Care of the Newborn Exposed to Substances during Pregnancy

Practice Resource for Health Care Providers

May 2024

Perinatal Services BC
Provincial Health Services Authority

Territory acknowledgement

We respectfully acknowledge that this document was developed at Perinatal Services BC on the unceded, traditional and ancestral territories of the Coast Salish People, specifically the xʷməθkʷəy̓əm (Musqueam), Sḵwx̱wú7mesh Úxwumixw (Squamish Nation) and səl̓ílwətaɬ (Tsleil-Waututh Nation) who have cared for and nurtured the lands and waters around us for all time. We give thanks for the opportunity to live, work and support care here.

Limitations of scope

Iatrogenic opioid withdrawal: Infants recovering from serious illness who received opioids and sedatives in the hospital may experience symptoms of withdrawal once the drug is discontinued or tapered too quickly. While these infants may benefit from the management strategies discussed in this module, the ESC Care Tool is intended for newborns with prenatal substance exposure.

Language

A note about gender and sexual orientation terminology: In this resource, the terms pregnant women/person and mother/birthing person are used. This is to acknowledge and be inclusive of transgender individuals who are pregnant, and to respect those who wish to continue to be identified as pregnant women or mothers. We encourage all providers to not assume the gender identity or sexual orientation of the pregnant person (or their partner) and to respectfully and non-judgmentally ask all pregnant people about their preference for how they wish to be addressed.

Suggested Citation: Perinatal Services BC. (May 2024).
Care of the Newborn Exposed to Substances During Pregnancy: Instruction Manual. Vancouver, BC.

This manual was designed in partnership by UBC Faculty of Medicine's Division of Continuing Professional Development (UBC CPD), Perinatal Services BC (PSBC), BC Women's Hospital & Health Centre (BCW) and Fraser Health. Content in this manual was derived from module 3: Care of the newborn exposed to substances during pregnancy in the online module series, Perinatal Substance Use, available from https://ubccpd.ca/course/perinatal-substance-use

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1. Introduction

1.1 Terminology:

Reviewing the literature on substance exposed newborns several terms and/or diagnoses are used such as:

- **Neonatal Abstinence Syndrome** [1, 2]
  Clinical diagnosis of neurologic, gastrointestinal, and musculoskeletal disturbances associated with withdrawal when substance source(s) are interrupted at birth. Withdrawal from opioids and other psychoactive substances.
  * This is the term that will be used in the manual.

- **Neonatal Opioid Withdrawal Syndrome** [1, 3]
  Clinical features specific to withdrawal from opioids.

- **Poor Neonatal Adaptation Syndrome** [4, 5]
  Clinical features specific to prenatal exposure to selective serotonin reuptake inhibitors (SSRIs) and serotonin norepinephrine reuptake inhibitors (SNRIs). Includes features observed in NAS and NOWS, but also characterized by respiratory distress syndrome (RDS). Also called SSRI neonatal behavioural syndrome (SNBS) but restricted to SSRI and SNRI.

- **Substance Exposed Newborn** [1, 7]
  Newborn exposed to substances during pregnancy that may cause symptoms of withdrawal postnatally.

1.2 Epidemiology:

The incidence of NAS doubled in B.C. and Canada between 2010 and 2020 (Figure 1).[8,9] Incidence rates in B.C. continued to rise between 2010 and 2023 but remained relatively stable between 2019 and 2023 (Figure 2).[9] Newborns diagnosed with NAS have longer and more costly length of stay in the hospital, especially when treated with morphine.[10–12] This has imposed an increasing economic burden on the B.C. health care system, with total NAS-related hospital expenditure in 2014 reported to be 1.7 times higher than in 2010.[10]

Figure 1: Annual incidence of Neonatal Abstinence Syndrome (NAS) in B.C. and Canada (2010–2020)

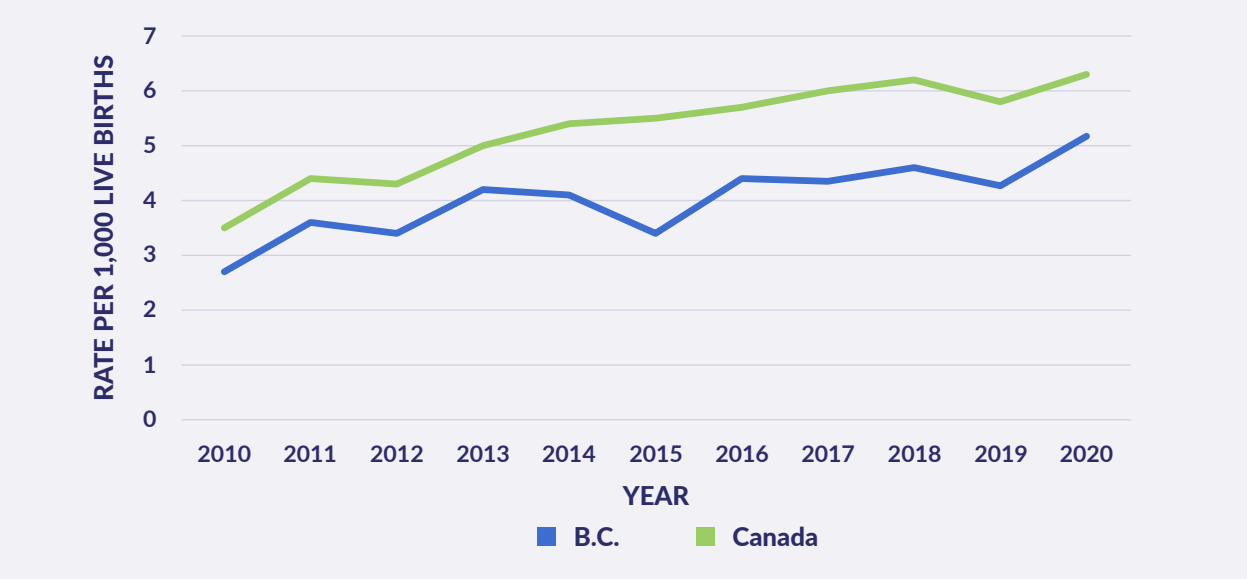
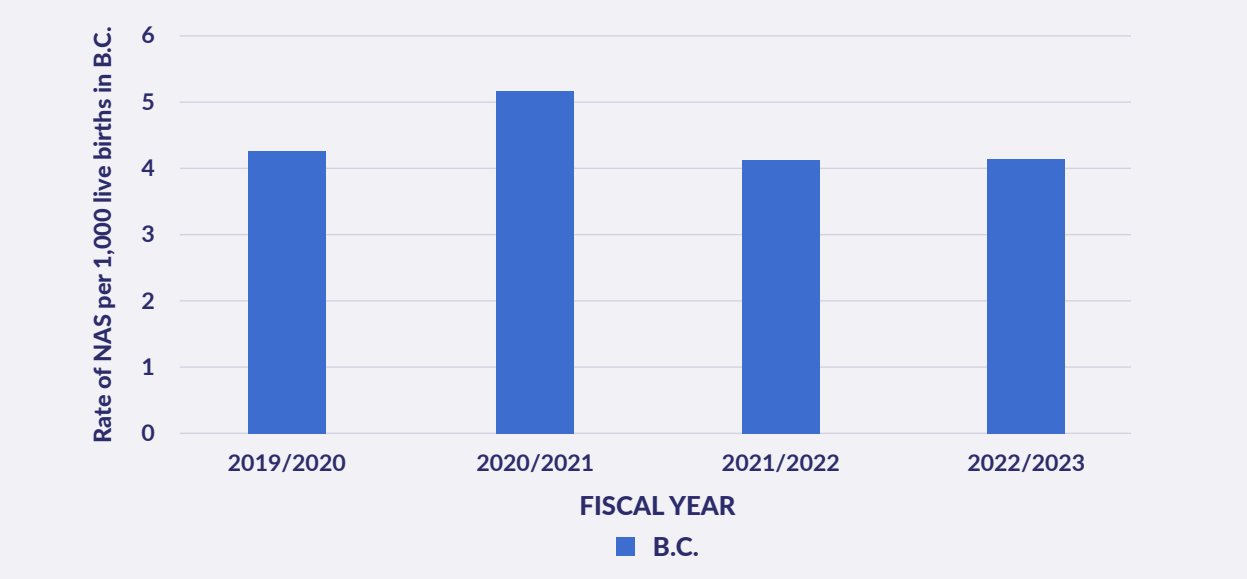


Figure 2: Annual incidence of infants diagnosed with Neonatal Abstinence Syndrome (NAS)



2. Newborn care guiding principles

2.1 Trauma Informed Age Appropriate Care (TIAAC)

The period following birth is a sensitive period and a critical phase in human development.[13] Trauma suffered during the first few years of life can lead to toxic stress and adversely influence normal development.

Toxic stress is defined as strong, prolonged, and/or frequent adverse experiences that activate the stress response in the newborn in the absence of protective relationships. Potential stressors include:

- maternal separation
- unresponsive and/or inconsistent care
- an overwhelming sensory environment[13–17]

Toxic stress can result in epigenetic modification in which changes occur in DNA transcription affecting the development of major organs, especially the heart, brain, and kidneys, with lifelong health consequences.[17–19]

Providing appropriate care for the newborn during periods of acute withdrawal should focus on **mitigating the effects of toxic stress**. This involves providing effective social emotional buffering by adhering to age appropriate, trauma-informed care principles. Social buffering confers protective effects against toxic stress.[17] Quality of parenting where the parent actively engages and responds to the needs of the newborn can have a profound positive influence on the effectiveness of social buffering during stressful situations.[19]

Examples of trauma informed age appropriate care include:

- keeping the mother and newborn together
- promoting newborn-centred care
- delivering responsive and consistent care
- managing pain and stress in a timely manner
- protecting sleep
- ensuring a healthy environment that allows for the regulation of sensory input
- adjusting activities of daily living such as feeding to meet age appropriate needs

How early experiences alter gene expression and shape development

1 Substance exposed newborn experiences toxic stress (e.g. maternal separation, unresponsive and/or inconsistent care)

2 Toxic stress causes epigenetic modification in DNA transcription

2.2 Newborn responsive and family-centered care

Newborn responsive and family-centered care[21–25] focuses on the newborn and family and:

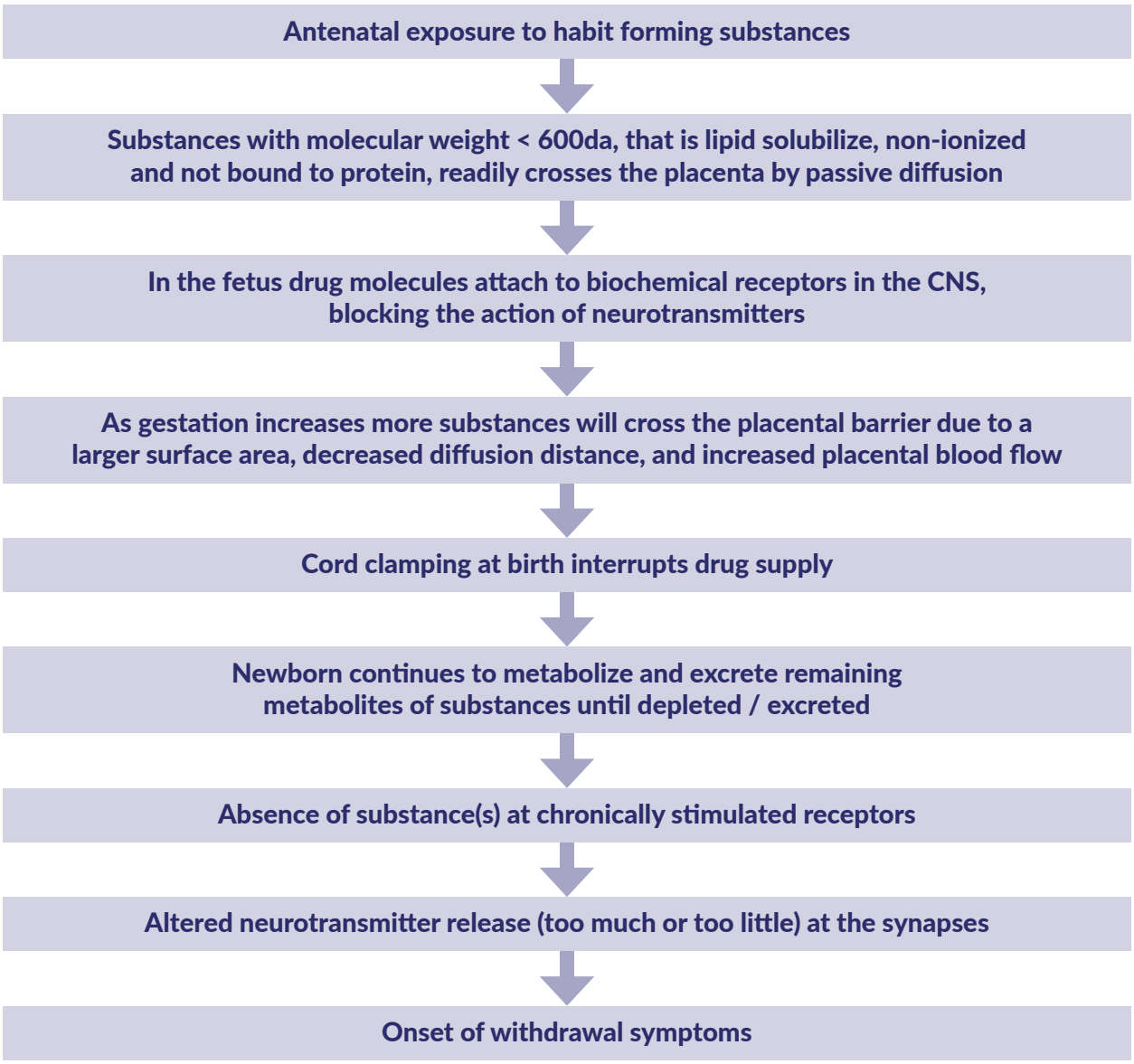
- is optimal, evidence-based, and applies to all care environments;
- enhances bonding and attachment and promotes healthy physical and emotional development of the newborn;
- requires collaboration between healthcare providers and the mother/parent/caregiver, recognizing that the mother/parent/caregiver plays an integral role in the care of the newborn;
- needs to be holistic, culturally appropriate, and delivered as close to home as possible;
- prioritize meeting the needs of the newborn and the family;
- empowers the mother/parent/caregiver through honest, consistent communication and support to build care capacity that will ensure ongoing competent care;
- promotes mother and newborn togetherness, skin-to-skin care, breastfeeding or chestfeeding (unless contraindicated), and maternal emotional support to manage the stress related to the symptoms of substance withdrawal in the newborn;
- promotes an appropriate care environment for the newborn exposed to substances that will allow for the control of light and noise as tolerated;
- is sleep protective. The newborn exposed to substances should not be awakened unnecessarily for assessments and/or procedures;
- decreases length of hospital stay;
- is neuroprotective;
- allows for better allocation of resources.

3. Clinical presentation of neonatal abstinence syndrome

3.1 Pathophysiology

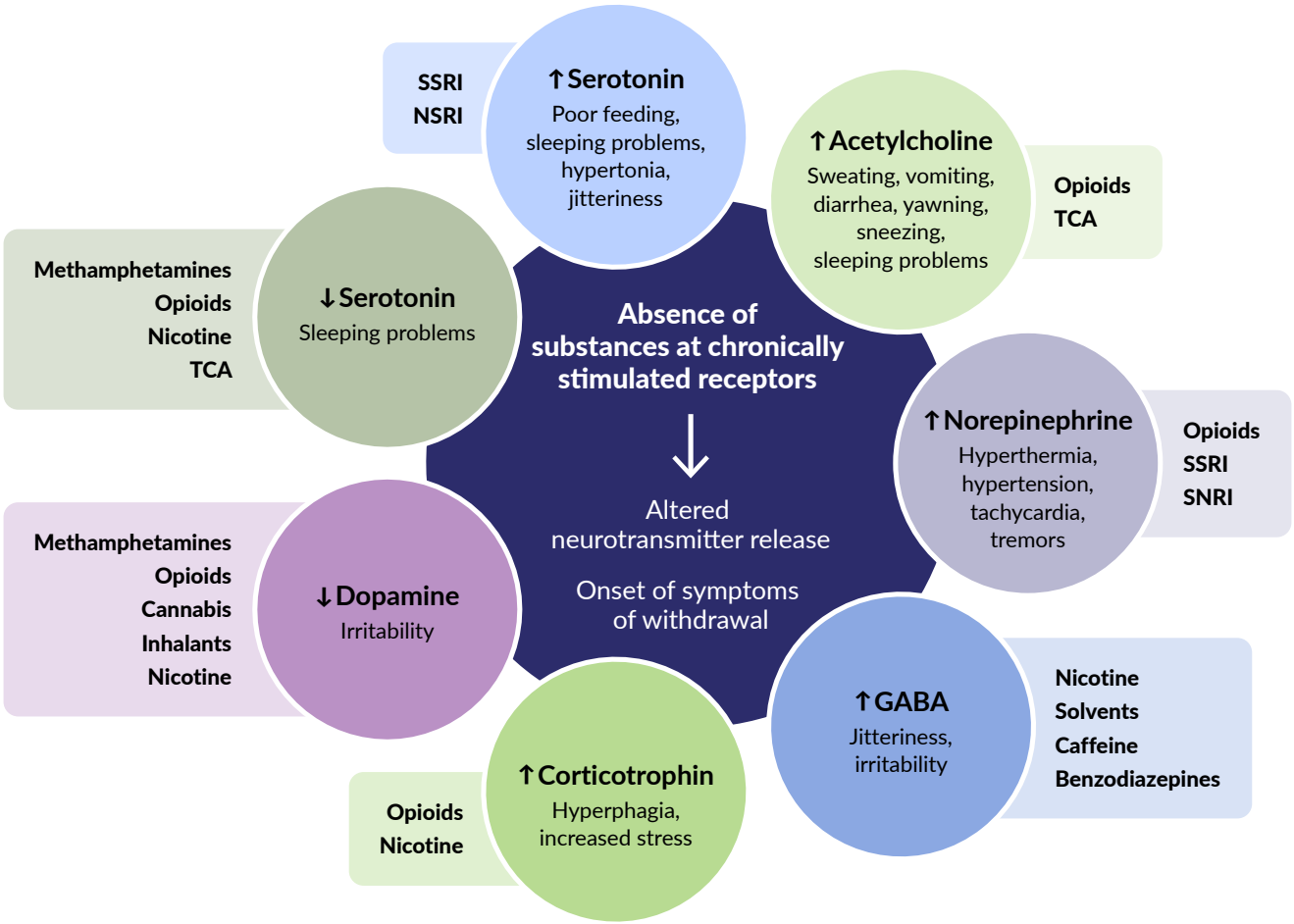
While the pathophysiology of NAS is unclear, exposure to psychotropic substances and abrupt discontinuation of these substances at birth alters neurotransmitter activity in the brain of the newborn.

Withdrawal symptoms may present similar to drug toxicity syndrome (effect of too much of the substance). However, symptoms of drug toxicity decrease as the drug is eliminated where symptoms of withdrawal increase due to the interruption of the drug supply. Prenatal exposure to substances such as cocaine and SSRIs can result in symptoms of withdrawal, drug toxicity, or a combination of both.[25–28]



3.2 Substance effects on neurotransmitters [30–32]

Clamping and cutting of the umbilical cord at birth interrupt the drug supply to the newborn. The newborn will continue to metabolize and excrete the remaining metabolites of the substances until depleted, and once depleted the absence of these substances alters neurotransmitter release resulting in signs of substance withdrawal. Presentation of withdrawal signs and symptoms will depend on the type of substance and the type of neurotransmitter that is affected.



TCA = Tricylic antidepressant

SSRI = Selective serotonin reuptake inhibitor

SNRI = Serotonin norepinephrine reuptake inhibitor

GABA = Gamma aminobutyric acid (naturally occurring amino acid that works as a neurotransmitter in the brain

For interactive content, please access module 3: Care of the newborn exposed to substances during pregnancy (lesson 3) via https://ubccpd.ca/course/perinatal-substance-use

3.3 Signs and symptoms

NAS consists of neurologic, gastrointestinal, and musculoskeletal disturbances associated with withdrawal once the source of the substance(s) is interrupted at birth. However, these disturbances are highly variable and there is currently no reliable way to predict the presence or severity of withdrawal symptoms.

SYSTEM	SIGNS AND SYMPTOMS
Central Nervous System	Irritability, high pitched cry, tremors, hypertonic, sleep disturbances
Gastrointestinal System	Loose stools, vomiting, dysrhythmic sucking and swallowing, poor intake with weight loss
Respiratory System	Excessive secretions, nasal stuffiness, tachypnea
Autonomic Nervous System	Sweating, sneezing, yawning, hyperthermia

Variation in Expression and Severity of Withdrawal Symptoms

The incidence, timing of onset, presentation, and severity of NAS varies significantly among the population of newborns exposed to substances.[12, 25, 33, 34]

Variation can be attributed to a variety of factors such as:

- type of maternal opioid replacement therapy[35, 37]
- maternal polysubstance use and patterns of substance use[38, 39]
- period of substance exposure and total accumulation of substance/s
- timing of last substance exposure and half-life of substance
- maternal and newborn metabolism and excretion[34]
- gestational age of the newborn exposed to substances. Newborns born prematurely (before 37 weeks gestation) reportedly present with less severe withdrawal symptoms and shorter periods of withdrawal. This may be due to CNS immaturity, receptor immaturity, lower fat deposits, shorter period of total drug exposure, decreased placental transmission due to smaller surface area and larger diffusion distance and different NAS symptomatology
- breastfeeding or chestfeeding
- assessment tool used to evaluate symptoms of withdrawal and treatment of these symptoms
- mother-baby togetherness practices
- engagement of non-pharmacological strategies
- pharmacological treatment regime
- genetics[34]

4. Assessment of the newborn exposed to substances

4.1 Prenatal history

Several features of maternal life experiences and physical health conditions can contribute to the likelihood of a newborn developing NAS.[25, 38–41]

- diagnosis of opioid use disorder (OUD) or substance use disorder (SUD)
- receiving treatment for mental health disorders
- on opioid agonist therapy (OAT)
- positive urine drug screen (UDS) during pregnancy
- history of sexually transmitted infections
- inconsistent prenatal care

4.2 Differential diagnosis

Consider alternative diagnoses if abnormal CNS symptoms are noted. Other serious neonatal conditions that may present with signs similar to NAS include:[42, 43]

SIGN	DIFFERENTIAL DIAGNOSIS
Irritability	• Gastroesophageal reflux • Pain/discomfort • Sepsis • CNS insult
Fever	• Sepsis • Hyperthyroidism
Feeding problems	• Oromotor dysfunction • Congenital anomalies (e.g., cleft palate, micrognathia, Pierre Robin sequence, genetic syndromes such as Prader Willi) • Polycythemia • Immaturity, including late preterm birth • CNS insult • Sepsis
Jitteriness	• See https://youtu.be/VxAtSA4bV7A • Hypoglycemia • Hypocalcemia • Immaturity • CNS insult
Seizures (rare in infants with NAS)	• Hypocalcemia • Hypoglycemia • CNS insult
Myoclonic jerking	• Not uncommon in opioid-exposed newborns and can be mistaken for seizure activity. See https://youtu.be/KU_V2qLH3Cw • Myoclonic jerks can be unilateral or bilateral, occur during sleep, and do not stop when the extremity or affected body part is held. Electroencephalograms are not indicated in newborns with myoclinic jerks.

Adjusted from Neonatal abstinence syndrome differential diagnosis. Table 3: Jansson L, Patrick S. Neonatal abstinence syndrome. Pediatr Clin N Am. 2019;66(2):353-367.

4.3 Comorbidities (HIV, HepB)

Not all newborns exposed to substances are at risk of HIV and Hepatitis B transmission. Review the maternal history to determine risk and need for prophylaxis.

Mother to child transmission of HIV can occur during pregnancy, at the time of delivery, or via breastmilk.[44, 45] For more information on screening for risk factors and management of the newborn visit the BC Women's Hospital and Health Centre HIV/AIDS Resource webpage at www.bcwomens.ca/health-professionals/professional-resources/oak-tree-clinic-resources

Mother to child transmission of Hepatitis B can occur during pregnancy.[46] Consult the BC Centre for Disease Control website at for most current information on screening the newborn at risk for Hepatitis B, prophylaxis indications and interventions.

4.4 Diagnostic testing for prenatal drug exposure

Although neonatal drug testing is often performed to inform treatment planning, the decision to screen a newborn can be stigmatizing.[47] Routine testing for suspected prenatal substance use is not advisable,[48] as it can adversely affect the therapeutic relationship between the mother and health providers and can affect child welfare services.[49] A positive screen does not necessarily indicate the need for child protection nor influence the type of support required. Informed consent must be obtained prior to testing. However, tests may still be ordered by the primary care provider in the absence of maternal consent if deemed medically necessary.

Issues with diagnostic testing for substance exposure

- Pharmacokinetics of drugs through the maternal-placental-fetal unit and in the newborn are not well understood.[47]
- Variation in specimen collection methods, storage, and transport of the specimen to the laboratory can influence test accuracy.[50, 51]
- Poor sensitivity and specificity may generate false positive or negative results.[52, 53]
- Local laboratories may lack the ability to further analyze positive screens required to inform clinical management, or the resources to process them in a timely manner.[54, 55]

Newborn drug testing information

SPECIMEN	EASE OF COLLECTION	WINDOW OF DETECTION	SENSITIVITY AND SPECIFICITY
Urine [47, 56, 57]	Can be difficult, collect in the immediate postpartum period	Exposure in last 48 hours prior to delivery	May detect postnatal drug exposure prior to collection of specimen.
Meconium [47, 56–59]	Can be difficult	Late second and third trimester exposure	Testing on meconium not supported in BC at this time. May detect postnatal drug exposure prior to collection of specimen. Also detects drugs administered during labour and delivery.
Hair [47, 54, 60, 61]	Easy	Third trimester exposure	Dependent on timing of collection. In BC, a moratorium was placed on hair strand testing in 2015 following independent review.
Cord Tissue [47, 57, 62, 63]	Easy	Third trimester exposure	Detects drugs administered during labour and delivery.
Cord Blood [47, 64, 65]	Easy	Last 24 hours prior to delivery	Detects drugs administered during labour and birth.

5. Assessment of withdrawal symptoms

5.1 Tools for assessment

Several neonatal withdrawal assessment tools have been developed over the years.[66] The Finnegan Neonatal Abstinence Scoring Tool (FNAST) is the most commonly used tool to assess the severity of withdrawal and inform clinical management.[67–71] However, with the increased understanding of neonatal substance withdrawal the usefulness of the FNSAT is being questioned.

Limitations of the FNSAT:

- Modified and unvalidated versions are often used due to its intimidating length and complexity[66, 72, 73]
- To minimize subjectivity and maximize inter-rater reliability, extensive and continuous training is required[73–76]
- Assessment of some criteria (e.g., Moro reflex) requires the newborn to be disturbed, which may artificially inflate scores
- Validated for use in full term newborns only[71]
- Likely to prompt earlier initiation and greater intensity of pharmacological management[47]

5.2 The Eat, Sleep and Console (ESC) Care Tool

In 2008, a quality improvement initiative was launched at Yale New Haven Children's Hospital, Connecticut, USA to improve inpatient outcomes for Neonatal Abstinence Syndrome.[77] The objective was to decrease the average length of hospital stay by 50% for newborns exposed to substances in utero. One of the key interventions of the Yale New Haven quality improvement project was the development and implementation of a novel assessment tool; the Eat, Sleep and Console (ESC) Care Tool.[77–79] This work was influenced by the innovative work done by Dr Ron Abrahams, Dr Paul Thiessen and Sarah Payne on Fir Square, BC Women's Hospital where mothers and newborns were kept together, and functional assessments and weight gain were used to assess withdrawal in the newborn.[80–82] The ESC Care Tool, developed in 2017, is a function-based assessment tool that assesses how the newborn eats, sleeps, and consoles.[83–85]

The ESC Care Tool was adapted by B.C. with permission from the developers of the original ESC Care Tool and:

- Is best practice evidence-based care.[85]
- Aligns with trauma informed, culturally safe care and newborn responsive care
- Promotes mother and baby togetherness
- Promotes the use of non-pharmacological strategies to support the newborn during the acute phase of substance withdrawal
- Allows for easy adoption and implementation across all care settings in B.C.
- Is an objective assessment tool with high inter-rater reliability.[83]
- Promotes standardized documentation and care.
- Is low cost, simple and achievable.[84]

Principles of the ESC approach

- Aims to support the newborn exposed to substances to achieve developmentally normal eating, sleeping, consoling, and weight gain milestones.
- Mother/caregiver is the primary provider of responsive, newborn-centered care and integral to managing NAS.
- Encourage the mother and health care professional to consider reasons other than withdrawal that may affect how the newborn is eating, sleeping, consoling, and/or gaining weight.

5.3 Recommendations

ESC Care Tool is developed to track the newborn's ESC behaviours and interventions over a 24-hour period:

- Initiate ESC assessments and non-pharmacological strategies within 4–6 hours of birth.
- Perform ESC assessment every 2–4 hours after feeding in collaboration with parent/caregiver.[83]
- Continue ESC assessments for minimum of 4–7 days for the newborn exposed to long-acting opioids such as methadone, and a minimum of 48 hours for shorter acting opioids (e.g., oxycodone, codeine).[83, 86, 87]
- For newborns that required pharmacological management, ESC assessments should continue for at least 24 hours after administration of the last dose of morphine.[88, 89]
- Gestational age at birth and actual postnatal age needs to be considered when assessing ESC behaviours. Some of these behaviours may be normal age appropriate behaviour such as cluster feeding and natural fluctuations in sleep-wake patterns.
- Assessments include all ESC behaviours that occurred since the newborn's last assessment as well as all non-pharmacological care interventions implemented. Incorporate input from all caregivers who interacted with the newborn during this period.
- Assess the newborn in their own room and do not remove them from their parent's (or other caregiver's) arms if being held. Document the ESC assessments and care recommendations on the ESC Care Tool or electronic medical record (EMR).
- Educate parents in the use of the Newborn Care Diary, including how to assess and document how well their newborn is eating, sleeping, and consoling. Explain to parents:
    - the objectives of the ESC Care Tool, its assessment items, and definitions
    - the indications for Bedside RN and Parent/Caregiver Huddle and Full Care Team Huddles
    - while it is recommended that parents use the Newborn Care Diary to keep track of their newborns' behaviours and for staff to incorporate these observations into their ESC assessments, it is their choice to use it or not as there are many other ways they can contribute to the care of their baby.

  It is important to remember than not all mothers are able to complete the newborn care diary for various reasons which may be related to their current health issues, substance use or withdrawal, or mental capacity. In this case nursing may choose to complete this tool through observation of the newborn and caregiver interactions, and by asking key questions to determine the ESC assessment.

6. Eat, Sleep, Console Care Tool

EATING, SLEEPING, CONSOLING (ESC) CARE TOOL

- Initiate a new ESC Care Tool record every day.
- Review ESC behaviors with parents/caregivers every 2 – 4 hours after feedings.
- If not clear whether the baby's poor eating, sleeping, or consoling is due to substance withdrawal, indicate **Yes** and continue to monitor closely while optimizing all non-pharmacological interventions.
- Numbers within this tool are NOT intended as a "score" but as a coding key
- Review definitions of items prior to performing assessment of ESC behavior (back page)

Date:		Birth Weight (grams):	Daily weight (grams):
Gestational Age:	Age in days:	Weight loss % since birth:	Gain↑/ Loss↓:
Corrected Gestational Age:		Weight loss more than 10%: YES/NO	

Time of assessment									
ESC ASSESSMENT **Y=Yes N=No**									
EAT:									
Poor eating? *(If Yes, answer next question; if No go to Sleep)*									
Poor eating due to substance withdrawal?									
SLEEP:									
Sleep less than one hour? *(If Yes, answer next question, if No go to Console)*									
Sleep less than one hour due to substance withdrawal?									
CONSOLE:									
Unable to console within 10 min (or cannot stay consoled for longer than 10 min)? *(If Yes, answer next question, if No go to Consoling Support Needed)*									
Unable to console within 10 min (or cannot stay consoled for longer than 10 minutes) due to substance withdrawal?									
Support needed to console: (Use # to code) 1. Able to self-console 2. Able to console (and stay consoled) with caregiver support within 10 min 3. Unable to console (or cannot stay consoled) with caregiver support within 10 min									
PARENT/CAREGIVER									
PARENT/CAREGIVER PRESENT FOR: **Use # to code**									
1. More than three hours 2. Two - three hours	3. One - two hours 4. Less than one hour	5. No parent/caregiver present							
WHO PROVIDED MOST OF INFANT CARE?									
1. Mother/Birth Parent 2. Partner	3. Family Member 4. Support Person	5. RN 6. Other (define):							
PLAN OF CARE **Y=Yes N=No**									
Recommend Bedside RN and Parent/Caregiver Huddle?									
Recommend Full Care Team Huddle?									
Management Considerations (Use # to code) 1.Continue/optimize non-pharm care	2. Medication treatment 3.Continue medication	4. Plan documented in narrative notes.							
NON-PHARMACOLOGICAL CARE INTERVENTIONS **S = Start intervention I = Increase intervention R = Reinforce intervention**									
Rooming – in									
Parent/caregiver presence									
Optimal feeding at early hunger cues									
Cue based newborn-centered care									
Skin-to-skin contact									
Baby held by parent/care giver									
Safe swaddling									
Quiet, low light environment									
Non-nutritive sucking/pacifier									
Rhythmic movement									
Additional help/support in room									
Parent/caregiver self-care and rest									
Other (Describe in Narrative Notes)									

Tool adapted with permission from Boston Medical, Yale-New Haven Children's Hospital and Children's Hospital at Dartmouth-Hitchcock

EATING, SLEEPING, CONSOLING (ESC) CARE TOOL

EAT, SLEEP, CONSOLE CARE TOOL DEFINITIONS	
WEIGHT LOSS	Weight loss based on **daily** weight assessment is calculated as more than 10% requires a full care team huddle
EATING	
Poor eating	Baby unable to coordinate feeding within 10 minutes of showing hunger cues **AND/OR** Baby unable to sustain feeding for age appropriate duration at breast OR Baby unable to take in age and weight appropriate volume by alternative feeding method
Poor eating due to substance withdrawal	Answer **YES**, if due to substance withdrawal symptoms (e.g. fussiness, tremors, uncoordinated suck, excessive rooting)
Poor eating due to reasons other than substance withdrawal	Do not answer Yes if poor eating is not due to substance withdrawal (e.g. prematurity, transitional sleepiness, excess mucus in first 24 hours, and inability to latch due to infant / maternal anatomical factors).
Not sure	If it is not clear if poor eating is due to substance withdrawal or not, answer Yes and continue to monitor.
SLEEPING	
Poor sleeping	Baby unable to sleep for at least one hour after feeding
Sleep less than 1 hour due to substance withdrawal	Answer **YES** if baby is unable to sleep for at least one hour after feeding due to substance withdrawal symptoms (e.g. fussiness, restlessness, increased startle, tremors).
Sleep less than 1 hour due to reasons other than substance withdrawal	Do not answer yes if sleep less than 1 hour is not due to substance withdrawal (e.g. physiologic cluster feeding in first few days of life, interruptions in sleep due to external noise, light and clinical care).
Not sure	If it is not clear if the baby's difficulties in sleeping is due to substance withdrawal or not, answer Yes and continue to monitor
CONSOLING	
Unable to console	Baby unable to console within 10 minutes and/or stay consoled for longer than 10 minutes
Unable to console due to substance withdrawal?	Answer **Yes** if baby unable to console due to substance withdrawal symptoms
Unable to console due to reasons other than substance withdrawal?	Do not answer yes if inconsolability is due to other factors (e.g. caregiver non-responsiveness to infant hunger cues, pain).
Not sure	If it is not clear if inconsolability is due to substance withdrawal or not, answer Yes and continue to monitor.
Consoling Support Needed:	
1. Able to self-console	Able to self-console without any caregiver support needed.
2. Able to console with support	Able to console with any level of caregiver/consoling support provided e.g. skin to skin, rocking, swaddling.
3. Unable to console	Unable to console with caregiver support within 10 minutes, or can't stay consoled for longer than 10 minutes.
PARENTAL/CAREGIVER	
Parental/Caregiver Presence	Time since last assessment that parent, or another caregiver, spent with baby. Caregiver can be parent, other family member, designated visitor, cuddler, or healthcare worker that can deliver cue-based care in a timely manner.
Who provided infant care	1. Mother/birth parent refers to the biological or adoptive/foster mother/parent. 2. Partner as identified by the mother/birth parent or foster/adoptive parent 3. Support person: family, friends, support workers not associated with hospital 4. RN: Registered Nurse 5. Other: Any person not included in previous categories including volunteer cuddler
PLAN OF CARE	
Bedside RN and Parent/ caregiver Huddle	Bedside RN and parent/caregiver meet if infant Score **Yes for any ESC item** to determine if non-pharmacological care interventions need to be implemented, or can be optimized further.
Full Care Team Huddle	Bedside RN, parent/caregiver and physician meet if infant has more than **10% weight loss and/or CONTINUED Yes for any ESC item,** (or any other significant concerns) despite optimal non-pharmacological care.
NON-PHARMACOLOGICAL CARE INTERVENTIONS	
Start	Initiate intervention for the first time
Increase	Need more discussion and/or teaching on intervention
Reinforce	Encourage caregiver to continue intervention

Tool adapted with permission from Boston Medical, Yale-New Haven Children's Hospital and Children's Hospital at Dartmouth-Hitchcock

7. How to use the ESC Care Tool

For interactive content, please access module 3: Care of the newborn exposed to substances during pregnancy (lesson 5) via ubccpd.ca/course/perinatal-substance-use

7.1 Date/age and weight

Date/age information

Document gestational age, corrected age, and actual age in days for each 24-hour period to accommodate for natural age-related changes in eating and sleep-wake pattern.

Weight

- Document birth weight, daily weight, and weight changes.
- Monitor excessive weight loss and slow weight gain due to higher energy requirements, poor feeding, loose stools, and vomiting.
- Weight loss more than 10% requires a full care team huddle regardless of ESC assessment.

7.2 ESC assessment

Eating

Assess eating behaviour. Poor eating is defined as follows:

- Newborn is unable to coordinate feeding within 10 minutes of showing hunger cues **and/or**
- Newborn is unable to sustain feeding for age appropriate duration at breast **or**
- Newborn is unable to take in age and weight appropriate volume by alternative feeding method

If the newborn is eating well answer **NO** and move to section that assess sleeping.

If the newborn is eating poorly answer **YES** and answer the next question to determine if poor eating is due to substance withdrawal or not.

- Substance withdrawal symptoms such as fussiness, tremors, uncoordinated suck, and excessive rooting can affect the newborn's ability to eat and gain weight effectively. If poor eating is due to symptoms of substance withdrawal answer **YES**.
- If poor eating is clearly due to reasons other than symptoms of withdrawal such as prematurity, transitional sleepiness, excess mucus in the first 24 hours, and
- inability to latch due to newborn / maternal anatomical factors, answer **NO**. Implement appropriate management strategies (e.g., NG feeds for preterm newborns), optimize non- pharmacological interventions, and monitor closely.
- If it is unclear whether substance withdrawal symptoms are responsible for poor eating, answer **YES** and continue to monitor closely as this may be an indication of escalating withdrawal symptoms.

If the newborn is eating poorly a Parent/caregiver–RN huddle is recommended to review optimal feeding recommendations with parent/caregiver. If eating has not improved on subsequent assessment, despite interventions, a full care team huddle is indicated.

Sleeping

Assess sleeping behaviour. If the newborn sleeps for more than one hour after feeding answer **NO** and move to the section that assesses consoling.

If the newborn is unable to sleep for at least one hour after feeding answer **YES** for poor sleeping and answer the next question to determine if poor sleeping is due to substance withdrawal or not.

- Substance withdrawal symptoms such as fussiness, restlessness, increased startle, and tremors can affect sleeping behaviour. If the newborn is unable to sleep for at least one hour after feeding due to substance withdrawal symptoms answer **YES**.
- If the newborn sleeps less than 1 hour due to reasons other than substance withdrawal such as physiologic cluster feeding in the first few days of life, interruptions in sleep due to external noise, ambient light, or clinical care answer **NO**.
- If it is unclear whether substance withdrawal symptoms are responsible for poor sleeping or not answer **YES** and continue to monitor.

A Parent/caregiver–RN huddle is recommended to review nonpharmacological strategies to promote sleeping. If, on subsequent assessment, newborn is still sleeping less than one hour after feeding due to symptoms of withdrawal, despite interventions, a full care team huddle is indicated.

Console

Assess consoling behaviour. If the newborn consoles easily within 10 minutes and remains consoled for longer than 10 minutes answer **NO** to indicated that the newborn does not experience any difficulty in consoling and move to the section that assess parental/caregiver presence.

If the newborn is unable to console within 10 minutes or unable to remain consoled for longer than 10 minutes answer **YES** for difficulty in consoling and answer the next question to determine if difficulty in consoling is due to substance withdrawal or not.

- Altered neurotransmitter release due to substance withdrawal increase agitation and difficulty in consoling. If the newborn is unable to console easily within 10 minutes and unable to remain consoled for longer than 10 minutes due to substance withdrawal symptoms answer **YES**.
- Answer **NO** if the newborn's inconsolability is clearly due to other factors such as caregiver non-responsiveness to newborn hunger cues.
- If it is unclear whether substance withdrawal symptoms are responsible for inconsolability or not answer **YES** and continue to monitor.

If the newborn has difficulty in consoling regardless of reason a Parent/caregiver–RN Huddle is recommended to review appropriate care interventions and Consoling Support Interventions. Monitor the newborn closely and continue to optimize non-pharmacological strategies. If newborn is still unable to console at subsequent assessment, despite effective implementation of all levels of consoling support, a full care team huddle is indicated.

Document consoling support needed using the numerical codes 1, 2 or 3:

1. Newborn is able to self-console
2. Newborn can console (and stay consoled) with caregiver support within 10 min
3. Newborn is unable to console with caregiver support within 10 min, or cannot stay consoled for 10 min

Please note the numbers are NOT intended as a "score" but to indicate an escalation of withdrawal symptoms and identify a need for increased intervention.

7.3 Parent/caregiver section

Parent/caregiver presence and involvement in the care of the newborn

- Document the time, since the last assessment, that the parent/s, or another caregiver, spent with the newborn.
- Caregiver can be a parent, other family member, designated visitor, cuddler, or healthcare worker that can deliver responsive care in a timely manner.
- Document the caregiver who provided the most care.

Numbers above are NOT intended as a "score" but used for ease of documentation and to identify parental/caregiver involvement in the care of the newborn. A Parent/caregiver–RN huddle is recommended if parent/caregiver is not spending enough time at the bedside, and/or not delivering newborn care in a responsive and timely manner. During the huddle the parent/ bedside RN will review options to assist the parent/caregiver to provide responsive and timely care.

7.4 Plan of care

Parent/caregiver and bedside RN huddle

- Parent/caregiver and Bedside RN should meet if the newborn receives a YES for any ESC item. During the huddle, the parent/caregiver and RN review and discuss starting or optimizing non-pharmacological care interventions to improve feeding, sleeping, and consoling behaviour.

Full care team huddle

Bedside meeting of the entire team (parents/caregiver, bedside RN, nurse leader if applicable, and provider) is indicated if the newborn:

- Has more than 10% weight loss
- Continued **YES** for any ESC items despite optimal non-pharmacological care
- Is unable to console despite effective implementation of all levels of consoling support
- Has any other significant concerns

The full care team will:

- Review non-pharmacological strategies and parental presence
    - If non-pharmacological care interventions are maximized to the fullest and the newborn continues to have poor eating, sleeping, or consoling behaviour (or other significant concerns are present) and symptoms are felt to be due to substance withdrawal, pharmacological management may be indicated.
- Continue to follow the newborn closely, optimizing all non-pharmacological interventions regardless of management decision.

Non-pharmacological care interventions

The ESC Care Tool promotes the use of non-pharmacological strategies to support the newborn during the acute phase of substance withdrawal. Use this section to indicate the use of these strategies using the following codes:

S = Start when the parent/caregiver starts the strategy for the first time

I = Increase when the parent/caregiver needs to increase use of this strategy

R = Reinforce when the parent/caregiver is using the strategy effectively

Note: *Document only interventions related to current assessment, you do not have to complete each non-pharmacological intervention field at every assessment.*

8. Non-pharmacological management

Withdrawal from substances after birth results in physiological and physical dysregulation. This may impact sensory stimulation integration, state regulation, motor and tone control, and the autonomic nervous system.[90] The objective of non-pharmacological care interventions are to provide the newborn with an environment that supports their ability to self-regulate.

Although these strategies are commonly used to comfort and support newborns, high quality research to determine their effectiveness is lacking. Despite the current shortcomings in research methodology, data suggests that non-pharmacological interventions may decrease the severity of withdrawal, the need for medical intervention, and duration of hospitalization.[34, 91]

8.1 Sensory stimulation integration

The following strategies may be helpful to support the newborn and prevent sensory overload during the active period of withdrawal:

- quiet environment[90, 92]
- room or care environment should be away from high-volume/noisy areas
- parents/caregivers should silence phones and keep conversations at bedside low.
- limit visitors to 1 or 2 at a time, and only to those that will be quiet and supportive
- low ambient light[90, 92, 94]
- cue–based care
- approach the bedside using a gentle voice prior to touching the newborn[95]
- slow, gentle handling[90, 95]
- hold newborn closely when transferring from one space to another to prevent startling[90]
- swaddling contains and prevents erratic movements and startling[90, 94]
- tactile stimulation should be gentle and firm; avoid stroking[79]
- apply gentle pressure over the newborn's head or body[90, 93]
- bringing arms/hands midline and positioning newborn in a fetal position[90, 95, 96]

Swaddling

In the newborn exposed to substances swaddling has been shown to:

- reduce crying, startles, and physiological stress [97, 98]
- improve sleep, motor organization and self-regulation [97, 98]

Safety

Combination of swaddling with prone position increases the risk of sudden infant death syndrome. Discontinue use of swaddling prior to discharge, as soon as withdrawal symptoms have resolved.
See https://www.caringforkids.cps.ca/handouts/swaddling

8.2 State regulation

Sleep-wake regulation is an indication of how effectively the newborn can regulate their internal processes and the influence of external stimulations. Full-term newborns will transition between quiet sleep, active sleep, drowsy, quiet awake, and crying.

The newborn exposed to substances may:

- have trouble regulating sleep-wake states
- spend more time in active sleep than in quiet sleep, resulting in sleep deprivation, disorganization, and/or fragmentation [90, 99]
- display state liability (move quickly from state to state)
- transition from sleep to crying with minimal cueing [100]
- stay longer in one state (excessive crying, wakefulness) [100]

Strategies that may be helpful to support the newborn with state regulation

- protect sleep-wake cycles, do not wake newborn up for routine care, allow for uninterrupted periods of rest/sleep
- cue-based responsive care; respond to newborn's stress cues and needs in a timely manner
- skin-to-skin contact [102]
- approach the bedside using a gentle voice prior to touching the newborn [95]
- slow, gentle handling [90, 95]
- determine and provide level of stimulation required to assist with transition from sleep to a quiet, alert state
- non-nutritive sucking [90]
- gentle vertical rocking
- soothing techniques

8.3 Skin-to-skin

Encourage skin-to-skin contact as much as possible to help calm the newborn, promote neurobehavioural organization, bonding and attachment, and increase breastmilk supply (if breastfeeding or chestfeeding). Skin-to-skin care is associated with improved sleep patterns,[101] a reduction in excessive crying and motor agitation associated with NAS, and a decreased need for pharmacological management.[102]

Parent/caregiver should sit in a comfortable chair and be fully awake and focused on the newborn. Distractions such as cell phones should be avoided. The newborn should be naked except for a diaper and placed directly on mother's/parent/caregiver's chest with a blanket placed over both for warmth. A wrap can also be used to secure the newborn.

Ensure newborn's:

- head is turned to one side
- head is in the sniffing position and neck straight to maintain airway
- face is visible
- nose and mouth are not covered by the blanket or wrap
- legs are flexed and is lying chest to chest with mother/parent

8.4 Vertical rocking

Vertical rocking has been shown to decrease neurological hyperactivity and promote self-regulation.[90, 103, 104]

The Hold[104]

- See https://youtu.be/j2C8MkY7Co8.
- Newborn can be swaddled. If not, fold newborn's arms snugly across their chest.
- Pick up newborn and hold in a vertical, flexed position.
- Gently but securely hold the newborn's bottom with the dominant hand.
- Maintain airway by supporting the newborn's chin with the other hand.
- Bring newborn's head a bit forward to position newborn at a 45-degree angle, as it will be easier to securely hold the newborn.
- Slowly and rhythmically rock the newborn up and down.

Rhythmic movement using swings, chairs or beds

- Swings or vibrating bouncy seats can also be used to provide rhythmical rocking.
- Adhere to manufacturer's safety recommendations and site-specific protocols when using.[106]

8.5 Motor and tone control

The newborn exposed to substances may display:

- abnormal tone, mostly increased tone
- exaggerated primitive reflexes
- tremors
- jitteriness
- uncoordinated movements
- feeding difficulties related to suck-swallow incoordination
    - incorrect positioning of tongue during feeding
    - poor latch
    - tendency to take in more than normal amount of air during feeding leading to GI discomfort

Strategies that may be helpful to support the newborn with motor and tone control

- gentle handling
- vertical rocking
- body position: simulate the fetal position (c-position) to improve tone regulation [88]
- swaddling [105]
- optimal feeding strategies
- non-nutritive sucking to modulate and decrease uncoordinated movements [88]
- skin care to prevent and/or manage excoriation and diaper dermatitis

8.6 Optimal feeding strategies

Feeding behaviours

The newborn exposed to substances may have impaired feeding behaviours such as:

- excessive suck
- incoordinate suck-swallow
- regurgitation
- hyperphagia [107]
- predominance of 'fussing' behaviours when bottle fed [109]
- short feeding episodes, often not completing the feed [109]
- abdominal discomfort associated with withdrawal
- dysmature pattern of swallow-breath interaction [110]

These feeding difficulties and the hypermetabolic state due to withdrawal may result in difficulties with weight gain.

Feeding

Mothers/parents are encouraged to breastfeed or chestfeed unless there is concern related to continued substance use or other medical contraindication present such as HIV.

- Despite the documented benefits of human milk, breastfeeding or chestfeeding rates are low in women/people with substance use disorder. [111–113]
- The risk-benefits of breastfeeding or chestfeeding should be carefully considered, and attempts should be made to minimize barriers and promote breastfeeding or chestfeeding.
- In the newborn exposed to substances, breastfeeding or chestfeeding is associated with:
  - delayed onset of withdrawal symptoms [95, 114]
  - decreased severity of withdrawal symptoms [81, 111, 114, 115]
  - decreased need for pharmacological management [13, 14, 114]
  - decreased length of pharmacological management [95, 111]
  - shorter length of hospital stay [9, 15, 16]

Strategies that may be helpful to support optimal feeding

- optimal feeding at early hunger cues without any limits placed in duration or volume of feeding
- small volume, frequent feeding
- non-nutritive sucking to calm newborn and coordinate the suck/swallow rhythm
- swaddle newborn to contain and reduce extension posturing
- consider intermittent gavage feeding to support weight gain

Breastfeeding or chestfeeding

- If newborn is breastfeeding or chestfeeding, ensure the newborn is latching deeply, with a comfortable latch for mother/parent, and with sustained active suckling with only brief pauses noted. If necessary, assist the mother/parent to achieve a more optimal latch/position.
- To organize suck prior to latching, use expressed human milk and have the newborn suck on an adult finger. Withhold pacifier use if possible.
- Consider fortifying human milk or supplementation with a high-calorie human milk substitute for poor weight gain.[17–19]

Bottle feeding

If newborn is bottle feeding:

- Reduce GI discomfort by using mother's expressed breast/chest milk, donor human milk or human milk substitute with a low osmolality.[116]
- Mimic breastfeeding or chestfeeding by letting newborn pause and rest periodically.
- Modify the bottle position and nipple flow rate if indicated.
- Provide chin support to assist newborn to effectively coordinate suck and swallow without gagging or excessive spitting up if indicated.
- Feed in elevated side lying position to:
  - allow for improved stomach emptying and reduce reflux
  - make it easier for the newborn to organize and control fluid in oral captivity to prepare for swallowing

8.7 Skin care

Newborns are at risk for skin injuries as adaptation to the extrauterine environment is still ongoing. The functionally immature epidermal barrier and acid-mantle increases the risk of chemical, microbial, or friction skin injuries.[118, 119]

Due to irritability, uncontrolled movements, and diarrhea related to withdrawal, the newborn exposed to substances is at risk for excoriations and diaper dermatitis.[120]

Types of skin injuries

- **Excoriation/abrasions**
  - Redness of the skin or broken/bleeding skin often found on the chin, ankles and face.

    Cause: Rubbing of an extremity or face on a linen covered surface/blankets due to excessive and uncontrolled movements of the extremities and/or head.

Strategies that may be helpful to prevent excoriations/abrasions:

- skin-to-skin care
- offer nonnutritive sucking at breast/chest or with pacifier, clean finger of parent/caregiver, health care provider gloved finger
- swaddle newborn in flexed position
- gentle rocking
- soft clothing and linens
- hand mitts

- **Diaper dermatitis**
  - Inflammatory reactions of the skin within the diaper area.

    Cause: Withdrawal leads to an increase of loose, watery stool. In an occlusive diaper environment, prolonged and excessive humidity causes the skin to macerate. The macerated skin in combination with the friction from diapers and wiping can lead to redness and skin breakdown.

Strategies that may be helpful to prevent diaper dermatitis

- human milk feeds whenever possible
- frequent diaper changes
- clean diaper area gently with:
  - wash cloth and water
  - If using commercial wipes ensure that wipes contain pH buffers to maintain slight acidity of the skin and are free of alcohol, fragrance, preservatives, and other skin irritants.
- air dry diaper area
- perform perineal assessment with each diaper change
- allow for time without wearing a diaper (use a cotton pad to protect the bed while the newborn is diaper free)
- use “superabsorbent diapers”
- apply thin layer of silicone cream to perineal area to moisturize and protect the skin from stool and urine with each diaper change

8.8 Autonomic Nervous System (ANS)

Newborns exposed to substances may display signs of ANS dysregulation:

- mottling of the skin
- tachypnea
- hiccups
- yawning
- sneezing
- spitting up
- frequent bowel movements, loose stools

Strategies that may be helpful to support the newborn with ANS dysregulation:

- observe signs of stress and modify interaction to prevent escalation of ANS dysregulation
- protect sleep
- gentle handling
- small, frequent feeds
- manage environmental stimulation
- gradually increase environmental and sensory stimulation depending on the newborn’s tolerance level

9. Pharmacological management

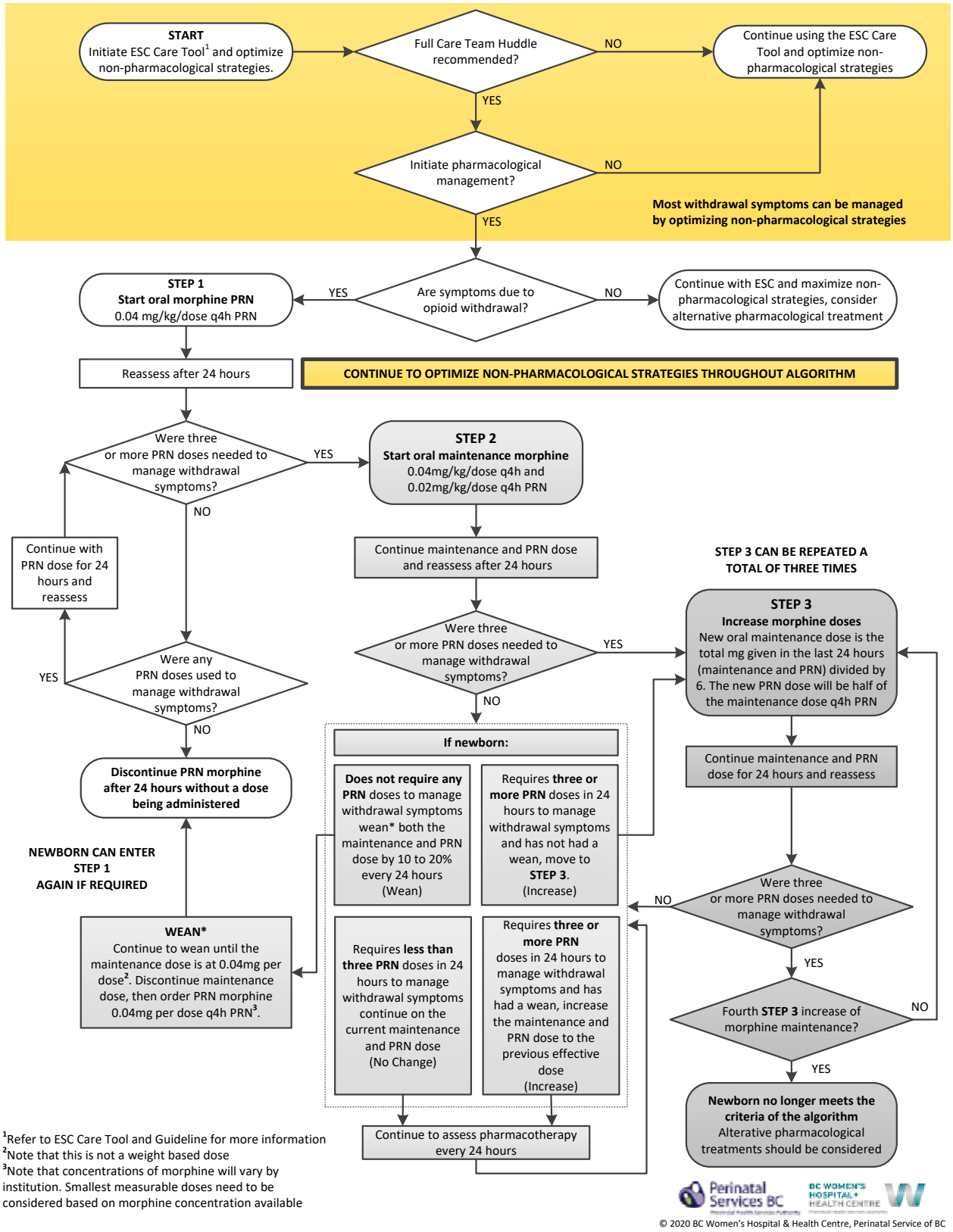
9.1 Current status

The current evidence as to when to initiate medication, treatment regimens, dosing, weaning protocols and use of adjunctive management is limited.[123–125] Evidence does show that a standardized pharmacological management protocol with clear weaning guidelines decreases the length of pharmacological intervention and hospital stay.[115, 123, 126, 127] While suboxone and methadone can be used to manage substance withdrawal symptoms in the newborn, morphine is the most commonly used drug to manage newborn opioid withdrawal.[12, 25, 127] Morphine is a full mu-opioid receptor agonist with well-established pharmacokinetic features and a short half-life.

General principles

- Rooming-in and implementing non-pharmacological strategies are paramount. Pharmacological intervention should be employed as an adjunct.
- Use ESC Care Tool to guide management.
- Minimize opiate replacement exposure in the newborn.
- The need for pharmacological management alone is not an indication for admission to the NICU. Transfer to the NICU only if there is a medical indication.

9.2 Treatment algorithm for the newborn exposed to substance(s) in pregnancy



[1]Refer to ESC Care Tool and Guideline for more information
[2]Note that this is not a weight based dose
[3]Note that concentrations of morphine will vary by institution. Smallest measurable doses need to be considered based on morphine concentration available

10. Appendix

Consoling support interventions that can be used when newborn is difficult to console

1 Talk softly and slowly to newborn, using voice to calm newborn.

2 Look for hand-to-mouth movements and facilitate by gently bringing newborn's hand to mouth.

3 Continue talking and place hand firmly but gently on newborn's abdomen.

4 Continue soft talking and bring newborn's arms and legs to the centre of body.

5 Pick up newborn, hold skin-to-skin or swaddled in blanket, and gently rock or sway.

6 If a fed newborn is showing hunger cues, offer a finger or pacifier after a feed for newborn to suck.

Based on the Brazelton Newborn Behaviour Scale

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Perinatal Services BC
Provincial Health Services Authority

Suggested Citation: Perinatal Services BC. (May 2024).
Care of the Newborn Exposed to Substances During Pregnancy: Instruction Manual. Vancouver, BC.

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