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Managing Newborns at Risk for Neonatal Abstinence Syndrome (NAS)/Neonatal Opioid Withdrawal Syndrome (NOWS): Updates and Emerging Best Practices

Developed by Lauren Wilkinson and Dr. Astrid Guttmann for PedsCases.com.
February 11th, 2026

Introduction:

Hi everyone, and welcome back to *PedsCases*! I'm Lauren Wilkinson, a second-year medical student at Queen's University, and today we'll be discussing the Canadian Paediatric Society's (CPS) updated statement on managing newborns at risk for neonatal abstinence syndrome (NAS) or neonatal opioid withdrawal syndrome (NOWS). This podcast was co-developed with Dr. Astrid Guttmann, a pediatrician at SickKids Hospital in Toronto, Ontario.

This is an increasingly important topic as the rates of prenatal opioid exposure and neonatal abstinence syndrome (NAS) have been rising across Canada. Currently, approximately 1 in 20 (5%) births are exposed to opioids prenatally, including opioid agonist therapy, and about 0.6% of newborns are diagnosed with neonatal abstinence syndrome (NAS).[1,2] Prenatal opioid exposure has been linked to health and developmental concerns and therefore present unique challenges for families and healthcare teams.

Before we start, I want to define what NAS and NOWS are. NAS (Neonatal Abstinence Syndrome) is the general term for a newborn developing withdrawal symptoms due to prenatal substance exposure. It's also the term hospitals use for coding diagnoses. NOWS (Neonatal Opioid Withdrawal Syndrome) is a term for a type of NAS specifically caused by prenatal exposure to opioid drugs, though it does not have its own diagnostic code. The terms are often used interchangeably since more than 98% of NAS cases are caused by prenatal exposure to opioids.[3]

Learning Objectives

Let's go over the learning objectives. By the end of this podcast, you should be able to:

1. Describe the epidemiology and health impacts of prenatal opioid exposure and NAS/NOWS.
2. Recognize the clinical presentation and risk factors for NAS/NOWS.

3. Understand the tools used to assess newborn withdrawal, including the shift towards the *Eat, Sleep, Console* model.
4. Apply best practices for non-pharmacologic and pharmacologic management.

Clinical Case

Let's start with a case.

You're a resident on the postpartum ward. A 27-year-old woman with opioid use disorder, currently on methadone, has just delivered a healthy term newborn, baby Georgia. Georgia is rooming-in with her parent.

At 36 hours of life, the nurse notices that Georgia is fussy, has a high-pitched cry, and isn't feeding well. Her parent is exhausted and concerned.

As the resident on call, you're asked to assess. What's going through your mind? How do you approach this case?

Keep Georgia in mind as we move through today's episode.

Objective 1: Epidemiology, Health Impacts, and Why This Matters

Let's start by describing the epidemiology and health impacts of prenatal opioid exposure and NAS/NOWS.

The incidence of NAS in Canada has nearly doubled over the past decade, from 3.5 to 6.3 per 1000 live births between 2010 and 2020, and cases are still likely underreported.[1] In First Nations communities in Ontario, rates of NAS in newborns are about 11 times higher than the general population,[4] as a result of higher rates of opioid use disorder in birthing parents. This is related to the ongoing effects of multi-generational trauma from harmful policies of colonization, stigma, and Indigenous-specific racism.[5]

Prenatal opioid exposure has been linked to adverse infant health outcomes and longer-term developmental outcomes. Short term outcomes include poor fetal growth, preterm birth, NAS, low birth weight, stillbirth, prolonged hospitalizations, and infant mortality. Studies have also found impacts on neurodevelopment, cognition, school performance, behavior, and vision; although evidence for direct long-term impacts remain limited given other inter-related social and environmental factors.[6–9] It is important to note that these impacts vary by the type of prenatal opioid exposure, and many studies do not differentiate between opioids used for pain, opioid agonist therapy or illicit opioids. Harm reduction policies, including maternal maintenance treatment with methadone and buprenorphine during the prenatal period, have been shown to reduce overdose mortality, unregulated substance use recurrence, preterm birth, and

improve birthweight.[10] Prenatal opioid exposure, and NAS specifically, also disrupt infant and parent bonding and cause high stress for families, in part related to fear of child welfare involvement even in cases where mothers are stable and being treated for opioid use disorder.

Objective 2: Clinical Presentation and Risk Factors

Let's move on to our second objective: Recognize the clinical presentation and risk factors for NAS/NOWS.

NAS and NOWS symptoms can involve multiple systems, including neurologic, gastrointestinal, respiratory, and musculoskeletal systems. Symptoms vary considerably depending on prenatal substance exposure type, dose, timing, gestational age at birth, and adult metabolism.[11]

A way to remember the clinical presentation is to use the acronym WITHDRAWALS.

W – Wakefulness
I – Irritability, tone, and moro reflex increased
T – Tremors, temperature instability or fever, tachypnea
H – Hyperactivity, high-pitched or excessive crying, hiccups, hypersensitivity to sounds, hyperreflexia
D - Diaphoresis, disorganized suck, diarrhea, disturbed sleep, disruptive feeding behaviours
R – Respiratory distress, runny nose, regurgitation, rub marks (excoriation), rejecting feeds
A – Apnea, autonomic dysfunction
W – Weight loss resulting in increased caloric demand
A – Alkalosis
L – Lethargy and lacrimation (eye-tearing)
S – Sneezing, seizures

The onset of NOWS/NAS depends on the opioid; however, it usually manifests within 24-72 hours after birth.[11]

Interestingly, preterm infants are at lower risk for NAS/NOWS than term infants and may have less severe symptoms. This may be because they are exposed to the opioids for a shorter period of time, because their kidneys and liver are immature and cannot fully metabolize the substances, minimal fat stores lead to lower opioid deposition, and their immature brains lack the capacity to express symptoms of NAS/NOWS .[11] Other risk factors for NAS development and severity include higher dose of opioids and vaginal delivery.[12]

Objective 3: Assessment Tools

Now that we know what symptoms to look for, let's move on to our third objective and talk about how to assess an infant that was exposed to substances prenatally.

Traditionally, the Finnegan score has been used. This tool assigns points based on a checklist of withdrawal symptoms. The first score is obtained 1-2 hours after delivery, and then every 3-4 hours thereafter. While this is still used widely, it does have some limitations, namely it is time-consuming and subjective.[11]

For these reasons, a new, evidence-based approach has emerged, called the Eat, Sleep, Console (ESC) model. It is a family-centred approach that focuses instead on function:

- Can the newborn eat adequately?
- Can they sleep for at least one hour?
- Can they be consoled within 10 minutes?

This new model has been shown to decrease the length of hospital stay and the need for pharmacological intervention. The CPS now recommends ESC as the preferred assessment method.

Regardless of the tool used, assessments should always be done during a natural wake cycle. Infants should not be distributed during sleep or feeds. Assessments should continue for a minimum of 72, and up to 120 hours after birth, depending on the type of exposure, and through the duration and discontinuation of pharmacological treatment, should the infant require it.[11]

Objective 4: Management

Non-Pharmacologic Care

Finally, let's talk about management.

If an infant exposed to substances develops NAS or NOWS, the first step is always non-pharmacologic management.[11,13] Many symptoms of NAS cause overstimulation, and therefore non-pharmacological interventions often focus on maximizing infant comfort. This can include lower lighting, swaddling, rooming-in, skin-to-skin care, newborn-led care, gentle waking, and a quiet environment. Direct breast and expressed human milk should also be encouraged. This can delay NAS/NOWS symptom onset and reduce need for pharmacological intervention. Birthing parents who are on opioid agonist therapy, HIV-negative, and not consuming unregulated substances should be encouraged and supported in breastfeeding. If newborns are not gaining weight due to NAS symptoms such as disrupted feeding, supplementation may be necessary.[11,13]

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These strategies not only improve outcomes but also build parental confidence and attachment. A Canadian study in Kingston, Ontario found that the proportion of infants requiring pharmacological treatment decreased from 15% in the first year to 3.5% when rooming-in was implemented as part of the care plan for opioid-dependant infants, and length of hospital stay also decreased.[14]

Pharmacologic Care

Even with non-pharmacological care, about 50-80% of infants with NAS/NOWS will still require pharmacological intervention.[11]

Pharmacologic treatment is reserved for infants who cannot eat, sleep, or be consoled despite non-pharmacological care. Whenever possible, the mother-infant dyad should be admitted together, and if separation occurs, a newborn should be transitioned back to rooming-in as soon as medically possible.

First-line treatment for NAS/NOWS remain morphine and methadone. Both are considered safe and effective, although a few studies have reported shorter hospital length of stay with methadone compared to morphine.

Non-opioid sedatives, phenobarbital or clonidine, can be added as adjunct agents in refractory cases when symptoms are not controlled with first-line pharmacological intervention. Phenobarbital may be preferred in cases of polysubstance exposure, although the evidence is limited.

It is important to remember that naloxone should never be administered to a newborn with NAS/NOWS. This can cause severe withdrawal, including seizure development.[11]

Discharge Planning

Let's finish by talking about discharge planning. Observation should continue for at least 72 hours after short-acting opioid exposure, and up to 120 hours after long-acting opioids, if pharmacological treatment was not required. After this, the newborn is eligible for discharge. If pharmacological treatment was required, infants must be observed through treatment and discontinuation. This is usually done in-hospital, but with appropriate supports, an in-community weaning approach may be used. Interestingly, a Canadian observational study found that infants weaned in the community actually spent fewer days in hospital and were less likely to return for further withdrawal treatment, although they remained on morphine for a longer duration overall. Therefore, in-community weaning may be preferable in some cases.

Discharge planning must include a clear follow-up plan with a primary care physician who is familiar with the management of NAS/NOWS, linkage with community supports

and culturally appropriate services, and infant neurodevelopment assessments including regular eye exams.

Case Resolution

Let's return to baby Georgia.

You assess her using the ESC model. She is fussy during feeds, she only sleeps for 30 minutes at a time, and she is crying excessively. What are your next steps?

You start by optimizing non-pharmacological interventions. She is already rooming-in with her parent, and you encourage frequent skin-to-skin contact and safe swaddling. You talk to Georgia's parent about keeping the room dim and quiet and about the benefits of breastfeeding. You also have a lactation consultant come assist Georgia's parent with latching.

Despite optimizing supportive care, Georgia's symptoms persist. She still struggles to eat and can't sleep for more than an hour at a time. She has limited intake and low urine output and is losing more weight than expected. Her parent is very worried. After discussion with your team, you initiate methadone, while keeping Georgia with her parent. Her symptoms gradually improve.

Before discharge, you make a coordinated plan with Georgia's primary care provider and her parent. You talk to her primary care provider about follow-up care for NAS/NOWS and the need for neurodevelopmental assessments including eye exams at follow-up appointments. You also go through the necessary follow-up care with Georgia's parent, and connect her to community supports, including early years programs, infant development programs, and parent support groups[11].

Great work navigating that case! Before we finish, let's review some key takeaways

1. The incidence rates of NAS/NOWS have increased in Canada, with the majority of cases linked to prenatal opioid exposure.
2. Symptoms vary widely. Common signs include tremors, seizures, high-pitched crying, difficulty sleeping, and fever. The onset and severity depend on the exposure type, duration, and timing.
3. The Eat, Sleep, Console (ESC) approach is now the recommended assessment tool.
4. Non-pharmacologic care, particularly rooming-in, skin-to-skin care, and breastfeeding, are first-line for management for NAS/NOWS.
5. Pharmacologic treatment is indicated for infants with persistent symptoms despite supportive care. First-line agents are morphine or methadone, with adjuncts for refractory cases.

6. Management should be trauma-informed and culturally safe, and coordinated discharge planning should include follow-up, neurodevelopmental surveillance, and linkage to community supports

Outro

That brings us to the end of today's podcast on NAS and NOWS. This episode was based on the 2025 Canadian Paediatric Society position statement titled "Managing newborns at risk for neonatal abstinence syndrome (NAS)/neonatal opioid withdrawal syndrome (NOWS): Updates and emerging best practices".

I'm Lauren Wilkinson, and this is *PedsCases*. Thanks for listening!

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