# Neonatal Abstinence Syndrome: Information for the Primary Care Provider and Guidelines for Referral

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## The Growing Problem of Neonatal Abstinence Syndrome

Neonatal Abstinence Syndrome (NAS) is a drug withdrawal syndrome that occurs in infants who were exposed to prescription or illicit drugs in utero. These drugs include heroin, prescription opiates, buprenorphine, morphine, cocaine, methamphetamine and anxiolytics. NAS affects infants of all ethnicities and socioeconomic statuses.

The syndrome has been a problem for as long as these drugs have existed, but it has become a growing concern in recent years. The incidence of NAS tripled in the United States between 2000 and 2009, then increased again between 2009 and 2012 from 3.4 to 5.8 per 1,000 live births. In Ohio alone, the incidence increased from 2 per 1,000 births in 2006 to 15.5 per 1,000 births in 2015.

While these infants receive specialty care in the hospital, primary care providers play a key role in identifying ongoing concerns once they leave the neonatal intensive care unit (NICU).

## Presentation and Outcomes

Early symptoms are transient and may include inconsolable crying, tremors, hypertonia, diarrhea, sneezing, diaper rash, temperature instability, mottling and (less frequently) seizures. Infants with NAS are more likely to have low birth weight, exposure to poor prenatal care and later feeding difficulties.

The long-term neurodevelopmental impact of NAS remains uncertain; current literature suggests higher risks of communication and behavioral problems for babies with NAS well into adolescence. For these reasons, it is essential that these children are followed in their transition period after discharge from the NICU. They may also need services through a standardized developmental follow-up program.

### Key Reasons for Referral to a Specialized NAS Clinic

- **Phenobarbital weaning**
- **Neurodevelopmental concerns**
  - > Language delays
  - > Motor delays
  - > Atypical behaviors
  - > Difficulties interacting with caregivers
  - > Sensory sensitivity in the home environment

## The Nationwide Children's NAS Clinic

NAS patients who are discharged from a Nationwide Children's-affiliated NICU are seen within the following two weeks in the Nationwide Children's NAS Clinic. The initial appointment includes a thorough social assessment, explanation of care coordination and a discussion of developmental risks.

The clinic also works to carefully wean babies who have been treated with pharmacological methods in the hospital and were discharged home still on neuro-active medications. These infants often experience lasting withdrawal symptoms that can complicate their relationships with caregivers. They can be irritable, difficult to console, often act hungry and have difficulty sleeping, and this behavior can be exacerbated by a suboptimal home environment.

Of note, patients who are discharged on phenobarbital need to be weaned using a standardized protocol. The following protocol is an example of one that has been successfully utilized in the Nationwide Children's NAS Clinic, but there are no evidence-based protocols for phenobarbital weaning in the outpatient setting for patients diagnosed with NAS.

### Phenobarbital Weaning Protocol for Outpatient Infants with NAS

**If > 5mg/kg dosing twice per day then change to 5mg/kg at night and have patients return in 2-4 weeks for remainder of wean.**
**If ≤ 5mg/kg once per day or at night, follow these steps:**

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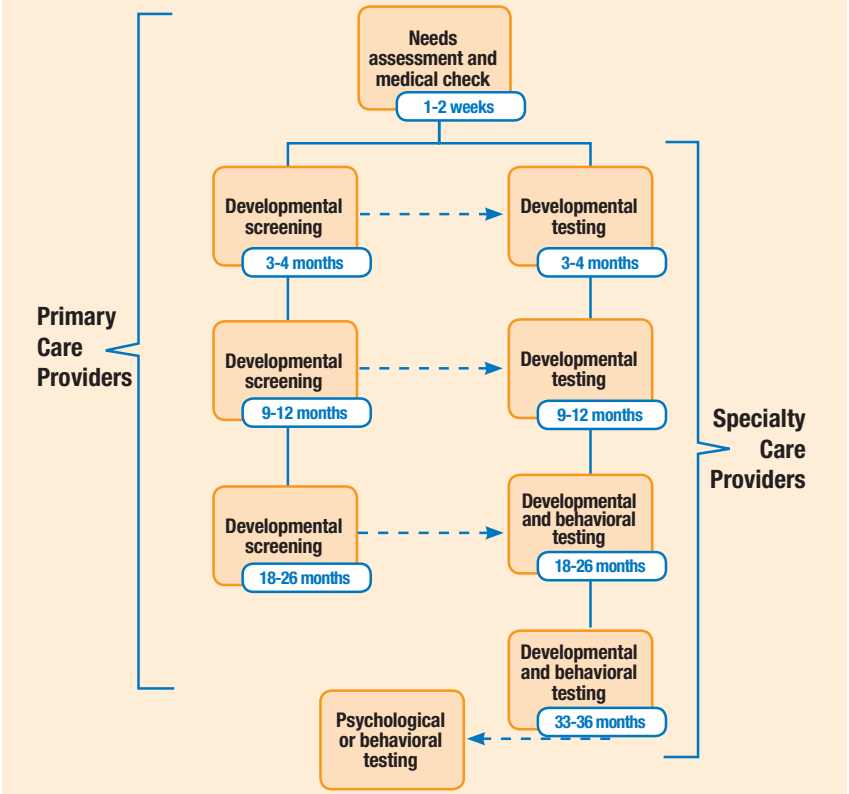
|---|---|
| 1. | If symptomatic with excessive neurologic symptoms (irritability, jitteriness/tremors, shrill cry and inability to calm interrupting sleep) then continue same dosing to outgrow without weight adjustment and return in 2-4 weeks. Sneezing, yawning and liquid stools are not reasons to stop wean. |
| 2. | If asymptomatic, start to wean with a reduction of 25-30% per week for 2-4 weeks with convenient home dosing. (i.e. 4ml x 7 days, 3ml x 7days, 2ml x 7days, 1ml x 7 days.) |
| 3. | If increased symptoms occur during wean, have caregivers go back to the previous week's dose and call for further instruction. Have patient return for follow-up medication check and assessment. |
| 4. | After follow-up, attempt again to decrease dose by 25-30% per week over 3-4 weeks. |
| 5. | Provider can use individual judgement and assessment to shorten or prolong wean. An infant no longer sleeping as well or no longer sleeping through the night are NOT reasons to stop the wean. |

## Transition From the NAS Clinic to Early Developmental Follow-up

### The Timing of Screenings and Tests for Patients With NAS




Patients will be scheduled for an appointment in the Early Developmental Follow-up Clinic at Nationwide Children's if they demonstrate hypertonia outside of what is typically seen in this patient population, were exposed to barbiturates in utero or have any other developmental concerns. This appointment, at 3 to 4 months of age, includes a standardized neurological examination and a Test of Infant Motor Performance. The visits can take 60 to 90 minutes and involve a multidisciplinary team, including a medical provider, nurse, therapist and social worker.

A primary pediatric provider concerned about an infant's development can make a referral to the Early Developmental Follow-up Clinic at any point. The infant will enter the developmental follow-up pathway and stay until reaching the age of 3.

The Early Developmental Follow-up Clinic does not provide primary care and relies on the pediatric provider to remain the sole medical home for his or her patients. Even if there are no developmental concerns after referral, the patient will still be seen in the clinic at 22-26 months of age and at 30-36 months for a full neurological exam and standardized assessment of cognition, expressive/receptive language and fine/gross motor skills on the Bayley Scales of Infant and Toddler Development. The clinic can easily make necessary referrals to Nationwide Children's behavioral health providers who will follow and treat problems into childhood and adolescence.

References:
Kocherlakota P. Neonatal abstinence syndrome. *Pediatrics*. 2014 Aug; 134(2): e547-61.
Finnegan LP, Connaughton JF Jr, Kron RE, Emich JP. Neonatal abstinence syndrome: assessment and management. *Addictive Diseases*. 1975; 2(1-2): 141-58.
Tolia VN, Patrick SW, Bennett MM, Murthy K, Sousa J, Smith PB, Clark RH, Spitzer AR. Increasing incidence of the neonatal abstinence syndrome in U.S. neonatal ICUs. *New England Journal of Medicine*. 2015 May 28; 372(22): 2118-26.
Patrick SW, Davis MM, Lehmann CU, Cooper WO. Increasing incidence and geographic distribution of neonatal abstinence syndrome: United States 2009 to 2012. *Journal of Perinatology*. 2015 Aug; 35(8): 650-5.
The Ohio Department of Health. Neonatal Abstinence in Ohio: 2006-2015 Report.

## Referrals and Consultations

Online: **NationwideChildrens.org/Neonatology**
Phone: **(614) 722-6200** or **(877) 722-6220** | Fax: **(614) 722-4000**
Physician Direct Connect Line for 24-hour urgent physician consultations:
**(614) 355-0221** or **(877) 355-0221**.

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