

NAS · Neonatal Abstinence Syndrome

NAS means the baby was exposed to opioids before birth, built dependence, and now withdraws. Score symptoms with the Finnegan scale and treat with morphine or methadone if the score is high.

THE ONE-LINE TRUTH

A newborn whose mother took opioids during pregnancy can get very sick after birth because the baby's body became used to the drug and now has to adjust without it.

The chain — how it unfolds

1. During pregnancy, the mother's opioid use delivers a steady supply of drug across the placenta into the baby's bloodstream and brain. — why: Opioids are small molecules that easily cross the placenta. The baby's developing brain is constantly bathed in the drug, and over time the brain's opioid receptors (especially mu receptors in the brainstem, limbic system, and spinal cord) become flooded and overstimulated.
2. The baby's brain adapts by increasing the number of opioid receptors and decreasing its own production of endorphins (the body's natural opioid-like chemicals). — why: The brain tries to restore balance when it senses too much opioid signal. More receptors mean the existing opioid is spread across more sites, and less endorphin production reduces the total 'opioid-like' activity. This neuroadaptation is the brain's attempt to reach a new normal—but it creates physical dependence.
3. At birth, the umbilical cord is clamped and cut. The opioid supply stops instantly. The baby's brain, now tuned to expect constant opioid, suddenly has none. — why: There is no gradual taper. The baby goes from a high, steady dose to zero in seconds. The opioid receptors that were occupied and quiet are now empty and screaming for stimulation. The systems that were suppressed by opioid—especially the locus coeruleus in the brainstem—are suddenly unleashed.
4. The locus coeruleus, no longer held in check by opioid, fires rapidly and releases a flood of norepinephrine throughout the brain and body. — why: Opioids normally inhibit the locus coeruleus, keeping norepinephrine release low and the baby calm. Without that brake, the locus coeruleus becomes hyperactive. Norepinephrine is the body's main 'alarm' chemical—it raises heart rate, increases alertness, tenses muscles, speeds breathing, and revs up the gut. This surge is what drives most withdrawal symptoms.

5. The baby begins to tremble (fine tremors of the hands and feet, sometimes the whole body), cry with a high-pitched, piercing sound, and become extremely irritable and hard to soothe. — why: The excess norepinephrine and lack of opioid-mediated calming make the nervous system hyperexcitable. Muscles contract too easily (causing tremor and stiffness), and the baby's brainstem and limbic system are stuck in a high-stress state (causing the inconsolable cry and irritability). The baby's sensory threshold is lowered—normal sounds, light, and touch feel overwhelming.
6. Feeding becomes very difficult. The baby has a disorganized suck, frequent gagging or vomiting, and diarrhea. Weight drops quickly. — why: The autonomic nervous system controls the gut. With the sympathetic side in overdrive and the parasympathetic side suppressed, the normal rhythmic contractions of the stomach and intestines (peristalsis) become chaotic. The baby cannot coordinate sucking, swallowing, and breathing smoothly. Vomiting and diarrhea occur because the gut is moving too fast and cannot absorb water or nutrients properly. The baby burns extra calories from constant trembling and crying but takes in far less milk than needed.
7. The baby sweats excessively, sneezes repeatedly, yawns frequently, and has a stuffy or runny nose. — why: These are all autonomic symptoms. The sympathetic surge raises body temperature and activates sweat glands (causing sweating). The nasal mucosa (the lining inside the nose) becomes congested because blood vessels dilate and secrete more mucus. Sneezing and yawning are reflexes triggered by irritation in the nasal passages and changes in arousal state—both are exaggerated when the nervous system is hyperactive.
8. The baby cannot sleep well. Sleep is fragmented—the baby may fall asleep for a few minutes but wakes frequently, startles easily, and never reaches deep, restful sleep. — why: Sleep requires the brain to shift into a calm, low-arousal state. The flood of norepinephrine and lack of opioid-mediated inhibition prevent this shift. The baby's brainstem cannot quiet down enough to allow normal sleep cycles. Exhaustion builds, but the nervous system remains too revved up to rest.

Spot it — what you see, and why

- High-pitched, hard-to-stop crying: When opioids leave the baby's system after birth, the nerves that were calmed by the drug suddenly fire faster. The brain's arousal center (the locus coeruleus) releases too much norepinephrine, a messenger that revs up the nervous system, so the baby becomes jumpy and cries in a sharp, piercing way that's very hard to soothe.
- Tremors or shaking: Without the opioid blocking signals, the baby's motor nerves fire too often. Muscles get extra signals to tighten and relax, causing visible shakes in the hands, arms, or legs—even when the baby isn't upset.

- Poor feeding or trouble latching: The baby's mouth and throat muscles are jittery and uncoordinated. The sucking reflex is there, but the brain signals are too scattered to organize a smooth suck-swallow rhythm, so the baby takes less milk and loses or doesn't gain weight.
- Trouble sleeping—wakes often, sleeps very little: The baby's arousal system stays on high alert because norepinephrine and other stress messengers are flooding the brain. This keeps the baby in a light, restless state instead of the deep sleep newborns usually need.
- Fast breathing (more than 60 breaths per minute) or stuffed-up nose: The autonomic nervous system—the part that runs breathing, heart rate, and digestion on autopilot—is out of balance. Blood vessels in the nose swell, making it stuffy, and the breathing center in the brainstem fires faster than normal.
- Sweating, sneezing, or yawning: When opioids leave, the autonomic nervous system overshoots. Sweat glands turn on too much, the nose becomes extra sensitive and sneezes, and the brain's oxygen sensors trigger yawns—all signs the body is trying to reset but can't find its balance yet.

Red flags — act now

- Seizures—rhythmic jerking, blank staring, or whole-body stiffness that won't stop
- Weight loss more than 10% of birth weight or baby refusing to eat at all
- Very fast breathing (over 80 breaths per minute) or grunting with each breath
- Severe dehydration—dry mouth, no tears, no wet diaper for 8 hours or longer
- Fever above 100.4°F (38°C) with no clear infection

Treat it — in this order

1. Ask the mother directly about opioid use (prescription pills, heroin, methadone, buprenorphine) during pregnancy and review her medical and pharmacy records → Confirms the root cause — opioid exposure — so you know what you are treating and can predict when withdrawal will start (usually 24-72 hours after birth for short-acting opioids, longer for methadone). This also guides testing and scoring.
2. Use rooming-in (keep baby with mom), skin-to-skin contact, swaddling, low lights and noise, and breastfeeding (if mom is not using illicit drugs or is stable on buprenorphine or methadone) to calm the nervous system → Lowers the baby's stress signals and overstimulation, which quiets the shaking, crying, and poor sleep because the baby's body feels safer and more regulated. These non-drug measures can prevent mild NAS from needing medicine at all.

3. Score withdrawal severity using the Finnegan Neonatal Abstinence Scoring Tool or Eat-Sleep-Console (ESC) scale every 3 to 4 hours to decide if medicine is needed → Gives you an objective, number-based measure of how bad the withdrawal is, so you know whether the baby's body can handle it with comfort care alone or truly needs drug treatment. This prevents both over-treating mild cases and under-treating dangerous ones.
4. Give morphine solution (0.02-0.1 mg/kg every 3-4 hours) or methadone (0.05-0.1 mg/kg every 12-24 hours) by mouth if Finnegan score is ≥ 8 twice or ≥ 12 once, or if ESC fails; start low and increase slowly until symptoms improve → Replaces the opioid the baby's nervous system depended on before birth, which stops the cascade of shaking, sweating, poor feeding, diarrhea, and seizures by calming the overstimulated nerves and bringing the brain back into balance.
5. Taper the opioid medicine slowly over days to weeks (usually reduce dose by 10-20% per day) while watching the baby's score for return of symptoms; do not stop suddenly → Lets the baby's brain and nervous system gradually re-learn to work without the opioid on board, so withdrawal does not roar back when you stop the medicine. A slow taper prevents the baby from crashing back into severe symptoms.

Your top priorities at the bedside

1. Score withdrawal symptoms using Finnegan or ESC scale every 3-4 hours and document trends — why: Objective scoring detects worsening withdrawal before crisis happens; serial scores guide when to start or adjust morphine or methadone dosing per protocol
2. Keep baby in room with mother (rooming-in) and encourage skin-to-skin contact at least 2 hours daily — why: Maternal contact stabilizes the autonomic nervous system (automatic body controls like heart rate and breathing) and decreases stress hormone release, reducing withdrawal severity by 30-50% in studies
3. Swaddle tightly, dim lights, reduce noise, and cluster care to minimize handling — why: Overstimulation (too much light, sound, or touch) worsens CNS hyperexcitability (overactive nervous system), increasing tremors, irritability, and high-pitched cry; calm environment lowers scores