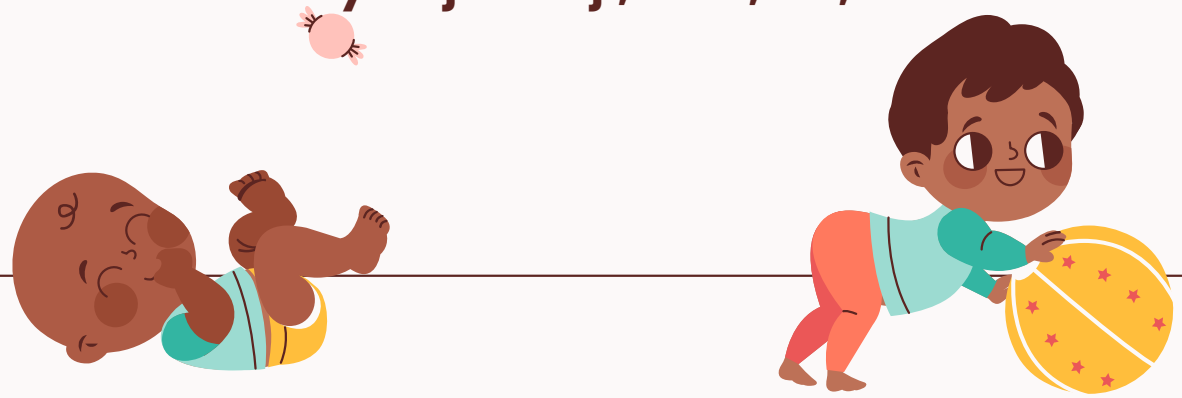
Kids and Drugs – Documenting Impact, Driving outcomes

Presented By Anjali Baji, MSN, RN, CCDS



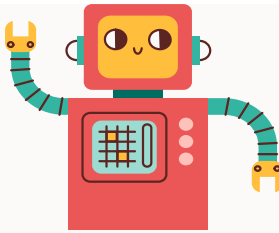

Children are often the silent
victims of drug abuse.
Rick Larsen

Contents of this template

Epidemiology & Impact of Neonatal Opioid Exposure

- **47–86%** of infants with prenatal opioid exposure develop withdrawal (NAS/NOWS)
- U.S. rate: **5.3 per 1,000 births (2022)**
- NICU admissions related to NAS have risen from **7 → 27 per 1,000 births**
- **~7%** of pregnant women reported prescription opioid use
- **20%** of those using opioids in pregnancy reported **misuse**
- Higher risk for **developmental delay, learning difficulties, and behavioral disorders**

Significance in Pediatrics



- 1 in 8 children live in households with at least one parent who has a substance disorder.
- **Prevalence**: In 2023, approximately 7.2% of U.S. adolescents aged 12 to 17 (1.86 million) reported using illicit drugs in the past month (WHO)
- **Death Rates:** The rate of opioid overdose deaths in individuals aged 15 to 24 increased by trifold from 1999 to 2022 (WHO) .
- **Hospitalizations:** Substance-related visits to U.S. children's hospitals for youth aged 12–21 increased by 47.9% between 2016 and 2021, with cannabis accounting for the majority of these visits (52.2%).

Definition of NAS/NOWS!

An infant born to a person with opioid use disorder is at risk for withdrawal, commonly referred to as neonatal abstinence syndrome (NAS) or neonatal opioid withdrawal syndrome (NOWS).

NAS versus NOWS

Neonatal Abstinence Syndrome (NAS): Withdrawal experienced by newborns after in-utero exposure to a variety of substances

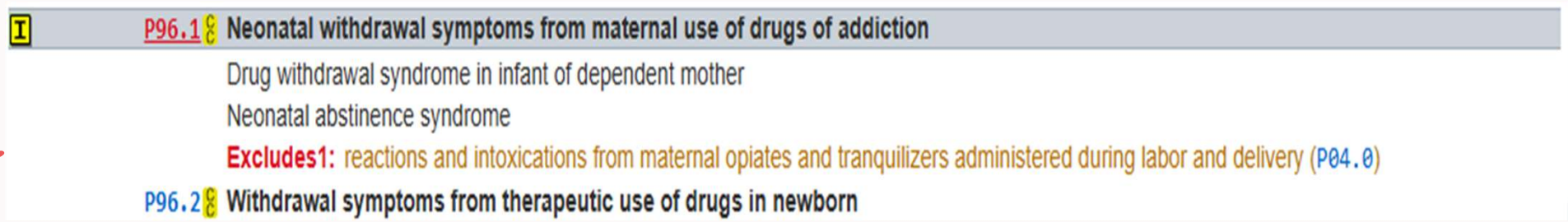
- Substances may include opioids, benzodiazepines, antidepressants, nicotine, alcohol, and other licit or illicit drugs

Neonatal Opioid Withdrawal Syndrome (NOWS): A subset of NAS

- NOWS refers specifically to withdrawal following prenatal opioid exposure
- Terminology helps improve diagnostic precision, treatment pathways, and reporting
- Increasingly, organizations prefer NOWS when opioids are the confirmed cause

Iatrogenic narcotic withdrawal

Acute withdrawal can also occur in infants who are treated with opioids and other sedating medications in the neonatal period (eg, neonates receiving opioids to facilitate mechanical ventilation).



Common drugs

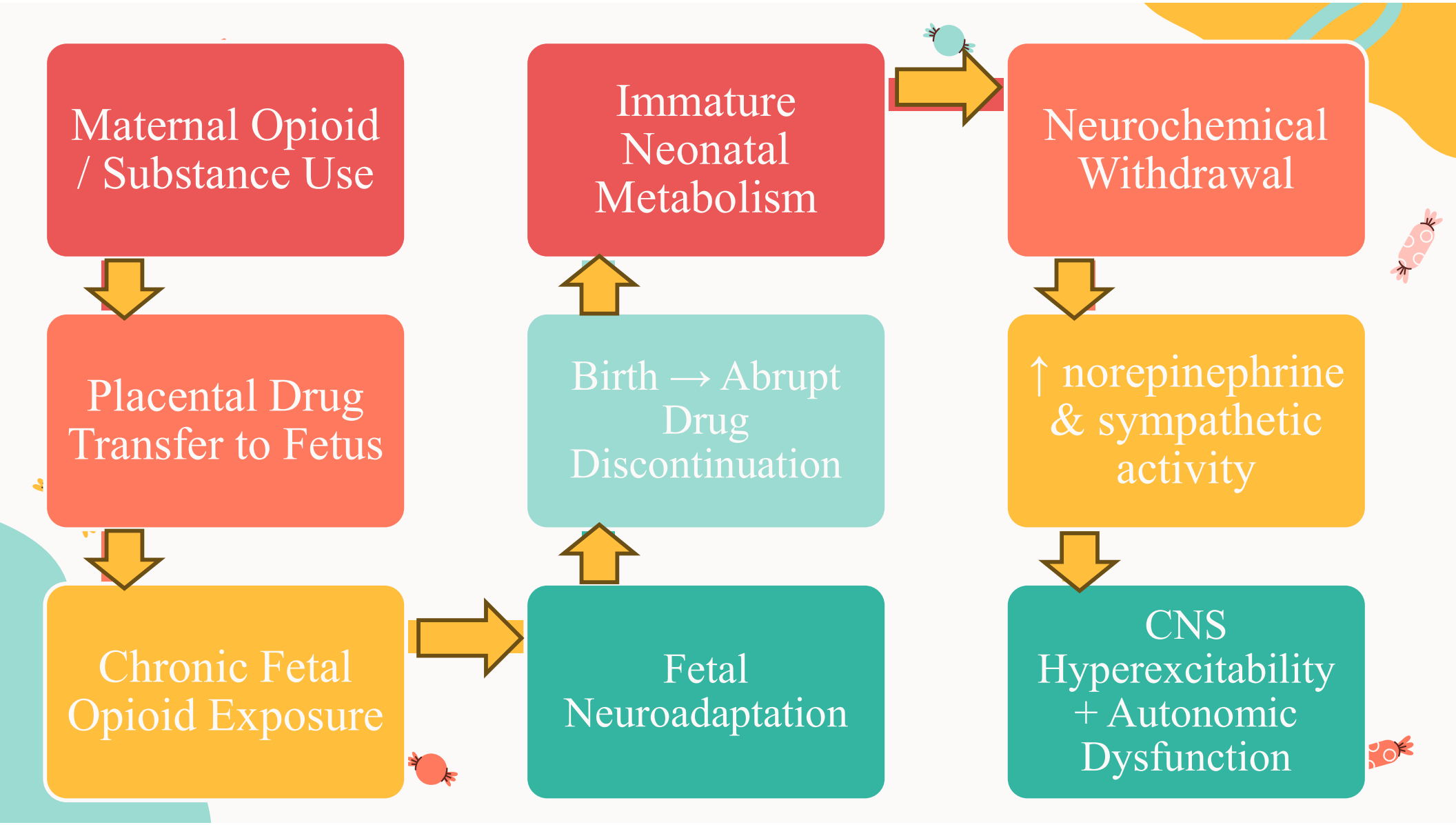
- Cocaine
- Nicotine
- Alcohol
- Benzodiazepines
- Selective serotonin (SSRIs and SNRIs)
- Xylazine
- Gabapentin
- Exposure to illicit opioids (eg, heroin)
- Misuse of licit opioids (eg, oxycodone, fentanyl)
- Exposure to medications used to treat maternal opioid use disorder (eg, methadone, buprenorphine)
- Opiates are a subclass of opioids consisting of alkaloid compounds that occur naturally in the opium poppy, including morphine and codeine.

Factors affecting NAT

Factors that affect the presentation of neonatal abstinence syndrome

Maternal factors	**Effects**
Illicit substance use	▪ Polysubstance use increases NAS severity.
Licit substance use (nicotine, psychotropic medications, OUD treatment medications, gabapentin)	▪ Psychotropics can alter/increase NAS symptoms. ▪ OUD treatment medications can predispose the infant to NAS, but benefits of treatment outweigh risks. ▪ Gabapentin produces atypical NAS symptoms.
Poor maternal health and well-being during the pregnancy, which can be caused by: ▪ Poor medical/obstetric care ▪ Maternal stress ▪ ACEs ▪ Violence ▪ Poverty ▪ Stigma associated with substance use/abuse	▪ Poor maternal health and well-being during pregnancy can affect the infant and alter/increase NAS symptoms. ▪ These factors can also alter the parent/caregiver's ability to respond appropriately to the infant, which can worsen NAS severity.
Breastfeeding	▪ Breastfeeding can decrease the length of pharmacologic treatment needed for NAS and decrease the length of stay for infants with NAS.
Infant factors	**Effects**
Sex	▪ Male sex increases risk for more severe NAS.
Gestational age	▪ Preterm infants have less severe NAS expression.*
Fetal adaptation to poor maternal health and well-being during the pregnancy	▪ How the fetus adapts to poor maternal health and well-being during the pregnancy can affect NAS symptoms.¶
Genetics/epigenetics	▪ Infants with particular genotypes (at OPRM1 and COMT gene sites) have less severe NAS expression. ▪ Hypermethylation at the same sites is associated with more severe NAS.
Environmental factors	**Effects**
Physical environment	▪ NICU care can exacerbate NAS severity. ▪ Rooming-in can reduce NAS severity.

Pathophysiology


Maternal Opioid / Substance Use
Placental Drug Transfer to Fetus
Chronic Fetal Opioid Exposure
Fetal Neuroadaptation
Birth → Abrupt Drug Discontinuation
Immature Neonatal Metabolism
Neurochemical Withdrawal
↑ norepinephrine & sympathetic activity
CNS Hyperexcitability + Autonomic Dysfunction

Multisystem manifestation

CNS and Autonomic → irritability, tremors, seizures, sweating, fever, yawning

Gastrointestinal → poor feeding, vomiting, diarrhea

Respiratory → tachypnea

Presenting features

- **CNS & ANS dysregulation**
- **Sleep disturbance:** fragmented sleep, short cycles, poor alertness
- **Motor/tone issues:** hypertonia, tremors, jitteriness
- **Autonomic signs:** sweating, sneezing, mottling, fever, tachypnea, nasal stuffiness, yawning
- **Sensory hyperarousal:** overstimulation, irritability, high-pitched cry
- **Feeding problems:** oral hypersensitivity, poor suck–swallow coordination
- **GI symptoms:** gassiness, vomiting, loose stools
- **Outcome:** poor weight gain

Criteria

≥2 of the following characteristic signs of withdrawal in the newborn:

- Excessive crying or irritability
- Fragmented sleep (<2 hours at a time after feeding)
- Tremors (jitteriness with or without being disturbed)
- Increased tone
- Gastrointestinal dysfunction (eg, hyperphagia, poor feeding, feeding intolerance, loose/watery stools)

NAS ONSET

- Onset varies with drug half-life & last exposure
- Heroin (short-acting): symptoms within 24 hrs
- Methadone/Buprenorphine: onset 24–72 hrs
- Delayed withdrawal: may appear ≥ 5 days of life
- Polysubstance exposure: may alter or prolong onset
- Observation period: typically 72 hrs to 7 days
- Peak symptoms: often occur 48–96 hrs after birth

Diagnostics

Urine

- Most commonly used
- Easy to obtain
- Rapid results
- Detects recent exposure only
- Lowest sensitivity
- Higher false-negative risk

Meconium

- More sensitive & specific
- Detects drug metabolites
- Sensitive for hepatobiliary & intestinal excretion
- Examples: heroin, cocaine, cannabinoids
- Reflects 2nd–3rd trimester exposure
- Longer turnaround time
- Useful for chronic exposure

Umbilical Cord Blood/Tissue

- Promising testing method
- Drug-specific immunoassays
- Easier to collect than meconium
- Detects prenatal exposure
- Good alternative when meconium unavailable

Modified Finnegan scoring system and interpretation

Modified Finnegan Neonatal Abstinence Score Sheet[1]

System	Signs and Symptoms	Score	AM	PM	Comments
Central Nervous System Disturbances	Excessive high-pitched (or other) cry < 5 mins	2			
	Continuous high-pitched (or other) cry > 5 mins	3			
	Sleeps < 1 hour after feeding	3			
	Sleeps < 2 hours after feeding	2			
	Sleeps < 3 hours after feeding	1			
	Hyperactive Moro reflex	2			
	Markedly hyperactive Moro reflex	3			
	Mild tremors when disturbed	1			
	Moderate-severe tremors when disturbed	2			
	Mild tremors when undisturbed	3			
	Moderate-severe tremors when undisturbed	4			
	Increased muscle tone	1			
	Excoriation (chin, knees, elbow, toes, nose)	1			
	Myoclonic jerks (twitching/jerking of limbs)	3			
	Generalised convulsions	5			
Metabolic/ Vasomotor/ Respiratory Disturbances	Sweating	1			
	Hyperthermia 37.2-38.3C	1			
	Hyperthermia > 38.4C	2			
	Frequent yawning (> 3-4 times/ scoring interval)	1			
	Mottling	1			
	Nasal stuffiness	1			
	Sneezing (> 3-4 times/scoring interval)	1			
	Nasal flaring	2			
	Respiratory rate > 60/min	1			
	Respiratory rate > 60/min with retractions	2			
Gastrointestinal Disturbances	Excessive sucking	1			
	Poor feeding (infrequent/uncoordinated suck)	2			
	Regurgitation (≥ 2 times during/post feeding)	2			
	Projectile vomiting	3			
	Loose stools (curds/seedy appearance)	2			
	Watery stools (water ring on nappy around stool)	3			
	Total Score				
	Date/Time				
	Initials of Scorer				

Modified Finnegan scoring system for neonatal abstinence syndrome

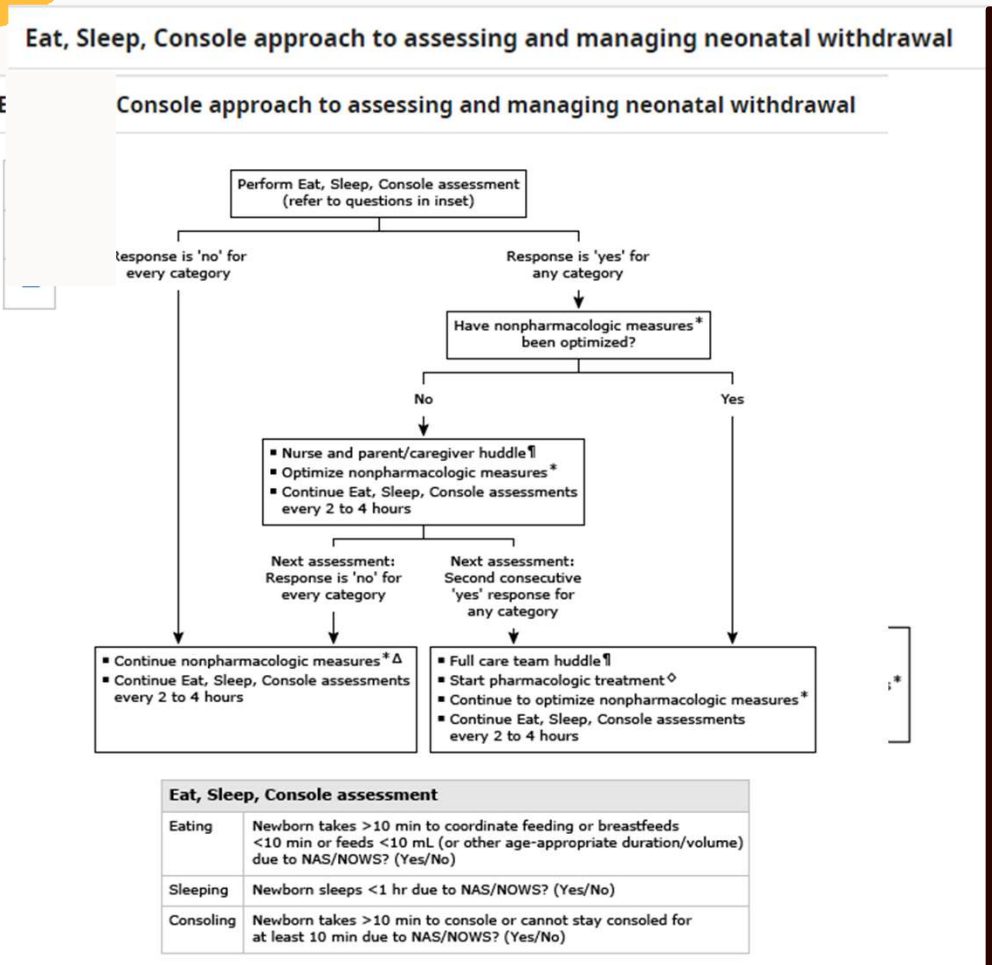
Scoring

Total score:

Interpretation

Score	Interpretation	Intervention
≤8	No or mild NAS manifestations	**If the newborn is not receiving pharmacologic therapy:** ▪ Continue nonpharmacologic measures.* ▪ Monitor scores every 3 to 4 hours. **If the newborn is receiving pharmacologic therapy for NAS:** ▪ Continue current nonpharmacologic and pharmacologic therapy.*Δ ▪ Monitor scores every 3 to 4 hours. ▪ If scores have been ≤8 for >24 to 48 hours, consider weaning NAS medication(s).◇
9 to 12	Moderate NAS manifestations	**If the newborn is not yet receiving pharmacologic therapy:** ▪ Provide nonpharmacologic measures and rescore in 1 hour.* ▪ If the next score is still >8, start pharmacologic therapy.Δ **If the newborn is receiving pharmacologic therapy for NAS:** ▪ Optimize nonpharmacologic measures and rescore in 1 hour.* ▪ If the next scores is still >8, increase pharmacologic therapy.Δ
>12	Severe NAS manifestations	**If the newborn is not yet receiving pharmacologic therapy:** ▪ Optimize nonpharmacologic measures and start pharmacologic therapy.*Δ **If the newborn is receiving pharmacologic therapy for NAS:** ▪ Optimize nonpharmacologic measures and increase pharmacologic therapy.*Δ

EAT SLEEP CONSOLE MODEL



Eat, Sleep, Console assessment	
Eating	Newborn takes >10 min to coordinate feeding or breastfeeds <10 min or feeds <10 mL (or other age-appropriate duration/volume) due to NAS/NOWS? (Yes/No)
Sleeping	Newborn sleeps <1 hr due to NAS/NOWS? (Yes/No)
Consoling	Newborn takes >10 min to console or cannot stay consoled for at least 10 min due to NAS/NOWS? (Yes/No)

Eat, sleep, console — The Eat, Sleep, Console approach is a functional assessment of withdrawal severity that has been adopted at many centers .This approach assesses NAS signs by asking three simple questions

- Does the newborn take >10 minutes to coordinate feeding or breastfeed for <10 minutes or feed <10 mL (or an age-appropriate duration and volume) due to NAS?
- Does the newborn sleep <1 hour due to NAS?
- Does the newborn take >10 minutes to console or cannot stay consoled for at least 10 minutes due to NAS?

Management

Morphine

- Morphine, methadone favored over sedatives
- Preferred first-line agent
- Short-acting
- Flexible dose titration

Methadone

Long-acting opioid
Alternative first-line option

Buprenorphine

Reduces NAS severity
Limited neonatal use
High ethanol content
Sublingual administration challenges

Phenobarbital

- Second-line therapy
- Useful in polysubstance exposure
- Effective with benzo/barbiturate exposure

Clonidine

Adjunct to opioid therapy
Helps autonomic symptoms
May reduce opioid requirement

Query Opportunities

Prematurity and IUGR – SGA, VLBW

Seizures

Birth defects

Poor feeding, hypoglycemia Dehydration and Acidosis/ Alkalosis

GERD

Failure to thrive

Apnea or Respiratory failure

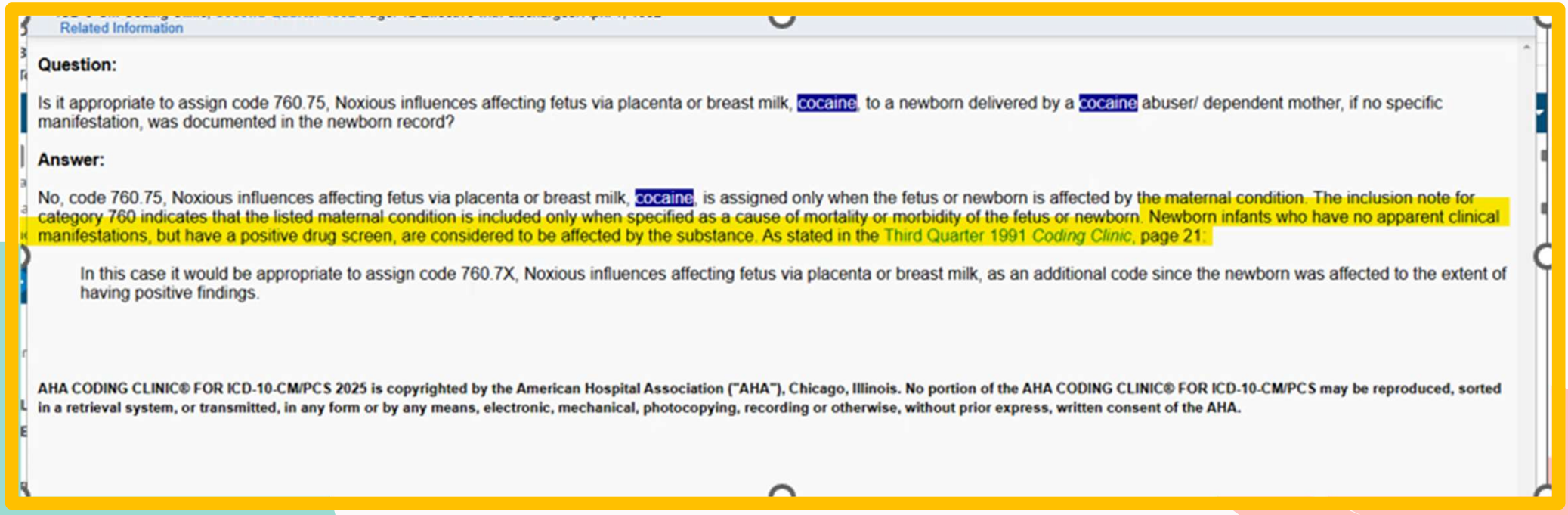
Intracerebral hemorrhage

Necrotizing Enterocolitis (NEC)

SDOH Factors

Coding clinics

Coding clinic on Newborn with No Manifestation, but positive drug screen



Related Information

Question:

Is it appropriate to assign code 760.75, Noxious influences affecting fetus via placenta or breast milk, cocaine, to a newborn delivered by a cocaine abuser/ dependent mother, if no specific manifestation, was documented in the newborn record?

Answer:

No, code 760.75, Noxious influences affecting fetus via placenta or breast milk, cocaine, is assigned only when the fetus or newborn is affected by the maternal condition. The inclusion note for category 760 indicates that the listed maternal condition is included only when specified as a cause of mortality or morbidity of the fetus or newborn. Newborn infants who have no apparent clinical manifestations, but have a positive drug screen, are considered to be affected by the substance. As stated in the Third Quarter 1991 *Coding Clinic*, page 21:

> In this case it would be appropriate to assign code 760.7X, Noxious influences affecting fetus via placenta or breast milk, as an additional code since the newborn was affected to the extent of having positive findings.

Newborn Observation for Possible Subutex® Withdrawal

Coding Clinic for ICD-10-CM/PCS, First Quarter 2022: Page 17

New code assignments contained in this issue effective with discharges April 1, 2022. Other coding advice or code assignments contained in this issue effective March 18, 2022.

Question:

A newborn delivered at term with Apgar scores of 9 and 9, was monitored for withdrawal symptoms due to intrauterine exposure of prescribed maternal Subutex®. Neonatal abstinence syndrome (NAS) monitoring was done daily; however, a urine drug screen was not performed. After five days of monitoring, the provider documented that the infant showed no symptoms, making withdrawal unlikely, so the infant was discharged. How should the newborn's intrauterine drug exposure be coded?

Answer:

Assign code Z05.8, Observation and evaluation of newborn for other specified suspected condition ruled out, as a secondary diagnosis for the extended observation and NAS monitoring. The documentation stated that the infant showed no signs or symptoms of withdrawal or NAS. Codes from category Z05 are used for newborns within the neonatal period, who are suspected to have an abnormal condition, but without signs or symptoms, and which after examination and observation, is found not to exist.

Per the *Official Guidelines for Coding and Reporting*, section 16.b.1, category Z05, Encounter for observation and evaluation of newborn for suspected diseases and conditions ruled out, is to be used "to identify those instances when a healthy newborn is evaluated for a suspected condition that is determined after study not to be present."

Notes

Code Update: As of October 1, 2023, new codes were created for Observation and evaluation of newborn for suspected condition related to home physiologic monitoring device ruled out (Z05.81) and Observation and evaluation of newborn for other specified suspected condition ruled out (Z05.82).

Cocaine addiction in newborns

Coding Clinic, **Third Quarter 1994** Page: 6
Effective with discharges: July 1, 1994

Question:

What diagnosis code should be assigned when the physician's diagnostic statement states "newborn addicted to cocaine," code 760.75, Noxious influences affecting fetus via placenta or breast milk; or code 779.5, Drug withdrawal syndrome in newborn?

Answer:

The physician should be queried to clarify what, if any, effects the cocaine had on the infant. If the infant exhibited no manifestations (asymptomatic), but had a positive drug screen, then code 760.75, Noxious influences affecting fetus via placenta or breast milk, should be assigned. If, however, the physician states that the infant experienced withdrawal, then code 779.5, Drug withdrawal syndrome in newborn, should be assigned.

The code for noxious influences affecting fetus via placenta or breast milk is indexed in the following manner:

Maternal condition, affecting fetus or newborn
noxious substance transmitted via breast milk or placenta

cocaine 760.75

Maternal drug and Teratogenic effect

Noxious Influences Affecting Fetus or Newborn

Coding Clinic, **Fourth Quarter 2005** Page: 82
New Codes Effective with Discharges: October 1, 2005
Other coding advice or code assignments contained in this issue Effective with Discharges: November 18, 2005

Noxious Influences Affecting Fetus or Newborn

Effective October 1, 2005, two new codes have been created to separately report anticonvulsants (**760.77**) and antimetabolic agents (**760.78**) as substances affecting fetus or newborn via placenta or breast milk.

Several substances have been recognized to affect fetal development when the mother is exposed to the substance during pregnancy. At the request of the American College of Medical Genetics, subcategory 760.7 has been expanded to track the effects of anticonvulsants and antimetabolic agents.

While relatively uncommon, approximately 1% to 3% of birth defects are related to medications taken by the mother while pregnant. The teratogenic effect of medications varies depending on the critical periods of fetal development. Different organs have different critical periods. The U.S. Food and Drug Administration (FDA) provides the most widely used system to grade the teratogenic effects of medications.

Approximately 12,000 U.S. women become pregnant annually while taking anticonvulsant medication. A retrospective study published in the *New England Journal of Medicine* showed birth defects occurred more frequently in infants exposed to anticonvulsant drugs; 20% of infants exposed to one drug had birth defects, and 28% of infants exposed to two or more drugs had birth defects.

Women may continue using anticonvulsants during pregnancy since seizures can be damaging to the fetus. Major seizures are associated with fetal anoxia. In addition, falls during a seizure may injure both the mother and the fetus.

Antimetabolic agents have varying degrees of teratogenic effects. Antimetabolic agents include Methotrexate (used to treat cancer, rheumatic diseases, psoriasis, and other conditions), retinoic acid (the active ingredient in Accutane, a drug used to treat acne) and statins (cholesterol lowering drugs). Methotrexate has been linked to craniofacial defects, anencephaly, hydrocephaly, and limb defects following use of high-dose methotrexate for chemotherapy. Retinoic acid is teratogenic in humans at very low doses. Exposure to retinoic acid during pregnancy can result in malformations of the fetus like craniofacial alterations, cleft palate, neural tube defects, cardiovascular malformations, thymic aplasia, psychological impairments, absent or defective ears, small jaw, and kidney alterations. Statins have been linked to spina bifida and other birth defects.

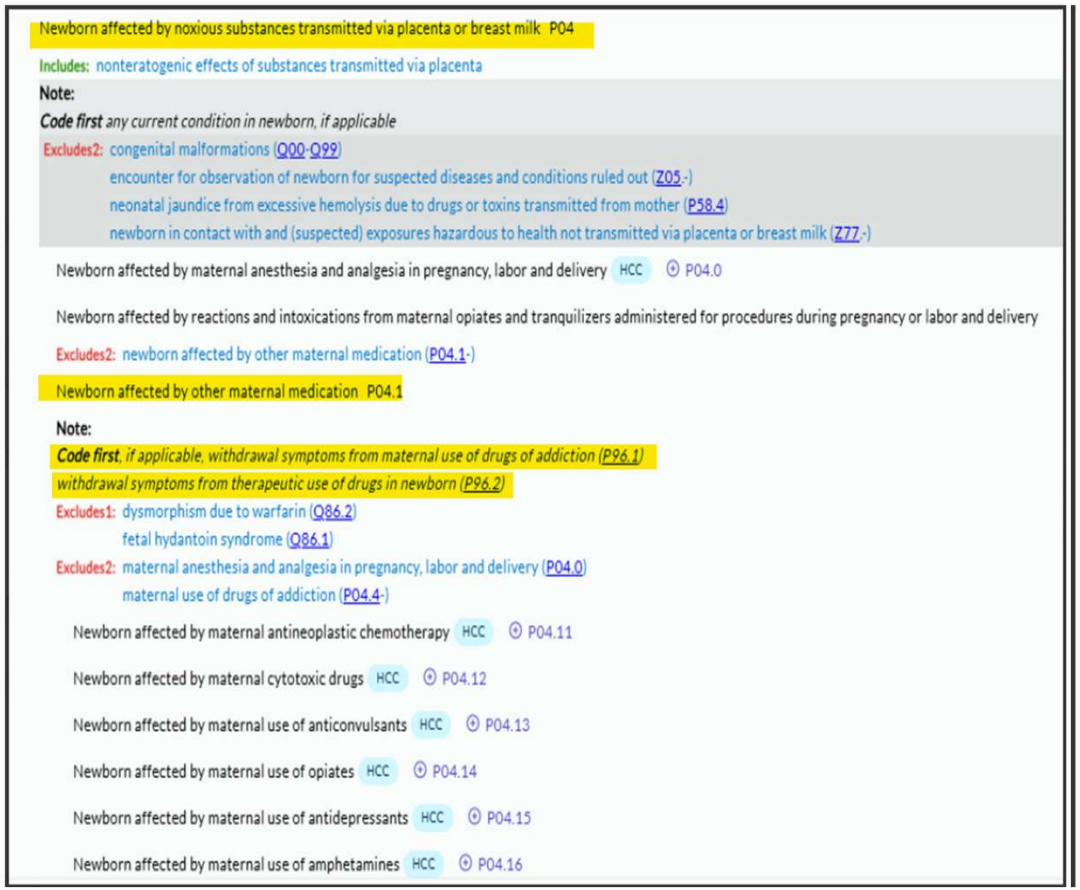
Question:

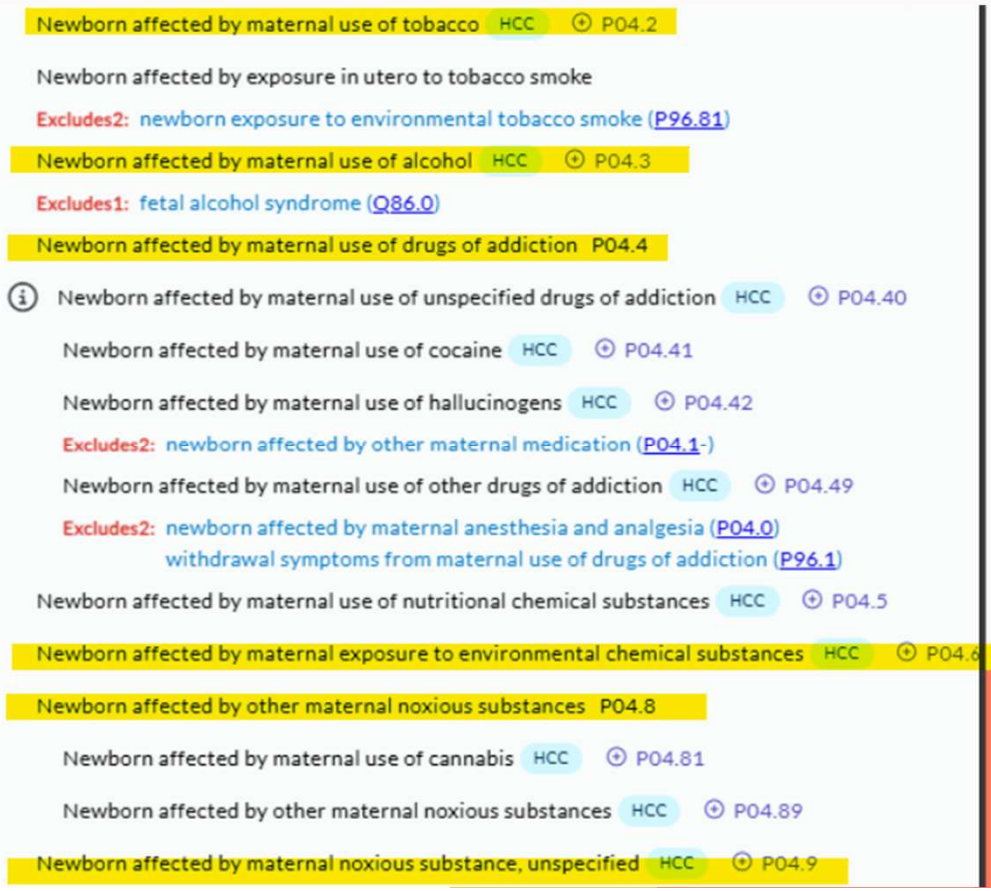
The patient is a 10-day-old newborn with congenital hydrocephalus. The patient's mother was known to have been undergoing a course of high-dose Methotrexate chemotherapy at the time of her pregnancy. The provider documentation supports congenital hydrocephalus due to Methotrexate chemotherapy. How should this be coded?

Answer:

Assign code 742.3, Congenital hydrocephalus, as the first-listed diagnosis. Assign code 760.78, Noxious influences affecting fetus or newborn via placenta or breast milk, antimetabolic agents, as an additional diagnosis.

P04.1- P04.9

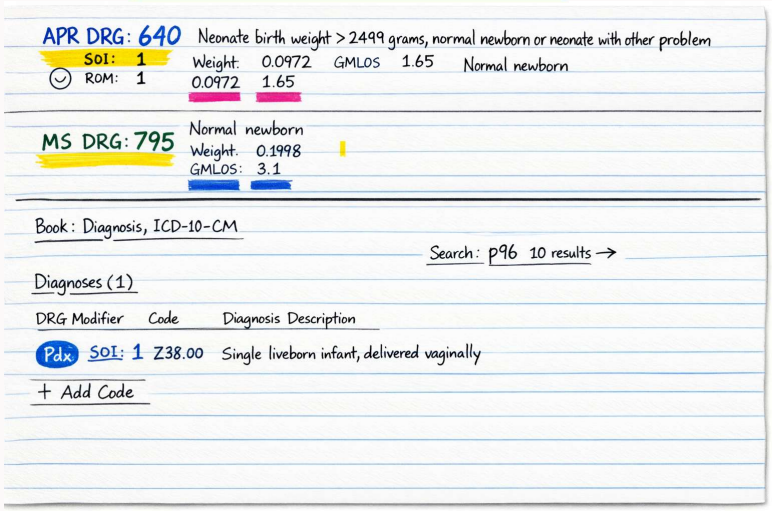

Newborn affected by noxious substances transmitted via placenta or breast milk P04
Includes: nonteratogenic effects of substances transmitted via placenta
Note:
Code first any current condition in newborn, if applicable
Excludes2: congenital malformations (Q00-Q99)
encounter for observation of newborn for suspected diseases and conditions ruled out (Z05.-)
neonatal jaundice from excessive hemolysis due to drugs or toxins transmitted from mother (P58.4)
newborn in contact with and (suspected) exposures hazardous to health not transmitted via placenta or breast milk (Z77.-)
Newborn affected by maternal anesthesia and analgesia in pregnancy, labor and delivery HCC P04.0
Newborn affected by reactions and intoxications from maternal opiates and tranquilizers administered for procedures during pregnancy or labor and delivery
Excludes2: newborn affected by other maternal medication (P04.1-)
Newborn affected by other maternal medication P04.1
Note:
Code first, if applicable, withdrawal symptoms from maternal use of drugs of addiction (P96.1)
withdrawal symptoms from therapeutic use of drugs in newborn (P96.2)
Excludes1: dysmorphism due to warfarin (Q86.2)
fetal hydantoin syndrome (Q86.1)
Excludes2: maternal anesthesia and analgesia in pregnancy, labor and delivery (P04.0)
maternal use of drugs of addiction (P04.4-)
Newborn affected by maternal antineoplastic chemotherapy HCC P04.11
Newborn affected by maternal cytotoxic drugs HCC P04.12
Newborn affected by maternal use of anticonvulsants HCC P04.13
Newborn affected by maternal use of opiates HCC P04.14
Newborn affected by maternal use of antidepressants HCC P04.15
Newborn affected by maternal use of amphetamines HCC P04.16


Newborn affected by maternal use of tobacco HCC P04.2
Newborn affected by exposure in utero to tobacco smoke
Excludes2: newborn exposure to environmental tobacco smoke (P96.81)
Newborn affected by maternal use of alcohol HCC P04.3
Excludes1: fetal alcohol syndrome (Q86.0)
Newborn affected by maternal use of drugs of addiction P04.4
Newborn affected by maternal use of unspecified drugs of addiction HCC P04.40
Newborn affected by maternal use of cocaine HCC P04.41
Newborn affected by maternal use of hallucinogens HCC P04.42
Excludes2: newborn affected by other maternal medication (P04.1-)
Newborn affected by maternal use of other drugs of addiction HCC P04.49
Excludes2: newborn affected by maternal anesthesia and analgesia (P04.0)
withdrawal symptoms from maternal use of drugs of addiction (P96.1)
Newborn affected by maternal use of nutritional chemical substances HCC P04.5
Newborn affected by maternal exposure to environmental chemical substances HCC P04.6
Newborn affected by other maternal noxious substances P04.8
Newborn affected by maternal use of cannabis HCC P04.81
Newborn affected by other maternal noxious substances HCC P04.89
Newborn affected by maternal noxious substance, unspecified HCC P04.9

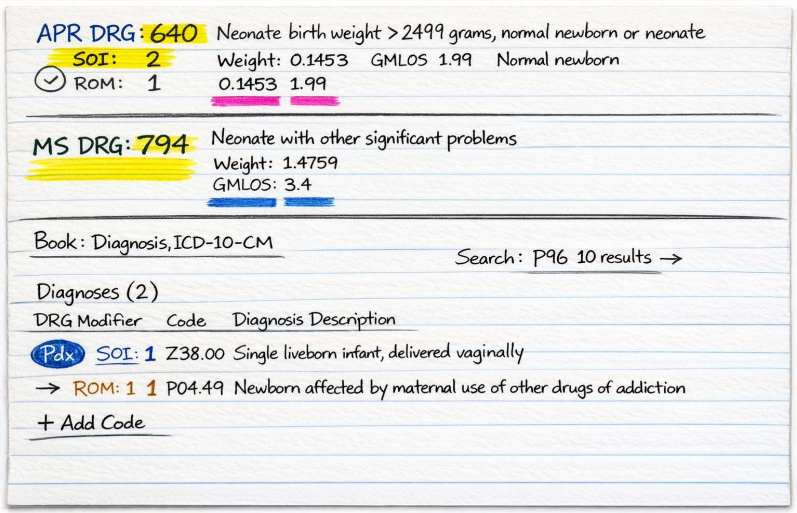
DRG Impact


IMPACT
PLAN
EVALUATION
COST
RISK
RESOURCES
SALES
ORGANIZATION
DATA
COMPLEX
ASSESSMENT
SCOPE
OPPORTUNITY
ANALYSIS ASSESSMENT AUDIT BUSINESS COMPLIANCE
MANAGEMENT PLAN PROCESS PROJECT QUALITY
RETENTION PERFORMANCE SOLUTION IMPORTANT
IDENTIFICATION
MONITOR
RESEARCH
CUSTOMER
PLANNING
IMPLEMENTATION

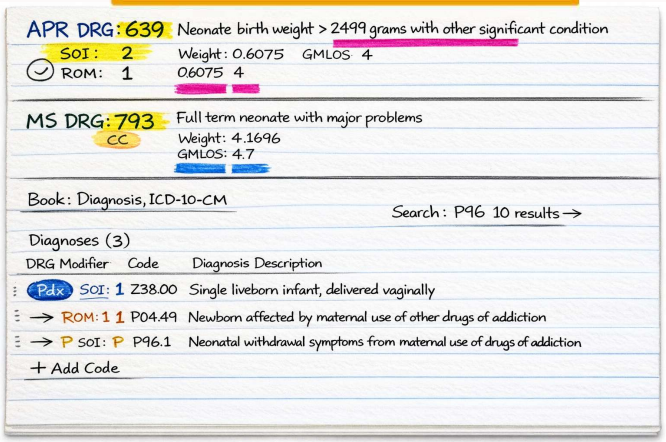
Normal Newborn



Newborn with drug exposure



Newborn with NAS



Most common Pediatric Drug

- Nicotine (vaping, cigarettes)
- Cannabis (marijuana, edibles, THC vapes)
- Alcohol
- Prescription opioids
- Benzodiazepines
- ADHD stimulants (misuse)
- Cocaine
- Methamphetamine
- MDMA (ecstasy, club drugs)
- Hallucinogens (LSD, psilocybin)
- Inhalants (glue, aerosol sprays, nitrous oxide)
- Synthetic cannabinoids (K2, Spice)
- Synthetic opioids (fentanyl and analogs)

Pediatric Drug exposure- possible queries

- Toxic encephalopathy
  - Respiratory failure
  - Aspiration pneumonia
  - Metabolic acidosis
  - Dehydration
  - Electrolyte imbalance
  - Malnutrition
  - AKI
  - Seizures
  - Cannabis Hyperemesis Syndrome
  - Toxic gastroenteritis
  - Poisoning
  - Intoxication vs Withdrawals
  - Cardiac arrhythmia from stimulants
  - EVALI - E-cigarette or Vaping Product Use–Associated Lung Injury


QUESTIONS?


Thank You!