

Newborn Critical Care Center (NCCC) Clinical Guidelines

Guidelines for Newborn Drug Screening

BACKGROUND

The use of drugs during pregnancy can result in a myriad of fetal and neonatal effects including birth defects with lifelong physical and developmental implications, prematurity, acute toxicity, and neonatal abstinence syndrome (NAS). As many as 55 - 94% of neonates exposed to opioids in-utero will exhibit withdrawal symptoms.¹

Women are at their highest risk of developing a substance use disorder between ages 18 to 29 years old and are at increased risk throughout their reproductive years (18 to 44). Pregnant females and soon to become pregnant females are therefore at increased risk of substance use. Prenatal substance use correlates with several harmful consequences for mother and fetus. Tobacco is the most common substance used during pregnancy, followed by alcohol, cannabis, and other illicit substances. Population-based National Survey of Drug Use and Health (NSDUH) between 2005 and 2014 studied 80,498 adolescent (ages 12 to 17 years) and 152,043 adult (ages 18 to 44 years) females. Rates of past-month use of tobacco were 23.0% in adolescents and 14.9% in adult females. Rates of past-month alcohol use were 11.5% in adolescents and 8.7% in adult females²

There is a recent increase in opiate use nationally in the general population, as well as in pregnancy, with a reported five-fold increase in pregnancy opioid use between 2000 and 2009. Between 2008 and 2012, amongst females of reproductive age, 39.4% of patients with Medicaid, and 27.7% of patients with private insurance filled an outpatient opioid prescription each year. Among the evaluation of over 1 million pregnant women with Medicaid, 21.6% filled a prescription for an opioid, and 2.5% of pregnant women received more than a one month supply of chronic opioid medication. Among those admitted to substance use treatment facilities for treatment of opioid use, the rate of pregnant females seeking treatment rose from 2% to 28% between 1992 and 2012.²

Overall, it is estimated that 20% of pregnant women use illicit drugs during pregnancy. Polysubstance use is a common phenomenon during pregnancy. A 2020 study found that 10% of women reported current alcohol use during pregnancy, and nearly half of those women reported current use of at least one other substance¹, although no federal law or guideline currently exists regarding screening or reporting. In 2016, the Comprehensive Addiction and Recovery Act modified child welfare legislation to expand Plan of Safe Care to include all infants affected by substance abuse withdrawal symptoms or a fetal alcohol spectrum disorder and who require services be identified for the family/caregivers of these infants. In North Carolina and at UNC, all positive urine/meconium drug screening results (that are not otherwise explained by prescribed maternal medications) are forwarded to the Department of Social Services (DSS) of the county where the mother resides, and DSS has full authority and jurisdiction to pursue further action.³

The decision to screen urine or meconium for the presence of opiates or other illicit drugs should be based on an assessment of risk factors for intrauterine drug exposure. There are currently no federal guidelines defining criteria for testing. Because such testing is for diagnostic purposes, a separate consent is not required.

WHY TEST?

- The goal of drug testing in neonates is to evaluate gestational exposure to identify infants at risk for withdrawal and other short and long term neurologic problems.⁴ Early intervention can help minimize acute and long-term effects of substance exposure.^{5,6}
- Potential for child neglect after discharge⁶
- Offer intervention services via Plan of Safe Care which can support the safest discharge opportunity for the infant and the family³

HOW DO WE TEST?

- Urine and meconium are most commonly used for neonatal drug screening⁷

Urine Specimen

- Noninvasive - generally provides the fastest results, usually within hours, use a bag specimen
- Narrow window of detection from maternal ingestion to excretion in infant's urine
 - Results are most useful for exposures occurring in preceding 3-5 days
 - Sample needs to be obtained as soon as possible after birth
- *Minimum 1 mL required for initial screening*, but a larger specimen is encouraged since confirmatory testing often requires larger volumes of 5-10 mL depending on the substance
- Method of collection can influence results³
 - Use of cotton balls may interfere with detection of marijuana and lead to false negative rapid (immunoassay) screens.
 - The presence of some baby soap products in the specimen can generate false positives for marijuana on rapid (immunoassay) screening
 - Clean catch specimen should be obtained using collection bag with adhesive, unless ELBW infant and concerns for skin integrity
- The initial broad screening tests classes of drugs e.g. opioids, benzodiazepines, amphetamines, barbiturates, cannabinoids, cocaine, and phencyclidine

Meconium Specimen

- Noninvasive; specimen collection may be difficult in newborns who pass meconium in utero prior to delivery, and in very small or critically ill neonates
- Longer window of detection
 - Reflects exposures occurring approximately 20 weeks prior to birth
- Minimum 1 gm (approx. 1 tsp) meconium required
 - Send-out to Mayo Medical laboratories with a 5-10 business days turnaround time

*If screen is **POSITIVE** for any individual drug in the urine or meconium specimen, confirmatory testing will be performed. This will likely not take additional time for urine, but may take up to 4 additional days for meconium.*

- A **presumptive positive** qualitative screening test simply indicates the presence or absence of a specific drug class in the urine; it is followed by a confirmatory test using the same specimen.
- **NOTE:** The possibility of cross reactivity with another substance could yield an initial presumptive positive, but ultimately negative result, so confirmatory testing is crucial.
- **A POSITIVE SCREEN SHOULD PROMPT A SOCIAL WORK CONSULT**

SCREEN IF THE FOLLOWING RISK FACTORS ARE PRESENT⁷:

Maternal History

- Mothers prescribed opiates during their pregnancy
- History of drug abuse within the last 18 months
- Prenatal care starting after 16 weeks, or less than a total of four prenatal visits
- History of child abuse, neglect, or court-ordered placement of other children outside the home
- History of domestic violence
- History of hepatitis, human immunodeficiency virus, syphilis, or prostitution
- Unexplained placental abruption
- Concern for acute maternal intoxication observed around the time of delivery
- Previously unexplained fetal demise or multiple spontaneous abortions and a history of a perinatal condition such as abruption or IUGR

Infant History

- Unexplained intrauterine growth restriction
- Infants with evidence of drug withdrawal such as hypertonia, irritability, or tremulousness (see [Table 1](#))

Umbilical Cord Tissue Segment Testing (*Not currently performed at UNC*)

- Advantages include ability to collect in a single encounter immediately after birth
- Window of detection believed to encompass the third trimester
- Limitations include uncertainty about the timing and mechanisms of drug deposition
- Cord tissue may reveal more recent exposures than meconium including exposures that happen just prior to or even during delivery
- Cord tissue is easy to collect and can be sent to lab for analysis immediately after a birth which may be preferable for nurses and clinicians
- Although offers many advantages, yield of testing is lower and it may be difficult to draw solid conclusions regarding timing or duration of exposure

References:

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2. Prince, M. K., & Ayers, D. (2021). *Substance Use In Pregnancy*. PubMed; StatPearls Publishing. <https://www.ncbi.nlm.nih.gov/books/NBK542330/>
3. *Infant Plan of Safe Care | NCDHHS*. (n.d.). www.ncdhhs.gov. <https://www.ncdhhs.gov/divisions/mental-health-development-disabilities-and-substance-abuse/infant-plan-safe-care>
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Table 1: Maternal Nonnarcotic Drugs That Cause Neonatal Withdrawal⁶

DRUG	SIGNS	ONSET	DURATION
Alcohol**	Hyperactivity, crying, irritability, poor suck, tremors, seizures, poor sleeping pattern, hyperphagia, diaphoresis	3 – 12 hours	18 months
Barbiturates	Irritability, severe tremors, hyperacusis, excessive crying, vasomotor instability, diarrhea, restlessness, increased tone, hyperphagia, vomiting, disturbed sleep	1 – 14 days	4 – 6 months with prescription*
Caffeine	Jitteriness, vomiting, bradycardia, tachypnea	At birth	1 – 7 days
Chlordiazepoxide (<i>Librium</i>)	Irritability, tremors	Days - weeks	9 months (1.5 months with prescription)
Clomipramine (<i>Tricyclic antidepressant</i>)	Hypothermia, cyanosis, tremors	12 hours	4 days with prescription
Diazepam (<i>Benzodiazepine</i>)	Hypotonia, poor suck, hypothermia, apnea, hypertonia, hyperreflexia, tremors, vomiting, hyperactivity, tachypnea	Hours - weeks	8 months, 10 – 66 days with prescription
Ethchlorvyol (<i>Sedative hypnotic</i>)	Lethargy, jitteriness, hyperphagia, irritability, poor suck, hypotonia		10 days with prescription
Glutethimide (<i>Sedative hypnotic</i>)	Increased tone, tremors, opisthotonos, high-pitched cry, hyperactivity, irritability, colic		6 months
Hydroxyzine (<i>Antihistamine</i>)	Tremors, irritability, hyperactivity, jitteriness, shrill cry, myoclonic jerks, hypotonia, increased respiratory and heart rates, feeding problems, clonic movements		5 weeks with prescription
Meprobamate (<i>Anxiolytic</i>)	Irritability, tremors, poor sleep patterns, abdominal pain		9 months, 3 months with prescription
SSRIs	Crying, irritability, tremors, poor suck, feeding difficulty, hypertonia, tachypnea, sleep disturbance, hypoglycemia, seizures	Hours - days	1 – 4 weeks
Tetrahydrocannabinol (<i>THC</i>)	Some reports of temporary symptoms like jitteriness and irritability		30 days

* **WITH PRESCRIPTION** indicates the infant was treated with pharmacologic agents and the natural course of the signs may have been shortened

** **SPECIAL NOTE ABOUT ALCOHOL:** Alcohol is cleared quickly and will not show up in a urine or meconium screen (though assays are being developed). **If a mother is inebriated at the time of delivery a blood alcohol level can be obtained on the mother or infant.** Acute alcohol intoxication can cause respiratory depression, hypoglycemia or seizures in the newborn. Alcohol withdrawal can cause seizures and cardiovascular collapse.