MAYO CLINIC LABORATORIES

Test Definition: DSM5X

Drugs of Abuse Screen 5, Chain of Custody, Meconium

Overview

Useful For

Identifying amphetamines (and methamphetamines), opiates, and phencyclidine, as well as metabolites of cocaine and marijuana in meconium specimens

Chain of custody is required whenever the results of testing could be used in a court of law. Its purpose is to protect the rights of the individual contributing the specimen by demonstrating that it was always under the control of personnel involved with testing the specimen; this control implies that the opportunity for specimen tampering would be limited. Since the evidence of illicit drug use during pregnancy can be cause for separating the baby from the mother, a complete chain of custody ensures that the test results are appropriate for legal proceedings.

Reflex Tests

Test Id	Reporting Name	Available Separately	Always Performed
COKMX	Cocaine and metabolite Conf, CoC, M	Yes	No
OPTMX	Opiate Confirmation, CoC, M	Yes	No
PCPMX	Phencyclidine Confirmation, CoC, M	Yes	No
THCMX	Carboxy-THC Confirmation, CoC, M	Yes	No
AMPMX	Amphetamines Confirmation, CoC, M	Yes	No

Additional Tests

Test Id	Reporting Name	Available Separately	Always Performed
COCH	Chain of Custody Processing	No	Yes

Testing Algorithm

Testing begins with immunoassay screen. Positive results are confirmed and quantitated by liquid chromatography tandem mass spectrometry at an additional charge.

Method Name

Competitive Chemiluminescent Immunoassay (CIA)

NY State Available

Yes

Specimen

Specimen Type
Meconium

Ordering Guidance
This test is for situations that require the chain-of-custody process. For testing **not** requiring chain of custody, order DASM5 / Drugs of Abuse Screen, Meconium 5

Specimen Required
Container/Tube: Chain of Custody Meconium Kit (T653) includes the specimen containers, seals, and documentation required
Specimen Volume: 1 g (approximately 1 teaspoon)
Collection Instructions: Collect entire random meconium specimen
Additional Information:
1. Specimen that arrives with a broken seal does not meet the chain-of-custody requirements.
2. The laboratory recommends sending chain-of-custody specimens by overnight shipment.

Forms
1. Chain of Custody Request is included in the Chain-of-Custody Kit (T282).
2. If not ordering electronically, complete, print, and send a Therapeutics Test Request (T831) with the specimen.

Specimen Minimum Volume
0.45 g (approximately 0.5 teaspoon)

Reject Due To

Grossly bloody	Reject, Pink OK
Stool Diapers	Reject

Specimen Stability Information

Specimen Type	Temperature	Time	Special Container
Meconium	Frozen (preferred)	21 days	
	Ambient	72 hours	
	Refrigerated	21 days	

Clinical & Interpretive

Clinical Information

Illicit drug use during pregnancy is a major social and medical issue. Drug abuse during pregnancy is associated with significant perinatal complications, which include a high incidence of stillbirths, meconium-stained fluid, premature rupture of the membranes, maternal hemorrhage (abruption placenta or placenta praevia), and fetal distress.(1) In the neonate, the mortality rate, as well as morbidity (eg, asphyxia, prematurity, low birthweight, hyaline membrane disease, infections, aspirations pneumonia, cerebral infarction, abnormal heart rate and breathing patterns, drug withdrawal) are increased.(1)

The disposition of drug in meconium is not well understood. The proposed mechanism is that the fetus excretes drug into bile and amniotic fluid. Drug accumulates in meconium either by direct deposit from bile or through swallowing of amniotic fluid.(2) The first evidence of meconium in the fetal intestine appears at approximately the 10th to 12th week of gestation and slowly moves into the colon by the 16th week of gestation.(3) Therefore, the presence of drugs in meconium has been proposed to be indicative of in utero drug exposure during the final 4 to 5 months of pregnancy, a longer historical measure than is possible by urinalysis.(2)

Chain of custody is a record of the disposition of a specimen to document each individual who collected, handled, and performed the analysis. When a specimen is submitted in this manner, analysis will be performed in such a way that it will withstand regular court scrutiny.

Reference Values

Negative

Positive results are reported with a quantitative liquid chromatography tandem mass spectrometry result.

Cutoff concentrations by competitive chemiluminescent immunoassay:
Amphetamines: 100 ng/g
Methamphetamine: 100 ng/g
Benzoylecgonine (cocaine metabolite): 100 ng/g
Opiates: 100 ng/g
Tetrahydrocannabinol carboxylic acid (marijuana metabolite): 20 ng/g
Phencyclidine: 20 ng/g

Interpretation

A positive result indicates that the baby was exposed to the drugs indicated.
The limit of quantitation varies for each of these drug groups.
-Amphetamines: >100 ng/g
-Methamphetamines: >100 ng/g
-Cocaine and metabolite: >100 ng/g
-Opiates: >100 ng/g
-Tetrahydrocannabinol carboxylic acid: >20 ng/g
-Phencyclidine (PCP): >20 ng/g

Cautions

If heroin use is suspected, specimen must be sent frozen to prevent loss of 6-monoacetylmorphine (6MAM, heroin metabolite). When refrigerated, a significant percentage of 6MAM will convert to morphine in fewer than 24 hours.

Unless sent frozen, the cocaine metabolite, m-hydroxybenzoylecgonine, will degrade within 72 hours of collection.

Clinical Reference

1. Ostrea EM Jr. Understanding drug testing in the neonate and the role of meconium analysis. J Perinat Neonatal Nurs. 2001;14(4):61-106
2. Ostrea EM Jr, Brady MJ, Parks PM, Asensio DC, Naluz A. Drug screening of meconium in infants of drug-dependent mothers: an alternative to urine testing. J Pediatr. 1989;115(3):474-477
3. Ahanya SN, Lakshmanan J, Morgan BL, Ross MG. Meconium passage in utero: mechanisms, consequences, and management. Obstet Gynecol Surv. 2005;60(1):45-74
4. Langman LJ, Bechtel LK, Holstege CP. Clinical toxicology. In: Rifai N, Chiu RWK, Young I, Burnham C-AD, Wittwer CT, eds. Tietz Textbook of Laboratory Medicine. 7th ed. Elsevier; 2023:chap 43
5. Langman LJ, Rushton AM, Thomas D, et al. Drug testing in support of the diagnosis of neonatal abstinence syndrome: The current situation. Clin Biochem. 2023;111:1-10. doi:10.1016/j.clinbiochem.2022.11.002
6. Marin SJ, Merrell M, McMillin GA. Drugs of abuse detection in meconium: a comparison between ELISA and biochip microarray. J Anal Toxicol. 2011;35(1):40-45. doi:10.1093/anatox/35.1.40
7. Baselt RC. Disposition of Toxic Drugs and Chemical in Man. 12th ed. Biomedical Publications; 2020

Performance

Method Description

The meconium sample received is screened by competitive chemiluminescent immunoassay by Randox Evidence+ to detect the presence of any of the drugs, or drugs that cross react with amphetamine, methamphetamine, cocaine metabolite, opiates, phencyclidine, and carboxy-tetrahydrocannabinol. Meconium specimens identified as positive by this screen are analyzed using liquid chromatography tandem mass spectroscopy for the specific drug or drug class indicated.(Unpublished Mayo method)

PDF Report

No

Day(s) Performed

Monday through Saturday

Report Available

1 to 2 days

Specimen Retention Time

2 weeks

Performing Laboratory Location

Mayo Clinic Laboratories - Rochester Superior Drive

Test Definition: DSM5X

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Fees & Codes

Fees

- Authorized users can sign in to Test Prices for detailed fee information.
- Clients without access to Test Prices can contact Customer Service 24 hours a day, seven days a week.
- Prospective clients should contact their account representative. For assistance, contact Customer Service.

Test Classification

This test was developed and its performance characteristics determined by Mayo Clinic in a manner consistent with CLIA requirements. It has not been cleared or approved by the US Food and Drug Administration.

CPT Code Information

80307
80324 (if appropriate)
80359 (if appropriate)
80353 (if appropriate)
80361 (if appropriate)
80365 (if appropriate)
80349 (if appropriate)
83992 (if appropriate)

LOINC® Information

Test ID	Test Order Name	Order LOINC® Value
DSM5X	Drugs of Abuse Screen 5, CoC, M	49046-6

Result ID	Test Result Name	Result LOINC® Value
36178	Amphetamine	26895-3
36179	Methamphetamine	27289-8
36180	Cocaine	26956-3
36181	Opiate	29158-3
36182	Phencyclidine	26859-9
36183	Tetrahydrocannabinol	26893-8
36184	Chain of Custody	77202-0