Test Definition: DASM4

Drugs of Abuse Screen, Meconium 4

Overview

Useful For

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

Reflex Tests

Test Id	Reporting Name	Available Separately	Always Performed
AMPHM	Amphetamines, Confirmation, M	Yes	No
COKEM	Cocaine and Metabolites, Confirm, M	Yes	No
OPATM	Opiate Confirmation, M	Yes	No
THCM	Carboxy-THC Confirmation, M	Yes	No

Testing Algorithm

Testing begins with immunoassay screen. Positive results are confirmed and quantified 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

For chain-of-custody testing, order DSM4X / Drugs of Abuse Screen 4, Chain of Custody, Meconium.

Specimen Required

Supplies: Stool container, Small (Random), 4 oz (T288)
Container/Tube: Stool container
Specimen Volume: 1 g (approximately 1 teaspoon)
Collection Instructions: Collect entire random meconium specimen.

Forms

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 distress, infections, aspiration pneumonia, cerebral infarction, abnormal heart rate and breathing problems, and 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)

Reference Values

Negative

Positives 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

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

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, et al. 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; 2023:454-454: 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):40-5. 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, 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

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)

LOINC® Information

Test ID	Test Order Name	Order LOINC® Value
DASM4	Drugs of Abuse Screen, Meconium 4	49046-6

Result ID	Test Result Name	Result LOINC® Value
32078	Amphetamine	26895-3
32080	Methamphetamine	27289-8
32082	Cocaine	26956-3
32084	Opiate	29158-3

32086	Tetrahydrocannabinol	26893-8
32087	Chain of Custody	77202-0