

Overview

Useful For

Identifying amphetamines (and methamphetamines), opiates, 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 under the control of personnel involved with testing the specimen at all times; 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.

Additional Tests

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

Testing Algorithm

Testing begins with immunoassay screen. Positives are confirmed and quantitated by liquid chromatography-tandem mass spectrometry (LC-MS/MS) at an additional charge.

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 |

Method Name

Enzyme-Linked Immunosorbent Assay (ELISA)

NY State Available

Yes

Specimen

Specimen Type

Meconium

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.

Reject Due To

Other Grossly bloody reject, Pink OK

Specimen Minimum Volume

0.45 g (approximately 0.5 teaspoon)

Specimen Stability Information

| Specimen Type | Temperature | Time | Special Container |
|---------------|--------------------|---------|-------------------|
| Meconium | Frozen (preferred) | 14 days | |
| | Refrigerated | | |

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 who collected it, who handled it, and who 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

Positives are reported with a quantitative LC-MS/MS result.

Cutoff concentrations

Amphetamines by ELISA: 100 ng/g

Methamphetamine by ELISA: 100 ng/g

Benzoylcegonine (cocaine metabolite) by ELISA: 100 ng/g

Opiates by ELISA: 100 ng/g

Tetrahydrocannabinol carboxylic acid (marijuana metabolite) by ELISA: 20 ng/g

Phencyclidine by ELISA: 20 ng/g

Interpretation

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, 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 Mar;14(4):61-82; quiz 105-106
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 Sep;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 Jan;60(1):45-56; quiz 73-74

Performance**Method Description**

Meconium specimen is homogenized in a buffer. The homogenate is analyzed by enzyme-linked immunosorbent assay (ELISA) to detect the presence of drug. If drug presence is indicated by a positive result of ELISA, liquid chromatography-tandem mass spectrometry analysis is performed to verify the presence of the drug. (Unpublished Mayo method)

PDF Report

No

Specimen Retention Time

2 weeks

Performing Laboratory Location

Rochester

Fees & Codes**Test Classification**

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

CPT Code Information

80307

LOINC® Information

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

| Result ID | Reporting Name | LOINC® |
|-----------|----------------------|---------|
| 36178 | Amphetamine | 26959-7 |
| 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 |