

## Overview

### Useful For

Detection of in utero exposure to amphetamine-type stimulants up to 5 months before birth

### Method Name

LiquidChromatography-TandemMassSpectrometry(LC-MS/MS)

### NY State Available

Yes

## Specimen

### Specimen Type

Meconium

### Ordering Guidance

For chain-of-custody testing, order AMPMX / Amphetamine-Type Stimulants Confirmation, 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.

### Reject Due To

Grossly bloody    Reject; Pink OK

Stool                Reject

Diapers

### Specimen Minimum Volume

0.3 g (approximately 1/4 teaspoon)

### Specimen Stability Information

Specimen Type	Temperature	Time	Special Container
Meconium	Frozen (preferred)	28 days	
	Ambient	28 days	
	Refrigerated	28 days	

## Clinical & Interpretive

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**Clinical Information**

Several stimulants and hallucinogens chemically related to phenylethylamine are referred to collectively as the amphetamine-type stimulants (amphetamines). Generally, this refers to the prescription and illicit amphetamines including amphetamine; methamphetamine; 3,4-methylenedioxymethamphetamine (MDMA, Ecstasy); 3,4-methylenedioxyamphetamine (MDA); and 3,4-methylenedioxyethylamphetamine (MDEA).(1) Methamphetamine has become a drug of choice among stimulant abusers because of its availability and ease to synthesize.

The metabolism of amphetamine consists of hydroxylation and deamination followed by conjugation with glucuronic acid. Methamphetamine is metabolized to amphetamine; both should be present in urine after methamphetamine use. Both MDMA and MDEA are metabolized to MDA.(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 tenth to twelfth week of gestation, and slowly moves into the colon by the sixteenth 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)

Intrauterine drug exposure to amphetamines has been associated with maternal abruption, prematurity, and decreased growth parameters such as low-birth weight.(4) Some intrauterine amphetamine-exposed infants may develop hypertonia, tremors, and poor feeding and abnormal sleep patterns.(5)

**Reference Values**

Negative

Positives are reported with a quantitative liquid chromatography-tandem mass spectrometry (LC-MS/MS) result.

Cutoff concentrations for LC-MS/MS testing:

Amphetamine: 20 ng/g

Methamphetamine: 20 ng/g

3,4-Methylenedioxyamphetamine: 20 ng/g

3,4-Methylenedioxyethylamphetamine: 20 ng/g

3,4-Methylenedioxymethamphetamine: 20 ng/g

**Interpretation**

The presence of any of the following: amphetamine; methamphetamine; 3,4-methylenedioxyamphetamine; 3,4-methylenedioxymethamphetamine; or 3,4-methylenedioxyethylamphetamine at greater than 20 ng/g is indicative of in utero exposure up to 5 months before birth.

**Cautions**

No significant cautionary statements

**Clinical Reference**

1. Baselt RC, ed: Disposition of Toxic Drugs and Chemical in Man. Biochemical Publications; 2008:83-86; 947-952; 993-999
2. Ostrea EM Jr, Brady MJ, Parks PM, Asensio DC, Naluz: Drug screening of meconium in infants of drug-dependent mothers: an alternative to urine testing. J Pediatr. 1989;115:474-477
3. Ahanya SN, Lakshmanan J, Morgan BL, Ross MG: Meconium passage in utero: mechanisms, consequences, and management. Obstet Gynecol Surv. 2005;60:45-56
4. Kwong TC, Ryan RM: Detection of intrauterine illicit drug exposure by newborn drug testing. National Academy of Clinical Biochemistry. Clin Chem. 1997;43:235-242
5. Dixon SD: Effects of transplacental exposure to cocaine and methamphetamine on the neonate. West J Med.

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1989;150:436-442

## Performance

### Method Description

Meconium is mixed with internal standard and extracted with methanol. The methanolic extract is further processed by solid phase extraction. The extract is analyzed by liquid chromatography tandem mass spectroscopy (LC-MS/MS).(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

80324

80359

G0480 (if appropriate)