

**Overview**

**Useful For**

Detection of in utero drug exposure up to 5 months before birth

**Method Name**

LiquidChromatography-TandemMassSpectrometry(LC-MS/MS)

**NY State Available**

Yes

**Specimen**

**Specimen Type**

Meconium

**Advisory Information**

For chain-of-custody testing, order COKMX / Cocaine and Metabolite Confirmation, Chain of Custody, Meconium.

**Specimen Required**

**Supplies:** Stool container. Small (Random), 4 oz (T288)

**Container/Tube:** Stool container (T288)

**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**

0.3 g (approximately 1/4 teaspoon)

**Reject Due To**

Other	Grossly bloody reject, Pink OK Stool Diapers
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**Specimen Stability Information**

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

## Clinical and Interpretive

### Clinical Information

Cocaine is an alkaloid found in *Erythroxylon coca*, which grows principally in the northern South American Andes and to a lesser extent in India, Africa, and Java.(1) Cocaine is a powerfully addictive stimulant drug. Cocaine abuse has a long history and is rooted into the drug culture in the United States,(2) and is 1 of the most common illicit drugs of abuse.(3,4) Cocaine is rapidly metabolized primarily to benzoylecgonine, which is further metabolized to *m*-hydroxybenzoylecgonine (*m*-HOBE).(1,5) Cocaine is frequently used with other drugs, most commonly ethanol, and the simultaneous use of both drugs can be determined by the presence of the unique metabolite cocaethylene.(4)

Intrauterine drug exposure to cocaine has been associated with placental abruption, premature labor, small for gestational age status, microcephaly, and congenital anomalies (eg, cardiac and genitourinary abnormalities, necrotizing enterocolitis, and central nervous system stroke or hemorrhage).(6)

The disposition of drug in meconium, the first fecal material passed by the neonate, 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 deposition from bile or through swallowing of amniotic fluid.(7) 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.(8) 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.(7)

### Reference Values

Negative

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

Cutoff concentrations

Cocaine by LC-MS/MS: 50 ng/g

Benzoylecgonine by LC-MS/MS: 50 ng/g

Cocaethylene by LC-MS/MS: 50 ng/g

*m*-Hydroxybenzoylecgonine by LC-MS/MS: 50 ng/g

### Interpretation

The presence of any of the following: cocaine, benzoylecgonine, cocaethylene, or *m*-hydroxybenzoylecgonine, at 50 ng/g or more is indicative of in utero drug exposure up to 5 months before birth.

### Cautions

No significant cautionary statements.

### Clinical Reference

1. Isenschmid DS: Cocaine. In Principles of Forensic Toxicology. Second edition. Edited by B Levine. Washington DC, AACC Press, 2003 pp 207-228

2. US Drug Enforcement Administration: Cocaine. Retrieved 9/3/09. Available at [www.usdoj.gov/dea/concern/cocaine.html](http://www.usdoj.gov/dea/concern/cocaine.html)

3. National Institute on Drug Abuse: NIDA InfoFacts: Crack and Cocaine. Retrieved 9/3/09. Available at [www.nida.nih.gov/InfoFacts/cocaine.html](http://www.nida.nih.gov/InfoFacts/cocaine.html)
4. Isenschmid DS: Cocaine-effects on human performance and behavior. *Forsensic Sci Rev* 2002;14:61
5. Kolbrich EA, Barnes AJ, Gorelick DA, et al: Major and minor metabolites of cocaine in human plasma following controlled subcutaneous cocaine administration. *J Anal Toxicol* 2006;30:501-510
6. 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
7. 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;115:474-477
8. Ahanya SN, Lakshmanan J, Morgan BL, Ross MG: Meconium passage in utero: mechanisms, consequences, and management. *Obstet Gynecol Surv* 2005;60:45-56

## Performance

### Method Description

Meconium is mixed with internal standard and broken down with acetic acid. The sample is then extracted with methanol and further processed by solid-phase extraction. The extract is analyzed by liquid chromatography-tandem mass spectrometry.(Unpublished Mayo method)

### PDF Report

No

### Day(s) and Time(s) Test Performed

Monday through Sunday; Varies

### Analytic Time

2 days

### Specimen Retention Time

2 weeks

### Performing Laboratory Location

Rochester

## Fees and 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 Regional Manager. 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. This test has not been cleared or approved by the U.S. Food and Drug Administration.

**CPT Code Information**

80353

G0480 (if appropriate)

**LOINC® Information**

Test ID	Test Order Name	Order LOINC Value
COKEM	Cocaine and Metabolites, Confirm, M	69008-1

Result ID	Test Result Name	Result LOINC Value
31859	Cocaine	69009-9
31860	Benzoylecgonine	69010-7
31861	Cocaethylene	69011-5
31862	m-Hydroxybenzoylecgonine	69012-3
31864	Interpretation	69050-3
31865	Chain of Custody	77202-0