Overview

Useful For
Detection of maternal prenatal opiate/opioid use up to 5 months before birth

Method Name
Liquid Chromatography-Tandem Mass Spectrometry (LC-MS/MS)

NY State Available
Yes

Specimen

Specimen Type
Meconium

Ordering Guidance
For chain-of-custody testing, order OPTMX / Opiate 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.

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

<table>
<thead>
<tr>
<th>Grossly bloody</th>
<th>Reject; Pink OK</th>
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</thead>
<tbody>
<tr>
<td>Stool</td>
<td>Reject</td>
</tr>
<tr>
<td>Diapers</td>
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Specimen Stability Information

<table>
<thead>
<tr>
<th>Specimen Type</th>
<th>Temperature</th>
<th>Time</th>
<th>Special Container</th>
</tr>
</thead>
<tbody>
<tr>
<td>Meconium</td>
<td>Frozen (preferred)</td>
<td>28 days</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Refrigerated</td>
<td>28 days</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Ambient</td>
<td>14 days</td>
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Clinical and Interpretive

Clinical Information

Opiates are naturally occurring alkaloids that are derived from the opium poppy and demonstrate analgesic effects. Opioids are derived from natural and semisynthetic alkaloids of opium or synthetic compounds:\(^1\):

- Codeine is a naturally occurring opioid agonist often incorporated into formulations along with acetaminophen or aspirin to increase its analgesic effect.\(^2\) Codeine is metabolized to morphine and subsequently undergoes glucuronidation and sulfation.

- Morphine is an opioid receptor agonist that is used for major pain analgesia.\(^2\) It has been shown to distribute widely into many fetal tissues,\(^3\) and has been detected in meconium.

- Hydrocodone is a semisynthetic analgesic derived from codeine. Hydrocodone is 6 times more potent than codeine and is prescribed for treatment of moderate-to-moderately severe pain.\(^2\) Hydrocodone undergoes O-demethylation in vivo, forming hydromorphone.

- Hydromorphone, a semisynthetic derivative of morphine, is an opioid analgesic. It is 7 to 10 times more potent than morphine, its addiction liability is similar to morphine.\(^2\)

- Oxycodone, a semisynthetic narcotic derived from thebaine. It is metabolized by O-demethylation, forming oxymorphone.\(^2\)

- Oxymorphone is a semisynthetic opioid derivative of thebaine and is indicated for moderate-to-severe pain.\(^2\)

- Heroin, a semisynthetic derivative of morphine, is rapidly deacetylated in vivo to the active metabolite 6-monoacetylmorphine (6-MAM), which is further hydrolyzed to morphine.\(^2\)

Opiates have been shown to readily cross the placenta and distribute widely into many fetal tissues. Opiate use by the mother during pregnancy increases the risk of prematurity and small size for gestational age. Furthermore, heroin-exposed infants exhibit an early onset of withdrawal symptoms compared to methadone-exposed infants. These infants demonstrate a variety of symptoms including irritability, hypertonia, wakefulness, diarrhea, yawning, sneezing, increased hiccups, jitteriness, excessive sucking, and seizures. Long-term intrauterine drug exposure may lead to abnormal neurocognitive and behavioral development as well as an increased risk of sudden infant death syndrome.

The disposition of opiates and opioids 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. 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. 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.

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:
**Test Definition: OPATM**

Opiate Confirmation, M

**Codeine:** 20 ng/g

**Hydrocodone:** 20 ng/g

**Hydromorphone:** 20 ng/g

**Morphine:** 20 ng/g

**Oxycodone:** 20 ng/g

**Oxymorphone:** 20 ng/g

**Interpretation**

The presence of any of the following opiates (codeine, morphine, hydrocodone, hydromorphone, oxycodone, oxymorphone) at 20 ng/g or greater or 6-monoacetlymorphine at 10 ng/g or greater indicates the newborn was exposed to opiates/opioids during gestation.

**Cautions**

No significant cautionary statements

**Clinical Reference**


**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 spectrometry (LC-MS/MS). (Unpublished Mayo method)

**PDF Report**

No

**Day(s) Performed**

Monday through Sunday

**Report Available**

2 to 3 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
80361
80365
G0480 (if appropriate)

LOINC® Information

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<th>Test Order Name</th>
<th>Order LOINC Value</th>
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<td>Opiate Confirmation, M</td>
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