Test Definition: OPATX

Opiate Confirmation, CoC, U

Overview

Useful For

Detection and quantification of codeine, hydrocodone, oxycodone, morphine, hydromorphone, oxymorphone, noroxycodone, noroxymorphone, norhydrocodone, dihydrocodeine, and naloxone in urine

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.

Additional Tests

Test ID	Reporting Name	Available Separately	Always Performed
COCH	Chain of Custody Processing	No	Yes
ADLTX	Adulterants Survey, CoC, U	Yes	Yes

Testing Algorithm

Adulterants testing will be performed on all chain of custody urine samples as per regulatory requirements.

Method Name

Immunoassay Followed by Liquid Chromatography-Tandem Mass Spectrometry (LC-MS/MS) Confirmation with Quantitation

NY State Available

Yes

Specimen

Specimen Type

Urine

Specimen Required

Specimen Type: Urine

Container/Tube: Chain-of-Custody Kit (T282) containing the specimen containers, seals, and documentation required.

Specimen Volume: 20 mL

Collection Instructions: Collect specimen in the container provided, seal, and submit with the associated documentation to satisfy the legal requirements for chain-of-custody testing.

Additional Information

1. If urine creatinine is required or adulteration of the sample is suspected, the following test should be requested, ADLTX / Adulterants Survey, Chain of Custody, Urine. For additional information, please refer to ADLTX / Adulterants Survey, Chain of Custody, Urine.

2. Submitting <20 mL will compromise our ability to perform all necessary testing.

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.

Specimen Minimum Volume

2.5 mL

Reject Due To

Gross hemolysis	OK
Gross icterus	OK

Specimen Stability Information

Specimen Type	Temperature	Time	Special Container
Urine	Refrigerated (preferred)	28 days	
	Frozen	28 days	
	Ambient	14 days	

Clinical and Interpretive

Clinical Information

Codeine is converted by hepatic metabolism to morphine and norcodeine with a half-life of 2 to 4 hours. If codeine is ingested, the ratio of codeine to morphine generally exceeds 1.0 in urine during the first 24 hours. The ratio may fall below 1.0 after 24 hours; and after 30 hours, only morphine may be detected.

Morphine is a naturally occurring narcotic analgesic obtained from the poppy plant, *Papaver somniferum*. Morphine is converted by hepatic metabolism to normorphine with a half-life of 2 to 4 hours. The presence of morphine in urine can indicate exposure to morphine, heroin, or codeine within 2 to 3 days. Ingestion of bakery products containing poppy seeds can also cause morphine to be excreted in urine. If excessively large amounts are consumed, this can result in urine morphine concentrations up to 2,000 ng/mL for a period of 6 to 12 hours after ingestion.

Hydrocodone exhibits a complex pattern of metabolism including O-demethylation, N-demethylation, and 6-keto reduction to the 6-beta hydroxymetabolites. Hydromorphone and norhydrocodone are both metabolites of hydrocodone. Dihydrocodeine is also a minor metabolite. Trace amounts of hydrocodone can also be found in the presence of approximately 100-fold higher concentrations of oxycodone or hydromorphone since it can be a pharmaceutical impurity in these medications. The presence of hydrocodone >100 ng/mL indicates exposure within 2 to 3 days prior to specimen collection.

Hydromorphone is metabolized primarily in the liver and is excreted primarily as the glucuronidated conjugate, with

small amounts of parent drug and minor amounts of 6-hydroxy reduction metabolites. The presence of hydromorphone >100 ng/mL indicates exposure within 2 to 3 days prior to specimen collection. Hydromorphone is also a metabolite of hydrocodone; therefore, the presence of hydromorphone could also indicate exposure to hydrocodone.

Dihydrocodeine is a semisynthetic narcotic analgesic prepared by the hydrogenation of codeine. It is also a minor metabolite of hydrocodone. It is metabolized to dihydromorphine and has a half-life of 3.4 to 4.5 hours.

Oxycodone is metabolized to noroxycodone, oxymorphone, and their glucuronides and is excreted primarily via the kidney. The presence of oxycodone >100 ng/mL indicates exposure to oxycodone within 2 to 3 days prior to specimen collection.

Oxymorphone is metabolized in the liver to noroxymorphone and excreted via the kidney primarily as the glucuronide conjugates. Oxymorphone is also a metabolite of oxycodone and, therefore, the presence of oxymorphone could also indicate exposure to oxycodone.

Naloxone is a synthetic narcotic antagonist and used for partial or complete reversal of opioid depression induced by natural or synthetic opioids. It has also been incorporated into oral tablets of opioids to discourage abuse. The duration of action is dependent on the dose and route of administration. The half-life in adults is approximately 30 to 81 minutes.

The detection interval for the opiates is generally 2 to 3 days after last ingestion.

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

Cutoff concentrations

IMMUNOASSAY SCREEN

300 ng/mL

Codeine by LC-MS/MS: 25 ng/mL

Dihydrocodeine-by LC-MS/MS: 25 ng/mL

Hydrocodone by LC-MS/MS: 25 ng/mL-

Norhydrocodone-by LC-MS/MS: 25 ng/mL

Hydromorphone by LC-MS/MS: 25 ng/mL

Oxycodone by LC-MS/MS: 25 ng/mL

Noroxycodone-by LC-MS/MS: 25 ng/mL

Oxymorphone by LC-MS/MS: 25 ng/mL

Noroxymorphone-by LC-MS/MS: 25 ng/mL

Naloxone-by LC-MS/MS: 25 ng/mL

Morphine by LC-MS/MS: 25 ng/mL

Interpretation

This procedure reports the total urine concentration; this is the sum of the unconjugated and conjugated forms of the parent drug.

Cautions

This test detects drugs structurally similar to morphine. Other drugs in the opioid class, such as fentanyl, meperidine, and methadone are not detected.

Clinical Reference

1. Gutstein HB, Akil H: Chapter 21: Opioid Analgesics. In Goodman and Gilman's The Pharmacological Basis of Therapeutics. Eleventh edition. Edited by LL Brunton, JS Lazo, KL Parker. New York, McGraw-Hill Companies Inc, 2006. Available at: http://www.accessmedicine.com/content.aspx?aID=940653

2. Baselt RC: Dispositition of Toxic Drugs and Chemical in Man. Ninth edition. Edited by RC Baselt. Foster City, CA: Biomedical Publications, 2011

3. Hackett LP,Dusci LJ,Ilett KF,Chiswell GM: Optimizing the hydrolysis of codeine and morphine glucuronides in urine. Ther Drug Monit 2002;24(5):652-657

Performance

Method Description

Opiates exist in patient urine as both free and either sulfate or glucuronide conjugates. Specimens are initially screened by immunoassay followed by enzyme hydrolysis is used to liberate the conjugated drug. Specimens are then centrifuged, diluted, and the analytes are separated by liquid chromatography-tandem mass spectroscopy and analyzed by multiple reaction monitoring.(Unpublished Mayo method)

PDF Report

No

Day(s) and Time(s) Test Performed

Monday through Friday, Varies

Analytic Time

2 days

Maximum Laboratory Time

5 days

Specimen Retention Time

14 days

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

Test ID	Test Order Name	Order LOINC Value
OPATX	Opiate Confirmation, CoC, U	In Process

Result ID	Test Result Name	Result LOINC Value
6541	Opiates Immunoassay Screen	70151-6
36213	Codeine-by LC-MS/MS	16250-3
42005	Dihydrocodeine-by LC-MS/MS	19448-0
36214	Hydrocodone-by LC-MS/MS	16252-9
42006	Norhydrocodone-by LC-MS/MS	61422-2
36215	Hydromorphone-by LC-MS/MS	16998-7
36216	Oxycodone-by LC-MS/MS	16249-5
42007	Noroxycodone-by LC-MS/MS	61425-5
36212	Oxymorphone-by LC-MS/MS	17395-5
42008	Noroxymorphone-by LC-MS/MS	90894-7
42009	Naloxone-by LC-MS/MS	77207-9
36217	Morphine-by LC-MS/MS	16251-1
36218	Opiates Interpretation	18390-5
36219	Chain of Custody	77202-0