

Overview

Useful For

Monitoring therapeutic efficacy, compliance, misuse and/or abuse in serum specimens of patients who have been prescribed any of the following: codeine, hydrocodone, oxycodone, morphine, hydromorphone, oxymorphone, and dihydrocodeine,

Detection and quantification of codeine, hydrocodone, oxycodone, morphine, hydromorphone, oxymorphone, noroxycodone, noroxymorphone, norhydrocodone, dihydrocodeine, and 6-monoacetylmorphine

Special Instructions

- [Clinical Toxicology CPT Code Client Guidance](#)

Method Name

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

NY State Available

Yes

Specimen

Specimen Type

Serum Red

Ordering Guidance

This test should only be ordered by healthcare professionals to monitor patients who have been prescribed any of the following opiates/opiates antagonists: codeine, oxycodone, noroxycodone, oxymorphone, hydrocodone, norhydrocodone, dihydrocodeine, morphine, 6-monoacetylmorphine, hydromorphone, and noroxymorphone.

Specimen Required

- Supplies:** Sarstedt Aliquot Tube, 5 mL (T914)
- Collection Container/Tube:** Red top (Serum gel/SST are **not acceptable**)
- Submission Container/Tube:** Plastic vial
- Specimen Volume:** 1 mL serum
- Collection Instructions:** Centrifuge and aliquot serum into a plastic vial.

Specimen Minimum Volume

Serum: 0.5 mL

Reject Due To

|                 |        |
|-----------------|--------|
| Gross hemolysis | Reject |
| Gross lipemia   | OK     |
| Gross icterus   | OK     |

Specimen Stability Information

| Specimen Type | Temperature              | Time     | Special Container |
|---------------|--------------------------|----------|-------------------|
| Serum Red     | Refrigerated (preferred) | 14 days  |                   |
|               | Ambient                  | 24 hours |                   |
|               | Frozen                   | 28 days  |                   |

Clinical & Interpretive

Clinical Information

Opiates are the natural or synthetic drugs that have a morphine-like pharmacological action. They are used primarily for relief of pain and often produce physical and psychological dependence. This test is for use by healthcare professionals to determine if patients prescribed any of the following opiates/opioids are receiving the right dose for therapeutic efficacy and/or are compliant: codeine, oxycodone, noroxycodone, oxymorphone, hydrocodone, norhydrocodone, dihydrocodeine, morphine, 6-monoacetylmorphine, hydromorphone, and noroxymorphone.

Reference Values

Therapeutic range/Metabolite information (as applicable):

6-monoacetylmorphine: Metabolite of heroin

Codeine: 10-100 ng/mL

Morphine: 10-80 ng/mL when used as sole therapy; Minor metabolite of codeine

Hydromorphone: 1.0-30 ng/mL when used as sole therapy; Metabolite of hydrocodone and minor metabolite of morphine

Hydrocodone: 10-100 ng/mL

Dihydrocodeine: 72-150 ng/mL when used as sole therapy; Minor metabolite of hydrocodone

Norhydrocodone: Metabolite of hydrocodone

Oxycodone: 10-100 ng/mL

Noroxycodone: Metabolite of oxycodone

Oxymorphone: 1.0-8.0 ng/mL when used as sole therapy; Metabolite of oxycodone

Noroxymorphone: Metabolite of oxymorphone

Cutoff concentrations:

6-Monoacetylmorphine: 1.0 ng/mL

Codeine: 1.0 ng/mL

Morphine: 1.0 ng/mL

Hydromorphone: 1.0 ng/mL

Hydrocodone: 1.0 ng/mL

Dihydrocodeine: 1.0 ng/mL

Norhydrocodone: 1.0 ng/mL

Oxycodone: 1.0 ng/mL  
Noroxycodone: 1.0 ng/mL  
Oxymorphone: 1.0 ng/mL  
Noroxymorphone: 1.0 ng/mL

**Interpretation**

Clinically, the presence of oxycodone, noroxycodone, oxymorphone, noroxymorphone, morphine, hydrocodone, norhydrocodone, hydromorphone, dihydrocodeine, codeine, and/or 6-monoacetylmorphine in serum can be used to verify adherence or compliance to prescribed opioids, and discourage drug misuse, abuse, and diversion.

The following adult therapeutic ranges are suggested by literature but must be interpreted alongside other clinical features/test results, symptoms, collection time since last dosage was taken, and signs of abuse/misuse.

6-monoacetylmorphine: Not established, it is a metabolite of heroin

Codeine: 10-100 ng/mL

Morphine: 10-80 ng/mL when used as sole therapy; it is also a minor metabolite of codeine

Hydromorphone: 1.0-30 ng/mL when used as sole therapy; it is also a metabolite of hydrocodone and minor metabolite of morphine.

Hydrocodone: 10-100 ng/mL

Dihydrocodeine: 72-150 ng/mL when used as sole therapy; it is also a minor metabolite of hydrocodone.

Norhydrocodone: Not established; it is a metabolite of hydrocodone.

Oxycodone: 10-100 ng/mL

Noroxycodone: Not established; it is a metabolite of oxycodone.

Oxymorphone: 1.0-8.0 ng/mL when used as sole therapy; it is a metabolite of oxycodone.

Noroxymorphone: Not established; it is a metabolite of oxymorphone.

**Cautions**

Any aberrant result should be discussed with the patient and could be confirmed by re-testing or using an alternative matrix (eg, urine).

**Clinical Reference**

1. Jannetto PJ, Bratanow NC, Clark WA, et al. American Association of Clinical Chemistry Laboratory Medicine Practice Guideline-using clinical laboratory tests to monitor drug therapy in pain management patients. J Appl Lab Med. 2018;2(4):489-526. doi:10.1373/jalm.2017.023341
2. Langman LJ, Bechtel LK, Holstege CP. Clinical toxicology. In: Rifai N, Chiu RWK, Young I, Burnham C-AD, Wittwer CT, eds. Tietz Textbook of Laboratory Medicine. 7th ed. Elsevier; 2023:chap 43

**Performance****Method Description**

The opiates are extracted from serum using a solvent to precipitate proteins. The supernatant is removed and analyzed by liquid chromatography tandem mass spectrometry.(Unpublished Mayo method)

**PDF Report**

No

Day(s) Performed

Tuesday

Report Available

2 to 9 days

Specimen Retention Time

14 days

Performing Laboratory Location

Mayo Clinic Laboratories - Rochester Superior Drive

Fees & 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 account representative. 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. It has not been cleared or approved by the US Food and Drug Administration.

CPT Code Information

G0480  
80361 (if appropriate for select payers)  
80365 (if appropriate for select payers)  
80356 (if appropriate for select payers)  
[Clinical Toxicology CPT Code Client Guidance](#)

LOINC® Information

| Test ID | Test Order Name                     | Order LOINC® Value |
|---------|-------------------------------------|--------------------|
| OPATS   | Opiate Panel, Free (Unconjugated),S | In Process         |

| Result ID | Test Result Name            | Result LOINC® Value |
|-----------|-----------------------------|---------------------|
| 623436    | 6-monoacetylmorphine - Free | 49749-5             |
| 623437    | Codeine - Free              | 12784-5             |
| 623438    | Morphine - Free             | 11244-1             |
| 623439    | Hydromorphone - Free        | 12787-8             |
| 623440    | Hydrocodone - Free          | 12786-0             |
| 623441    | Dihydrocodeine - Free       | 12785-2             |
| 623442    | Norhydrocodone - Free       | In Process          |

|        |                       |            |
|--------|-----------------------|------------|
| 623443 | Oxycodone - Free      | 12789-4    |
| 623444 | Noroxycodone - Free   | In Process |
| 623445 | Oxymorphone - Free    | 46974-2    |
| 623446 | Noroxymorphone - Free | In Process |