Test Definition: BUPM

Buprenorphine and Norbuprenorphine, Random, Urine

Overview

Useful For

Monitoring of compliance utilizing buprenorphine

Detection and confirmation of the illicit use of buprenorphine

Special Instructions

- Clinical Toxicology CPT Code Client Guidance

Highlights

Detection of buprenorphine and norbuprenorphine in urine for compliance testing.

Method Name

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

NY State Available

Yes

Specimen

Specimen Type

Urine

Ordering Guidance

For screening buprenorphine alone, order BUPS / Buprenorphine Screen, Random, Urine.

For comprehensive opioid screening, order TOSU / Targeted Opioid Screen, Random, Urine.

For situations where chain of custody is required, a Chain of Custody Kit (T282) is available. For chain-of-custody testing, order BUPMX / Buprenorphine and Norbuprenorphine, Chain of Custody, Random, Urine.

Additional drug panels and specific requests are available. Call 800-533-1710 or 507-266-5700.

Additional Testing Requirements

If urine creatinine is required or adulteration of the sample is suspected, the following test should also be ordered, ADULT / Adulterants Survey, Random, Urine.

Specimen Required

Supplies: Sarstedt Aliquot Tube, 5 mL (T914)

Collection Container/Tube: Plastic urine container
Submission Container/Tube: Plastic vial
Specimen Volume: 1 mL
Collection Instructions:
1. Collect a random urine specimen.
2. No preservative
Additional Information:
1. No specimen substitutions.
2. STAT requests are **not accepted** for this test.
3. Submitting less than 1 mL will compromise the ability to perform all necessary testing.

Forms

If not ordering electronically, complete, print, and send a Therapeutics Test Request (T831) with the specimen.

Specimen Minimum Volume

0.5 mL

Reject Due To

Gross hemolysis	OK
Gross icterus	OK

Specimen Stability Information

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

Clinical & Interpretive

Clinical Information

Clinically, buprenorphine is utilized as a substitution therapy for opioid dependence and as an analgesic. Buprenorphine is a partial agonist of the mu-opioid receptor. These mu binding sites are discretely distributed in the human brain, spinal cord, and other tissue. The clinical effects of mu receptor agonists are sedation, euphoria, respiratory depression, and analgesia. As a partial mu receptor agonist, buprenorphine's clinical effects are decreased, giving buprenorphine a wider safety margin.(1) Buprenorphine has a prolonged duration of activity. The combination of decreased clinical effects and prolonged activity gives buprenorphine the added advantage of a delayed and decreased withdrawal syndrome, compared to other opioids.(1) Compared to morphine, buprenorphine is 25 to 40 times more potent.(1) As with any opioid, abuse is always a concern. To reduce illicit use of buprenorphine, it is available mixed with naloxone in a ratio of 4:1. When the combination is taken as prescribed, only small amounts of naloxone will be absorbed. However, if the combination is transformed into the injectable form, naloxone then acts as an opioid receptor antagonist.

Buprenorphine is metabolized through N-dealkylation to norbuprenorphine through cytochrome P450 3A4 (CYP3A4). Both parent and metabolite then undergo glucuronidation. Norbuprenorphine is an active metabolite possessing one-fifth of the potency of its parent. The glucuronide metabolites are inactive.(1)

The primary clinical utility of quantification of buprenorphine in urine is to identify patients that have strayed from opioid dependence therapy.

Reference Values

Negative (Positive results are reported with a quantitative result)

Cutoff concentrations by liquid chromatography tandem mass spectrometry:
Buprenorphine: 5.0 ng/mL
Norbuprenorphine: 2.5 ng/mL

Interpretation

The presence of buprenorphine above 5.0 ng/mL or norbuprenorphine above 2.5 ng/mL is a strong indicator that the patient has used buprenorphine.

Cautions

Urine concentrations do not correlate well with serum drug levels and are not intended for therapeutic drug management.

Clinical Reference

1. Elkader A, Sproule B. Buprenorphine: clinical pharmacokinetics in the treatment of opioid dependence. Clin Pharmacokinet. 2005;44(7):661-680
2. Grimm D, Pauly E, Poschl J, Linderkamp O, Skopp G. Buprenorphine and norbuprenorphine concentrations in human breast milk samples determined by liquid chromatography-tandem mass spectrometry. Ther Drug Monit. 2005;27(4):526-530
3. Kacinko SL, Shakleya DM, Huestis MA. Validation and application of a method for the determination of buprenorphine, norbuprenorphine, and their glucuronide conjugates in human meconium. Anal Chem. 2008;80(1):246-252
4. Concheiro M, Shakleya DM, Huestis MA. Simultaneous quantification buprenorphine, norbuprenorphine, buprenorphine-glucuronide and norbuprenorphine-glucuronide in human umbilical cord by liquid chromatography tandem mass spectrometry. Forensic Sci Int. 2009;188(1-3):144-151
5. Langman LJ, Bechtel LK, Holstege CP. Clinical toxicology. In: Rifai N, Chiu RWK, Young I, Burnham CAD, Wittwer CT, eds. Tietz Textbook of Laboratory Medicine. 7th ed. Elsevier; 2023:chap 43
6. Baselt RC. Disposition of Toxic Drugs and Chemicals in Man. 10th ed. Biomedical Publications; 2014:2211

Performance

Method Description

Buprenorphine and its major metabolite (norbuprenorphine) are liberated from conjugation by enzyme hydrolysis.

Acetonitrile is added to the sample and an aliquot of the supernatant is diluted with water. Analysis is performed by liquid chromatography mass spectrometry/mass spectrometry using multiple reaction monitoring.(Unpublished Mayo method)

PDF Report
No

Day(s) Performed
Monday through Friday

Report Available
3 to 5 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
80348 (if appropriate for select payers)
Clinical Toxicology CPT Code Client Guidance

LOINC® Information

Test ID	Test Order Name	Order LOINC® Value
BUPM	Buprenorphine and Metabolite, U	69033-9

Result ID	Test Result Name	Result LOINC® Value
66200	Buprenorphine	3415-7
48296	Norbuprenorphine	49753-7