Atlas Medical CE

Buprenorphine Test Cassette (Urine)

A rapid, one step test for the qualitative detection of Buprenorphine in human urine.

IVD *For in vitro diagnostic use only.*

2 – 30°C Store at 2-30 °c

INTENDED USE

The BUP One Step Buprenorphine Test Cassette (Urine) is a lateral flow chromatographic immunoassay for the detection of Buprenorphine in human urine at a cut-off concentration of 10 ng/mL.

This assay provides only a qualitative, preliminary analytical test result. A more specific alternate chemical method must be used in order to obtain a confirmed analytical result. Gas chromatography/mass spectrometry (GC/MS) or Liquid Chromatography/mass spectrometry (LC/MS) are the preferred confirmatory methods. Clinical consideration and professional judgment should be applied to any drug of abuse test result, particularly when preliminary positive results are used.

INTRODUCTION

Buprenorphine is a potent analgesic often used in the treatment of opioid addiction. The drug is sold under the trade names Subutex,™ Buprenex,™ Temgesic,™ and Suboxone™ which contain Buprenorphine HCl alone or in combination with Naloxone HCl. Therapeutically, Buprenorphine is used as a substitution treatment for opioid addicts. Substitution treatment is a form of medical care offered to opiate addicts (primarily heroin addicts) based on a similar or identical substance to the drug normally used. In substitution therapy, Buprenorphine is as effective as Methadone but demonstrates a lower level of physical dependence. Concentrations of free Buprenorphine and Norbuprenorphine in urine may be less than 1 ng/mL after therapeutic administration, but can range up to 20 ng/mL in abuse situations. The plasma half-life of Buprenorphine is 2-4 hours. While complete elimination of a single-dose of the drug can take as long as 6 days, the detection window for the parent drug in urine is thought to be approximately 3 days.

The BUP One Step Buprenorphine Test Cassette (Urine) is a rapid urine screening test that can be performed without the use of an instrument. The test utilizes a monoclonal antibody to selectively detect elevated levels of Buprenorphine in urine. The BUP One Step Buprenorphine Test Cassette (Urine) yields a positive result when Buprenorphine in urine exceeds 10 ng/mL.

PRINCIPLE

The BUP One Step Buprenorphine Test Cassette (Urine) is an immunoassay based on the principle of competitive binding. Drugs which may be present in the urine specimen compete against the drug conjugate for binding sites on the antibody.

During testing, a urine specimen migrates upward by capillary action. Buprenorphine, if present in the urine specimen below 10 ng/mL, will not saturate the binding sites of antibody-coated particles in the test. The antibody-coated particles will then be captured by immobilized Buprenorphine conjugate and a visible colored line will show up in the test line region. The colored line will not form in the test line region if the Buprenorphine level exceeds 10 ng/mL because it will saturate all the binding sites of anti-Buprenorphine antibodies.

A drug-positive urine specimen will not generate a colored line in the test line region because of drug competition, while a drug-negative urine specimen or a specimen containing a drug concentration lower than the cut-off will generate a line in the test line region. To serve as a procedural control, a colored line will always appear in the control line region, indicating that proper volume of specimen has been added and membrane wicking has occurred.

MATERIALS

Materials Provided

- Test Cassette (contains mouse monoclonal anti-Buprenorphine antibody-coupled particles and Buprenorphine-protein conjugate. A goat antibody is employed in the control line system).
- Package insert.

Materials Required But Not Provided

- Specimen collection container
- Timer

PRECAUTIONS

- For medical and other professional *in vitro* diagnostic use only. Do not use after the expiration date.
- The test should remain in the sealed pouch until use.
- All specimens should be considered potentially hazardous and handled in the same manner as an infectious agent.
- The used test should be discarded according to local regulations.

STORAGE AND STABILITY

- Store as packaged in the sealed pouch either at room temperature or refrigerated (2-30°C).
- The test is stable through the expiration date printed on the sealed pouch.
- The test must remain in the sealed pouch until use.
- Do not freeze.
- Do not use beyond the expiration date.

SPECIMEN COLLECTION AND PREPARATION

Urine Assay

The urine specimen must be collected in a clean and dry container. Urine collected at any time of the day may be used. Urine specimens exhibiting visible precipitates should be centrifuged, filtered, or allowed settle to obtain a clear specimen for testing.

Specimen Storage

Urine specimens may be stored at 2-8°C for up to 48 hours prior to assay. For prolonged storage, specimens may be frozen and stored below -20°C. Frozen specimens should be thawed and mixed before testing.

PROCEDURE

Allow the test Cassette, urine specimen, and/or controls to reach room temperature (15-30°C) prior to testing.

1. Bring the pouch to room temperature before opening it. Remove the test Cassette from the sealed pouch and use it as soon as possible.
2. Place the test device on a clean and level surface. Hold the dropper vertically and transfer 3 full drops of urine (approx. 100µl) to the specimen well (S) of the test device, and then start the timer. Avoid trapping air bubbles in the specimen well (S). See the illustration below.
3. Wait for the red line(s) to appear. The result should be read at 5 minutes. It is important that the background is clear before the result is read. Do not interpret the result after 10 minutes.

INTERPRETATION OF RESULTS

(Please refer to the illustration)

NEGATIVE:* Two distinct colored lines appear. One colored line should be in the control line region (C), and another apparent colored line should be in the test line region (T). This negative result indicates that the Buprenorphine concentration is below the detectable level (10 ng/mL).

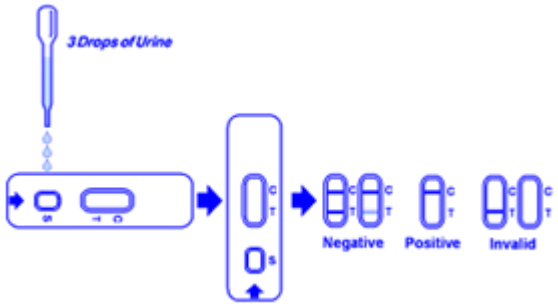
NOTE:

The shade of color in the test line region (T) will vary, but it should be considered negative whenever there is even a faint colored line.

POSITIVE: One colored line appears in the control region (C).

No line appears in the test line region (T). This positive result indicates that the Buprenorphine concentration exceeds the detectable level (10 ng/mL).

INVALID: Control line (C) fails to appear. Insufficient specimen volume or incorrect procedural techniques are the most likely reasons for control line failure. Review the procedure and repeat the test using a new test. If the problem persists, discontinue using the lot immediately and contact your local distributor.



QUALITY CONTROL

A procedural control is included in the test. A colored line appearing in the control region (C) is considered an internal procedural control. It confirms sufficient specimen volume, adequate membrane wicking and correct procedural technique.

Control standards are not supplied with this kit; however it is recommended that positive and negative controls be tested as good laboratory practice to confirm the test procedure and to verify proper test performance.

LIMITATION

1. The BUP One Step Buprenorphine Test Cassette (Urine) provides only a qualitative, preliminary analytical result. A secondary analytical method must be used to obtain a confirmed result. Gas chromatography/mass spectrometry (GC/MS) or liquid chromatography/mass spectrometry (LC/MS) are the preferred confirmatory methods. [2,3]
2. It is possible that technical or procedural errors, as well as other interfering substances in the urine specimen may cause erroneous results.
3. Adulterants, such as bleach and/or alum, in urine specimens may produce erroneous results regardless of the analytical method used. If adulteration is suspected, the test should be repeated with another urine specimen.
4. A positive result indicates presence of the drug or its metabolites but does not indicate level of intoxication, administration route or concentration in urine.
5. A negative result may not necessarily indicate drug-free urine. Negative results can be obtained when drug is present but below the cut-off level of the test.
6. Test does not distinguish between drugs of abuse and certain medications.

PERFORMANCE CHARACTERISTICS

Accuracy

A correlation study was conducted on fifty-eight (58) clinical specimens from patients reporting Buprenorphine use and one-hundred fifty (150) urine specimens collected from presumed non-drug users. Using the BUP One Step Buprenorphine Test Cassette (Urine), the specimens were tested and compared to the self-reported use of Buprenorphine. All specimens, including the ones showing negative results, were then confirmed by LC/MS. The following results were tabulated:

Method		Patient Self-Report		Total Results
BUP One Step Test Cassette	Results	Positive	Negative	
	Positive	51	0	51
	Negative	7	150	157
Total Results		58	150	208
% Agreement		88%	>99%	97%

When compared at 10 ng/mL with LC/MS, the following results were tabulated:

Method		LC/MS		Total Results
BUP One Step Test Cassette	Results	Positive	Negative	
	Positive	55	2	57
	Negative	1	168	169
Total Results		56	170	226
% Agreement		98%	99%	99%

Analytical Sensitivity

A drug-free urine pool was spiked with Buprenorphine at the following concentrations: 0 ng/mL, 5 ng/mL, 7.5 ng/mL, 10 ng/mL, 12.5 ng/mL and 15 ng/mL. The result demonstrates >99% accuracy at 50% above and 50% below the cut-off concentration. The data are summarized below:

Buprenorphine Concentration (ng/mL)	Percent of Cut-off	n	Visual Result	
			Negative	Positive
0	0%	90	90	0
5	-50%	90	90	0
7.5	-25%	90	75	15
10	Cut-off	90	60	30
12.5	+25%	90	31	59
15	+50%	90	0	90

Analytical Specificity

The following table lists compounds that are positively detected in urine by the BUP One Step Buprenorphine Test Cassette (Urine) at 5 minutes.

Compound	Conc. (ng/mL)	Compound	Conc. (ng/mL)
Buprenorphine	10	Buprenorphine 3-D-Glucuronide	15
Norbuprenorphine	20	Norbuprenorphine 3-D-Glucuronide	200

Precision

A study was conducted at 3 physician's offices by untrained operators using 3 different lots of product to demonstrate the within run, between run and between operator precision. An identical panel of coded specimens containing no Buprenorphine, 25% Buprenorphine above and below the cutoff and 50% Buprenorphine above and below the 10 ng/mL cutoff were provided to each site. The following results were tabulated:

Buprenorphine Concentration (ng/mL)	n per Site	Site A		Site B		Site C	
		-	+	-	+	-	+
0	15	15	0	15	0	15	0
5	15	15	0	15	0	15	0
7.5	15	8	7	10	5	9	6
12.5	15	0	15	1	14	0	15
15	15	0	15	0	15	0	15

Effect of Urinary Specific Gravity

Fifteen urine samples with specific gravities ranging from 1.004 to 1.034 were spiked with Buprenorphine to the concentrations of 5 ng/mL, and 15 ng/mL. The BUP One Step Buprenorphine Test Cassette (Urine) was tested in duplicate using the fifteen neat and spiked urine specimens. The results demonstrate that varying ranges of urinary specific gravity do not affect the test results.

Effect of the Urinary pH

The pH of an aliquoted negative urine pool was adjusted to a pH range of 5 to 9 in 1 pH unit increments and spiked with Buprenorphine to 5 ng/mL and 15 ng/mL. The spiked, pH-adjusted urine was tested with the BUP One Step Buprenorphine Test Cassette (Urine) in duplicate. The results demonstrate that varying ranges of pH do not interfere with the performance of the test.

Cross-Reactivity

A study was conducted to determine the cross-reactivity of the test with compounds in either drug-free urine or Buprenorphine positive urine. The following compounds show no cross-reactivity when tested with the BUP One Step Buprenorphine Test Cassette (Urine) at a concentration of 100 µg/mL.

Non Cross-Reacting Compounds

4-Acetamidophenol	Fenfluramine	Oxolinic acid
Acetone	Fenoprofen	Oxycodone
Acetophenetidin	Fentanyl	Oxymetazoline
Acetylsalicylic acid	Fluoxetine	Oxymorphone
N-Acetylprocainamide	Furosemide	Papaverine
Albumin	Gentisic acid	Pemoline
Aminopyrine	d-Glucose	Penicillin-G
Amitryptyline	Guaiacol Glyceryl Ether	Pentazocine
Amobarbital	Guaiacol Glyceryl Ether carbamate	Pentobarbital
Amoxapine	Hemoglobin	Perphenazine
Amoxicillin	Hydralazine	Phencyclidine
L-Amphetamine	Hydrochlorothiazide	Phenelzine
Ampicillin	Hydrocodone	Pheniramine
Apomorphine	Hydrocortisone	Phenobarbital
Aspartame	Hydromorphone	Phenothiazine
Atropine	p-	Phentermine

	Hydroxyamphetamine	
Benzilic acid	O-Hydroxyhippuric acid	Trans-2- phenyl cyclopropylamine
Benzoic acid	p-Hydroxymethamphetamine	L-Phenylephrine
Benzoylecgonine	p-Hydroxynorephedrine	B-Phenylethylamine
Benzphetamine	Hydroxyzine	Phenylpropanolamine (dL-norephedrine)
Bilirubin	3-Hydroxytyramine	Noscapine
dl-Brompheniramine	Ibuprofen	D,L-Octopamine
Buspirone	Ethyl-p-aminobenzoate	Orphenadrine
Caffeine	Etodolac	dl-Phenylpropanolamine
Cannabidiol	Famprofazone	Prednisolone
Cannabinol	Imipramine	Prednisone
Chloral hydrate	Iproniazid	5 beta-pregnane3alpha17alpha-21triol 21
Chloramphenicol	l-Isoproterenol	
Chlordiazepoxide	Isoxsuprine	Procaine
Chloroquine	Kanamycin	Promazine
Chlorothiazide	Ketamine	Promethazine
d-Chlorpheniramine	Ketoprofen	D,L-Propanolol
dl-Chlorpheniramine	Labetalol	D-Propoxyphene
Chlorpromazine	L-Ascorbic acid	D-Pseudoephedrine
Chlorprothixene	L-Ephedrine	Quinacrine
Cholesterol	L-Epinephrine	Quinidine
Cimetidine	Levorphanol	Quinine
Clomipramine	Lidocaine	Ranitidine
Clonidine	Lindane	Riboflavin
Cocaine HCl	Lithium carbonate	Salicylic acid
Codeine	Loperamide	Secobarbital
Cortisone	Maprotiline	Serotonin (5-hydroxytyramine)
l-Cotinine	Meperidine	Sodium chloride
Creatinine	Mephentermine	Sulfamethazine
Cyclobarbital	Meprobamate	Sulindac
Cyclobenzaprine	Methadone	Temazepam
Deoxycorticosterone	D-Methamphetamine	Tetracycline
l-Deoxyephedrine	L-Methamphetamine	Tetrahydrocortisone ,3-acetate
L-Depreny	Methaqualone	Tetrahydrozoline
Dextromethorphan	Methoxyphenamine	Thebaine
Diazepam	L-3,4-Methylenedioxy-	Theophylline

	amphetamine (MDA)	
Diclofenac	D-3,4 Methylendioxy-methamphetamine	Thiamine
Dicyclomine	Methylphenidate	Thioridazine (chlorpromazine)
Diflunisal	Methyprylon	L-Thyroxine
Digoxin	Methaqualone	Tolbutamide
4-Dimethylaminoantipyrine	Metoprolol	Cis-Tramadol
Diphenhydramine	Morphine sulfate	Trazodone
5,5-Diphenylhydantoin	Morphine-3-β-D-glucuronide	Triamterene
Disopyramide	Nalidixic acid	Trifluoperazine
Doxylamine	Nalorphine	Trimethobenzamide
Ecgonine hydrochloride	Naloxone	Trimethoprim
Ecgonine methyl ester	Naltrexone	Trimipramine
EDDP	Methyprylon	Tryptamine
Efavirenz (Sustiva)	Metoprolol	D, L-Tryptophan
EMDP	Nimesulide	Tyramine
Ephedrine	Norcodeine	D, L-Tyrosine
(1r,2s)-(-)Ephedrine	Morphine sulfate	Uric acid
l-ψ-Ephedrine	Alpha-Naphthaleneacetic Acid	Verapamil
dl-Epinephrine	Norethindrone	Zomepirac
Erythromycin	Normorphine	
β-Estradiol	D-Norpropoxyphene	
Estrone-3-sulfate	Oxazepam	
Ethanol (Ethyl alcohol)		

REFERENCES

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2. Baselt RC. Disposition of Toxic Drugs and Chemicals in Man. 6th Ed. Biomedical Publ., Davis, CA.,129, 2002
3. Hawks RL, CN Chiang. Urine Testing for Drugs of Abuse. National Institute for Drug Abuse (NIDA), Research Monograph 73, 1986.

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REF	Catalogue Number		Temperature limit
IVD	In Vitro diagnostic medical device		Caution
Σ	Contains sufficient for <n> tests and Relative size		Consult instructions for use (IFU)
LOT	Batch code		Manufacturer
	Do not re-use		Use-by date
	Manufacturer fax number		Do not use if package is damaged
	Manufacturer telephone number		Date of Manufacture
	Keep away from sunlight		Keep dry