DRUGSMART Instructions

FOR IN VITRO DIAGNOSTIC USE ONLY

INDICATIONS FOR USE

The DrugSmart Cup® is a an in vitro diagnostic test for the rapid detection of the following drugs in human urine:

Test Code	Drug (Analyte)	Cut-off (ng/ml)
AMP	Amphetamine	1000
BAR	Barbiturates	300
BZD	Benzodiazepines	300
COC	Cocaine	300
MDMA	3,4-methylenedioxymethamphetamine	500
MET	Methamphetamine	1000
MTD	Methadone	300
OPI300	Opiates 300	300
OPI	Opiates	2000
OXY	Oxycodone	100
PCP	Phencyclidine	25
TCA	Tricyclic Antidepressants	1000
THC	THC (Marijuana)	50

This test is intended for use in professional settings as the first step in a two step process to provide users with information concerning the presence or absence of the above stated drugs or their metabolites in a urine sample.

Tests for prescription drugs will yield preliminary positive results when prescription drugs are ingested, even at or above therapeutic doses. There are no uniformly recognized drug cutoffs for barbiturates, benzodiazepine and tricyclic antidepressants in urine. The multi-drug of abuse urine test device shows the drug was or was not present at the cutoff level.

The DrugSmart Cup® is CLIA waived. A certificate of waiver is needed for your laboratory in order to run this test. All applicable state and local laws must be met. Laboratories with a certificate of waiver must follow the manufacturer's instructions for performing the test, including use with only the waived specimen type(s). Any modification to the test or manufacturer's instructions will result in the test being classified as high complexity and is no longer CLIA waived.

This test provides only a preliminary 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 High Performance Liquid Chromatography (HPLC) is the preferred confirmatory method.

Clinical consideration and professional judgment should be applied to any drug of abuse test result, particularly when preliminary positive results are obtained

SUMMARY AND EXPLANATION

Drug abuse remains a growing social and economic concern in many developed and developing countries throughout the world. The above stated drugs are among the most frequently abused illicit drugs according to the U.S. Substance Abuse and Mental Health Services Administration (SAMHSA) and the U.S. Department of Health and Human Services.

The DrugSmart Cup uses a fast, qualitative, visually read competitive immunoassay method for screening without the need for instrumentation. The method employs a mixture of antibodies and antigens to selectively identify the drugs of abuse and their metabolites in test samples with a high degree of sensitivity.

The length of time following drug use for which a positive result may occur is dependent upon several factors including the frequency and amount of drug, metabolic rate, drug half-life, and the drug use's age, weight, activity, and diet.

TEST PRINCIPLE

The DrugSmart Cup® is a competitive immunoassay in which drugs and drug metabolites in a urine sample compete with immobilized drug conjugate for limited labeled antibody binding sites. By utilizing antibodies that are specific to different drug classes, the test permits independent, simultaneous detection of up to ten drugs from a single urine sample. The test results can be read at 5 minutes.

In the assay procedure, urine mixes with labeled antibody-dye conjugate and migrates along a porous membrane. When the concentration of a given drug is below the detection limit of the test, unbound antibody-dye conjugate binds to antigen conjugate immobilized on the membrane, producing a colored line in the appropriate Test Zone for that drug. Conversely, when the drug level is at or above the detection limit, free drug competes with the immobilized antigen conjugate on the membrane by binding to antibody-dye conjugate, forming an antigen-antibody complex and preventing the development of a colored line in the Test Zone.

Regardless of the drug levels in the sample, a colored line is produced in each Control Zone by a parallel immunochemical reaction. The presence of this colored line in the control region serves as 1) verification that sufficient volume is added and 2) that proper flow is obtained.

REAGENTS & MATERIALS SUPPLIED

- 25 test cups with strips containing dye-conjugated antibody and immobilized antigen in a protein matrix with sodium azide.
- Test Instructions.

MATERIAL REQUIRED BUT NOT PROVIDED

- Timing device (i.e. timer, clock, watch, etc.).

WARNINGS AND PRECAUTIONS

- For *in vitro* diagnostic use only
- Urine specimens may be potentially infectious. Proper handling and disposal methods should be established.
- Avoid cross-contamination of urine samples by using a new specimen collection container for each urine sample.
- Test device should remain sealed until ready for use.
- Do not use the test kit after the expiration date.
- A positive test result does not always mean an individual has taken the drug illegally as the drug may have been administered legally.

STORAGE AND STABILITY

The DrugSmart Cup® should be stored at 2-30°C (36-86°F) in the original sealed pouch. Do not freeze. Do not store and or expose reagent kits at temperature greater than 30°C.

SPECIMEN COLLECTION AND PREPARATION

Fresh urine does not require any special handling or pretreatment. A fresh urine sample should be collected in the test cup with a minimum of 30ml volume. **The DrugSmart Cup® employs a thermal strip to validate the urine collection. This device should be checked immediately after collection.**

TEST PROCEDURE

If specimen, control, or test devices have been stored at refrigerated temperatures, allow them to warm to room temperature before testing.
Do not open test device pouch until ready to perform the test.

1. Tear open the foil pouch and remove the Test Cup.
2. Issue the device to the individual to be tested.
3. Have them urinate directly into the Test Cup. Ensure the specimen is above the minimum level line indicated on the test cup label.
4. The cup must be returned immediately to the collector. Authorized personnel at the collection site is to remove tear-off label and read the results at five minutes post collection.

NOTE: In order to prevent any incorrect results, the test results should **not** be interpreted after 10 minutes.

INTERPRETATION OF RESULTS
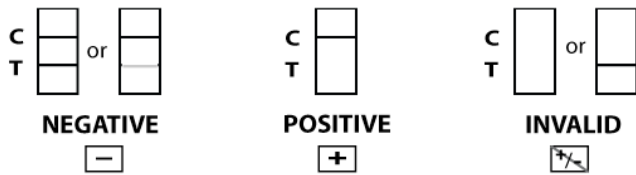
Negative (-): Colored lines appear in both Control Region (C) and Test Region (T). The line in the control region is the control line, which is used to indicate proper performance of the device. The line in the test region is the drug probe line. The test line may have varying intensity either weaker or stronger in color than that of the control line. A negative result for a drug indicates that the concentration of that drug in urine is below the cutoff level.

Positive (+): Colored line appears in the control region only. **No line appears in the test region.** The complete absence of a test line indicates a positive result for that drug. A preliminary positive result for a drug indicates that the concentration of that drug in urine is at or above the cutoff level.

Invalid: No colored line appears in the control region. If the control line does not form, the test result is inconclusive and should be repeated. Each strip in the DrugSmart Cup is read and functions independently. An invalid result on one test strip does not invalidate other results derived from the same device.

Each test strip is read individually and independently of one another.

QUALITY CONTROL

An internal procedural control is included in the test device. A line must form in the Control band region regardless of the presence or absence of drugs or metabolites. The presence of the line in the Control region indicates that the proper sample volume has been used and that the reagents are migrating properly. If the line in the Control region does not form, the test is considered invalid.

To ensure proper kit performance, it is recommended that the test devices be tested once a week with external controls. External controls are available from commercial sources. It is important to make sure that the control values are within established limits. If the values of external control do not fall within established limits, the test results are invalid. Additional controls may be tested according to guidelines or requirements of local, state, and/or federal regulations or accrediting organizations.

LIMITATIONS OF PROCEDURE

- The assay is designed for use with human urine only.
- A positive result with any of the tests indicates only the presence of a drug/metabolite and does not indicate or measure intoxication.
- There is a possibility that technical or procedural error as well other substances as factors not listed may interfere with the test and cause false results. See SPECIFICITY for lists of substances that will produce positive results, or that do not interfere with test performance.
- If adulteration is suspected, the test should be repeated with new sample.

PERFORMANCE CHARACTERISTICS
Accuracy

The accuracy of the DrugSmart Cup® was evaluated using urine specimens from clinical laboratories where the samples were analyzed by GC/MS. In addition, tests were also compared with other commercially available. The results of accuracy study are presented in the following tables:

AMPHETAMINE

	Predicate Kit Positive	Predicate Kit Negative
DrugSmart Positive	47	0
DrugSmart Negative	0	79

When compared to predicate kit, the agreement for positive samples was 100% and for negative samples was 100%. With respect to predicate kit, the agreement for all samples was 100%.

	GC/MS Positive	GC/MS Negative
DrugSmart Positive	45	2
DrugSmart Negative	1	78

When compared with GC/MS, the agreement for positive samples was 97.8% and for negative samples was 97.5%. With respect to GC/MS, the agreement for all samples was 97.6%.

BARBITURATES

	Predicate Kit Positive	Predicate Kit Negative
DrugSmart Positive	56	0
DrugSmart Negative	0	60

When compared to predicate kit, the agreement for positive samples was 100% and for negative samples was 100%. With respect to predicate kit, the agreement for all   samples was 100%.

	GC/MS Positive	GC/MS Negative
DrugSmart Positive	54	2
DrugSmart Negative	2	58

When compared with GC/MS, the agreement for positive samples was 96.4% and for negative samples was 96.7%. With respect to GC/MS, the agreement for all samples was 96.6%.

BENZODIAZEPINES

	Predicate Kit Positive	Predicate Kit Negative
DrugSmart Positive	42	0
DrugSmart Negative	1	79

When compared to predicate kit, the agreement for positive samples was 97.7% and for negative samples was 100%. With respect to predicate kit, the agreement for all samples was 99.2%.

	GC/MS Positive	GC/MS Negative
DrugSmart Positive	40	2
DrugSmart Negative	1	79

When compared with GC/MS, the agreement for positive samples was 97.6% and for negative samples was 97.5%. With respect to GC/MS, the agreement for all samples was 97.5%.

COCAINE

	Predicate Kit Positive	Predicate Kit Negative
DrugSmart Positive	53	0
DrugSmart Negative	2	85

When compared to predicate kit, the agreement for positive samples was 96.4% and for negative samples was 100%. With respect to predicate kit, the agreement for all samples was 98.6%.

	GC/MS Positive	GC/MS Negative
DrugSmart Positive	49	4
DrugSmart Negative	3	84

When compared with GC/MS, the agreement for positive samples was 94.2% and for negative samples was 95.5%. With respect to GC/MS, the agreement for all samples was 95%.

MARIJUANA

	Predicate Kit Positive	Predicate Kit Negative
DrugSmart Positive	62	0
DrugSmart Negative	0	76

When compared to predicate kit, the agreement for positive samples was 100% and for negative samples was 100%. With respect to predicate kit, the agreement for all samples was 100%.

	GC/MS Positive	GC/MS Negative
DrugSmart Positive	60	2
DrugSmart Negative	3	73

When compared with GC/MS, the agreement for positive samples was 95.2% and for negative samples was 97.3%. With respect to GC/MS, the agreement for all samples was 96.4%.

MDMA

	Predicate Kit Positive	Predicate Kit Negative
DrugSmart Positive	50	0
DrugSmart Negative	2	65

When compared to predicate kit, the agreement for positive samples was 96.2% and for negative samples was 100%. With respect to predicate kit, the agreement for all samples was 98.3%.

	GC/MS Positive	GC/MS Negative
DrugSmart Positive	48	2
DrugSmart Negative	3	64

When compared with GC/MS, the agreement for positive samples was 94.1% and for negative samples was 97%. With respect to GC/MS, the agreement for all samples was 95.7%.

METHAMPHETAMINE

	Predicate Kit Positive	Predicate Kit Negative
DrugSmart Positive	50	0
DrugSmart Negative	2	78

When compared to predicate kit, the agreement for positive samples was 96.2% and for negative samples was 100%. With respect to predicate kit, the agreement for all samples was 98.5%.

	GC/MS Positive	GC/MS Negative
DrugSmart Positive	48	2
DrugSmart Negative	3	77

When compared with GC/MS, the agreement for positive samples was 94.1% and for negative samples was 97.5%. With respect to GC/MS, the agreement for all samples was 96.2%.

METHADONE

	Predicate Kit Positive	Predicate Kit Negative
DrugSmart Positive	55	0
DrugSmart Negative	0	66

When compared to predicate kit, the agreement for positive samples was 100% and for negative samples was 100%. With respect to predicate kit, the agreement for all samples was 100%.

	GC/MS Positive	GC/MS Negative
DrugSmart Positive	52	3
DrugSmart Negative	2	64

When compared with GC/MS, the agreement for positive samples was 96.3% and for negative samples was 95.5%. With respect to GC/MS, the agreement for all samples was 95.9%.

OPIATES 300

	Predicate Kit Positive	Predicate Kit Negative
DrugSmart Positive	69	1
DrugSmart Negative	1	70

When compared to predicate kit, the agreement for positive samples was 98.6% and for negative samples was 98.6%. With respect to predicate kit, the agreement for all samples was 98.6%.

	GC/MS Positive	GC/MS Negative
DrugSmart Positive	68	2
DrugSmart Negative	2	69

When compared with GC/MS, the agreement for positive samples was 97.1% and for negative samples was 97.2%. With respect to GC/MS, the agreement for all samples was 97.2%.

OPIATES 2000

	Predicate Kit Positive	Predicate Kit Negative
DrugSmart Positive	65	1
DrugSmart Negative	0	73

When compared to predicate kit, the agreement for positive samples was 100% and for negative samples was 98.6%. With respect to predicate kit, the agreement for all samples was 99.3%.

	GC/MS Positive	GC/MS Negative
DrugSmart Positive	64	2
DrugSmart Negative	2	71

When compared with GC/MS, the agreement for positive samples was 97% and for negative samples was 97.3%. With respect to GC/MS, the agreement for all samples was 97.1%.

OXYCODONE

	Predicate Kit Positive	Predicate Kit Negative
DrugSmart Positive	52	1
DrugSmart Negative	2	59

When compared to predicate kit, the agreement for positive samples was 96.3% and for negative samples was 98.3%. With respect to predicate kit, the agreement for all samples was 97.4%.

	GC/MS Positive	GC/MS Negative
DrugSmart Positive	51	2
DrugSmart Negative	2	59

When compared with GC/MS, the agreement for positive samples was 96.2% and for negative samples was 96.7%. With respect to GC/MS, the agreement for all samples was 96.5%.

PHENCYCLIDINE

	Predicate Kit Positive	Predicate Kit Negative
DrugSmart Positive	59	1
DrugSmart Negative	0	78

When compared to predicate kit, the agreement for positive samples was 100% and for negative samples was 98.7%. With respect to predicate kit, the agreement for all samples was 99.3%.

	GC/MS Positive	GC/MS Negative
DrugSmart Positive	55	5
DrugSmart Negative	3	75

When compared with GC/MS, the agreement for positive samples was 94.8% and for negative samples was 93.8%. With respect to GC/MS, the agreement for all samples was 94.2%.

TRICYCLIC ANTIDEPRESSANTS

	Predicate Kit Positive	Predicate Kit Negative
DrugSmart Positive	56	1
DrugSmart Negative	0	61

When compared to predicate kit, the agreement for positive samples was 100% and for negative samples was 98.4%. With respect to predicate kit, the agreement for all samples was 99.2%.

	GC/MS Positive	GC/MS Negative
DrugSmart Positive	55	2
DrugSmart Negative	3	58

When compared with GC/MS, the agreement for positive samples was 94.8% and for negative samples was 96.7%. With respect to GC/MS, the agreement for all samples was 95.8%.

Specificity

The specificity for the DrugSmart Cup® was determined by testing various drugs, drug metabolites, and other compounds that are likely to be present in urine. All compounds were prepared in drug-free normal human urine.

The following compounds produce positive results when tested at levels greater than the concentrations listed below in ng/ml.

The following Amphetamine-related substances yield positive results for
Amphetamines:

d-Amphetamine	1,000
l-Amphetamine	10,000
3,4 methylenedioxyamphetamine(MDA)	4,500
p-Methoxyamphetamin(PMA)	1,500
Methylendioxyethylamphetamine(MDEA)	>100,000
Methylendioxymethamphetamine(MDMA)	>100,000

The following Barbiturate-related substances yield positive results for
Barbiturates:

Secobarbital	300
Alphenal	400
Amobarbiatal	2,000
Aprobarbital	300
Barbital	300
Butabarbital	300
Butalbital	3,000
Pentobarbital	400
Phenobarbitall	300

The following Benzodiazepine-related substances yield positive results for
Benzodiazepines:

Oxazepam	300
Alprazolam	400
Bromazepam	2,000
Chlordiazepoxide	8,000
Clobazam	400
Clonazepam	5,000
Diazepam	2,000
Estazolam	20,000
Flunitrazepam	1,000
Lorazepam	4,000
Lometazepam	5,000
Nitrazepam	200
Nordiazepam	500
Temazepam	200
Triazolam	8,000

The following Cocaine-related substances yield positive results for **Cocaine:**

Benzoylecgonine	300
Cocaine	50,000
Ecgonine	>100,000
Ecgonine Methyl Ester	>100,000

The following Marijuana-related substances yield positive results for **Marijuana:**

11-Nor-Δ-9-THC-9-COOH	50
Δ-9-THC	10,000
Cannabidiol	100,000
Δ-8-THC	7000
11-hydroxy-Δ-9-THC	2,000
Cannabinol	100,000

The following MDMA-related substances yield positive results for **MDMA:**

3,4 methylendioxymethamphetamin(MDMA)	500
d-Methamphetamine	250
d-amphetamine	10,000
l-Methamphetamine	500
Methylendioxyethylamphetamin(MDEA)	500
3,4 methylenedioxyamphetamine(MDA)	>100,000
p-Methoxyamphetamin(PMA)	>100,000

The following Methamphetamine-related substances yield positive results for **Methamphetamine:**

d-Methamphetamine	1000
d-amphetamine	40,000
l-Methamphetamine	20,000
Methylendioxyethylamphetamin(MDEA)	2,000
Methylendioxymethamphetamin(MDMA)	2,000
3,4 methylenedioxyamphetamine(MDA)	>100,000
p-Methoxyamphetamin(PMA)	>100,000

The following Opiates 300-related substances yield positive results for **Opiates 300:**

Morphine	300
6-Acetylmorphine	300
Codeine	300
Ethyl morphine	2,000
Hydromorphone	3,000
Hydrocodone	3,000

The following Opiates 2000-related substances yield positive results for **Opiates 2000:**

Morphine	2000
6-Acetylmorphine	2000
Codeine	2000
Ethyl morphine	25,000
Hydrocodone	25,000
Hydromorphone	30,000

The following Oxycodone-related substances yield positive results for **Oxycodone:**

Oxycodone	100
Oxymorphone	80000

The following PCP-related substances yield positive results for **Phencyclidine:**

Phencyclidine (PCP)	25
Thienylcycldexylpiperidine (TCP)	3000

The following TCA-related substances yield positive results for **TCA:**

Nortriptyline	1,000
Amitriptyline	1,000
Desipramine	800
Imipramine	1,000
Nordoxepline	1,500
Cyclobenzaprine	3,000
Clomipramine	10,000
Doxepine	5,000
Protriptyline	3,000
Perphenazine	50,000
Promazine	30,000
Trimipramine	5,000

Interference

Two pools of drug-free urine were spiked with drug standards to 50% below and 50% above cutoff concentrations. The drug concentrations were confirmed by GC/MS. The following compounds were evaluated for potential positive and/or negative interference with the DrugSmart Cup®.

All compounds were dissolved in the spiked sample solutions and tested with DrugSmart Cup®. An unaltered sample was used as a control. No positive interference or negative interference was found for the following compounds when tested at concentrations up to 100 μg/ml.

Acetaminophen	4-Dimethylaminoantipyrine	(+/-)-Norephedrine
Acetone	Dopamine	Oxalic Acid
Albumin	(+/-)-Epinephrine	Penicillin-G
Ampicillin	Erythromycin	Pheniramine
Aspartame	Ethanol	Phenothiazine
Aspirin	Furosemide	l-Phenylephrine
Atropine	Glucose	β-Phenylethylamine
Benzocaine	Guaiacol Glyceryl Ether	Procaine
Bilirubin	Hemoglobin	Quinidine
Caffeine	Ibuprofen	Ranitidine
(+)-Chlorpheniramine	(+/-)-Isoproterenol	Riboflavin
(+/-)-Chlorpheniramine	Ketamine	Sodium Chloride
Creatine	Levorphanol	Sulindac
Dextromethorphan	Lidocaine	Theophylline
	(+)-Naproxen	Tyramine
	Niacinamide	(1R,2S)-(-)-N-Methyl-
	Nicotine	Ephedrine

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CLIA Category: WAIVED