DRG

QuickScreen™ Methadone Test (RAP-3006)

Revised 28 Apr. 2011 rm (Vers. 2.1) **IVD**

Please use only the valid version of the package insert provided with the kit.

Intended Use

The QuickScreen One Step Methadone Screening Test is a rapid, qualitative immunoassay for the detection of Methadone in urine. The cutoff concentration for this test is 300 ng/mL. This assay is intended for professional use.
This test provides only a preliminary test result. A more specific alternate testing method must be used in order to obtain a confirmed analytical result. Gas chromatography/mass spectrometry (GC/MS) is the preferred confirmatory method. Other confirmation methods are available. Clinical consideration and professional judgment should be applied to any drug of abuse test result.

Summary & Explanation of the Test

Methadone is a synthetic opioid, clinically available in the U.S. since 1947. It acts on the central nervous system and cardiovascular systems producing respiratory and circulatory depression. It also produces meiosis and increases the tone of smooth muscle in the lower gastrointestinal tract while decreasing the amplitude of contractions. Methadone is metabolized in the liver by *N*-demethylation to form the metabolites 2-Ethylidene-1,5-Dimethyl-3,3-Diphenylpyrrolidine (EDDP) and 2-Ethyl-5-Methyl-3,3-Diphenylpyrrolidine (EMDP). These and the parent drug undergo hydroxylation, with subsequent conjugation with glucuronic acid. All are excreted in bile and are the major products measured after methadone administration. Excretion rates vary from 5 to 50% of a dose in 24 hours, dependent on urine volume, pH, dosage and metabolism rate. Methadone is used clinically for treatment of severe pain and in treatment programs for morphine and heroin addiction.

Urine-based screening tests for drugs of abuse range from complex analytical procedures to simple immunoassay tests. The sensitivity and rapidity of immunoassays have made them the most accepted method of preliminary screening for drugs of abuse in urine. This allows the laboratory to eliminate the large number of negative specimens and focus on the smaller number of initially positive samples.

Principles of the Procedure

The QuickScreen One Step Methadone Screening Test is a competitive immunoassay used to screen for the presence of Methadone in urine. It is a chromatographic absorbent device in which drugs or drug metabolites in a sample compete with drug / protein conjugate immobilized on a porous membrane for a limited number of antibody / dye conjugate binding sites. The test device employs a unique combination of monoclonal and polyclonal antibodies to selectively identify Methadone in urine with a high degree of confidence.
In the procedure, the absorbent end of the test device is inserted into the urine sample. The urine is absorbed into the device by capillary action, mixes with the antibody / dye conjugate, and flows across the pre-coated membrane. **When Methadone levels are below 300 ng/mL** (the detection sensitivity of the test), antibody / dye conjugate binds to the drug / protein conjugate immobilized in the Test Region (**T**) of the device. This produces a colored Test Band that, ***regardless of its intensity***, indicates a negative result.
When Methadone levels are at or above 300 ng/mL, the free drug in the sample binds to the antibody / dye conjugate, preventing the antibody / dye conjugate from binding to the drug / protein conjugate immobilized in the Test Region (**T**) of the device. This prevents the development of a distinct colored band, indicating a potentially positive sample.

Revised 28 Apr. 2011 rm (Vers. 2.1) IVD

In either case, a colored Control Band is produced in the Control Region (**C**) by a non-specific antibody-dye / conjugate reaction, serving as a built-in quality control device, demonstrating antibody recognition and reactivity, and confirming that the test is complete.

Reagents & Materials Supplied

1. 25 test devices (Cat. # 9035) containing:
   a. Monoclonal anti-Methadone antibody / colloidal gold conjugate in a protein matrix containing 0.1% sodium azide coated in the sample path
   b. Methadone derivative / protein conjugate immobilized as a line in the Test Region (**T**)
   c. Goat anti-mouse antibody immobilized as a line in the Control Region (**C**)
2. Directional Insert (Cat. # 9035-DI)
3. (Optional) Single Specimen Collection Kit (Cat. # 9501 or equivalent) – or –
4. (Optional) Split Specimen Collection Kit (Cat. # 9502 or equivalent)

Note – In addition to the materials supplied, a clock or other suitable timer is required.

Warnings & Precautions

1. FOR IN VITRO DIAGNOSTIC USE ONLY.
2. For Professional use only.
3. Urine samples have the potential to be infectious. Follow Universal Precautions for proper handling and disposal methods.
4. Do not use this kit beyond its expiration date.
5. This method was established using urine only. No other fluid has been evaluated.
6. Do not reuse the Test Device.

Storage & Handling Requirements

Store at room temperature (15 °C – 28 °C); do not freeze. Refer to expiration date for stability.

Sample Collection & Preparation

A fresh urine sample should be collected in one of the above-mentioned specimen collection kit or equivalent. Alternately, a clean, dry plastic or glass container, unused and without preservatives, may be used for specimen collection. Testing requires around ½-inch (50 – 60 mL) of urine in the sample container. If required by your procedure, aliquot a portion of urine into the split sample container for later confirmation of results. If not required, dispose of all but around ½-inch of urine and save the remainder for the QuickScreen™ test.

Samples may be tested immediately or stored for up to 48 hours at 2 – 8 °C. For longer storage, freeze samples at – 20 °C or below.

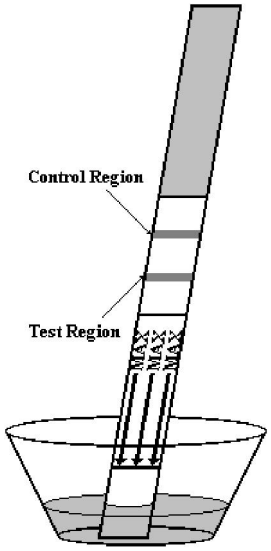
QuickScreen™ Methadone Test (RAP-3006)

Revised 28 Apr. 2011 rm (Vers. 2.1) **IVD**

Assay Procedure

Preparation

1. Confirm that all samples and test components are at room temperature (15 – 28 °C) before testing.
2. Do not break the seal on the foil pouch until you are ready to perform the test.



Testing

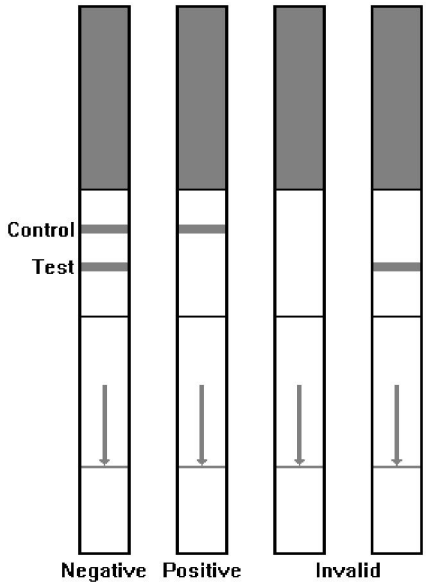
1. Open the foil pouch at the notch and remove the test device, taking care not to touch the exposed membrane.
2. Insert the absorbent end of the test device into the urine sample. DO NOT insert the device any deeper into the sample than the "MAX" level indicated by the line on the device label.
3. Read the result immediately at ten (10) minutes. Results read after more than 10 minutes have elapsed should be considered invalid.

Interpretation of Test Results

Negative – A negative result is indicated when two (**2**) colored bands appear, one in the Control Region (**C**) and one in the Test Region (**T**). This result indicates a Methadone level that is below the detection sensitivity of 300 ng/mL.

Positive – A positive result is indicated when only one (**1**) colored band appears in the Control Region (**C**) and no band appears in the Test Region (**T**). This result indicates a Methadone level that is at or above the detection sensitivity of 300 ng/mL.

Invalid – A test must be considered invalid if no bands appear or if a band appears in the Test Region without a Control Band. The presence of a Control Band is necessary to confirm assay performance.



DRG International, Inc., USA Fax: (908) 233 0758 e-mail: corp@drg-international.com

QuickScreen™ Methadone Test (RAP-3006)

Revised 28 Apr. 2011 rm (Vers. 2.1) **IVD**

Quality Control

An internal procedural control line is incorporated into the test device to help ensure proper kit performance and reliability. However, the use of external controls is recommended. Positive and negative controls within 25% of the cutoff concentration should produce the expected results.

For positive controls, only one (1) colored band will appear in the Control Region (C), and no band will appear in the Test Region (T).

For negative controls, two (2) colored bands will appear, one in the Control Region (C) and one in the Test Region (T).

Limitations of the Procedure

1. It is possible that substances and factors not described in this directional insert may interfere with the test, causing false results (e.g., technical or procedural error).
2. This test has been developed for testing urine samples only. The performance of this test using other specimens has not been substantiated.
3. Adulterated urine samples may produce erroneous results. Strong oxidizing agents such as bleach (hypochlorite) can oxidize drug analytes. If a sample is suspected of being adulterated, a new sample must be obtained.
4. All preliminary positive samples must be confirmed by another method. Gas chromatography / mass spectrometry (GC/MS) is the method of choice to confirm the presence and concentration of a drug in urine.
5. This test is a qualitative screening assay. It is not designed to determine the quantitative concentration of Methadone or the level of intoxication.
6. Because the QuickScreen test is a competitive assay, no prozone effect is present.
7. Occasionally, samples containing Methadone levels below the cutoff sensitivity for the test may produce a positive result.
8. Point-of-care testing data is not currently available.

DRG International, Inc., USA Fax: (908) 233 0758 e-mail: corp@drg-international.com

QuickScreen™ Methadone Test (RAP-3006)

Revised 28 Apr. 2011 rm (Vers. 2.1) **IVD**

Performance Characteristics

Sensitivity (CUTOFF)

The QuickScreen One Step Methadone Screening Test detects Methadone at a cutoff concentration of 300 ng/mL. 80 urine samples were assayed in a controlled study, with 90% of samples within 25% of the cutoff correctly identified and greater than 99% of all other samples correctly identified.

Samples, *n* =	**Conc. Range (ng/mL)**	Observed vs. Expected Results	**% Correct**
20	0 to 150	20 / 20	>99
10	151 to 225	10 / 10	>99
20	226 to 375	*18 / 20	90
20	376 to 450	20 / 20	>99
10	451 to 600	10 / 10	>99

* Two samples at 324 ng/mL and 336 ng/mL (108% and 112% of cutoff) gave negative QuickScreen results.

Kit Comparison

In an evaluation of 109 clinical urine specimens at 3 separate laboratory sites, including 2 independent clinical laboratories, QuickScreen was compared to the EMIT II methadone assay using a 300 ng/mL cutoff. The QuickScreen Methadone Test demonstrated an overall agreement of > 98% (107/109) compared to the EMIT II assay.

Agreement		Emit II Methadone	
		Positive (49)	Negative (60)
QuickScreen	(+)	47	0
Methadone	(–)	2**	60

**Resolution of Discrepant Results			
Sample	QuickScreen	EMIT II	GC/MS
X9475677D10	(–)	(+)	576 ng/mL
X9300161D10	(–)	(+)	560 ng/mL

Precision

Eight clinical urine pools ranging in concentration from 25 to 576 ng/mL were assayed once a day for twenty days using the QuickScreen Methadone Test. The results were interpreted individually by two technicians. Sample concentrations were confirmed by GC/MS analysis.

DRG International, Inc., USA Fax: (908) 233 0758 e-mail: corp@drg-international.com

QuickScreen™ Methadone Test (RAP-3006)

Revised 28 Apr. 2011 rm (Vers. 2.1) **IVD**

Sample	Conc. (ng/mL)	% of Cutoff	Test 1 Results	Test 2 Results	Total Correct	% Correct
1	25	8.3	20 / 20 (–)	20 / 20 (–)	40 / 40	100
2	97	32	20 / 20 (–)	20 / 20 (–)	40 / 40	100
3	195	65	20 / 20 (–)	20 / 20 (–)	40 / 40	100
4	288	96	20 / 20 (–)	20 / 20 (–)	40 / 40	100
5	373	124	20 / 20 (+)	20 / 20 (+)	40 / 40	100
6	422	141	20 / 20 (+)	20 / 20 (+)	40 / 40	100
7	472	157	20 / 20 (+)	20 / 20 (+)	40 / 40	100
8	576	192	20 / 20 (+)	20 / 20 (+)	40 / 40	100
		Totals:	**160 / 160**	**160 / 160**	**320 / 320**	**100**

Cross-Reacting Substances

Structurally related compounds were prepared in normal human urine and tested for cross-reactivity with the QuickScreen Methadone Test. The results are expressed as the amount of compound producing a result equivalent to 300 ng/mL of Methadone.

Compound	(–)-α-Acetylmethadol {LAAM}	(–)-α-Methadol	(±)-Methadone
Concentration	1.0 µg/mL	0.8 µg/mL	0.3 µg/mL

Interfering Substances

Extreme endogenous conditions of pH (4.5 – 8.5) and specific gravity (1.005 – 1.040) in normal human urine were found not to interfere with QuickScreen results. In addition, the following compounds were prepared in normal human urine and tested for interference with the QuickScreen Methadone Screening Test. The compounds were tested to 100 µg/mL, unless noted, with no interference observed.

QuickScreen™ Methadone Test (RAP-3006)

Revised 28 Apr. 2011 rm (Vers. 2.1) **IVD**

Acetoacetic Acid • Acetone • *N*-Acetylprocainamide • Acetylsalicylic Acid (Aspirin) • Albumin • Alphenal • Alprazolam[A] • Amantadine • (+)-Amethopterin • Amikacin • *dl*-Aminoglutethimide • Aminopyrine • Amitriptyline • Amobarbital • Amoxicillin • *d*, *dl* & *l*-Amphetamine • Ampicillin • Apomorphine • Aprobarbital • (–)-Arterenol • *l*-Ascorbic Acid (Vitamin C) • *d*, *dl* & *l*-Aspartic Acid • Atropine • Barbital • Barbituric Acid • Benzoic Acid • Benzoylecgonine • Benzphetamine • Benztropine Methane Sulfonate • Bilirubin • Bromazepam • Bromocriptine Mesylate • (+)-Brompheniramine • Butabarbital • Butalbital • Butethal • Cannabidiol • Cannabinol • Carbamazepine • Cephalexin • Chloramphenicol • Chlordiazepoxide • Chloroquine • (+) & (±)-Chlorpheniramine • Chlorpromazine • Chlorpropamide • Chlorprothixene • Cimetidine • Clemastine • Clomipramine • Clonazepam • Clonidine • Cocaine • Codeine • (–)-Cotinine • Creatinine • Cyclizine • Cyclobenzaprine • Cyclosporin A • Cyproheptadine • (–)-Deoxyephedrine • Desipramine • Desmethyldiazepam • Dextromethorphan • 5,5-Diallylbarbituric Acid • Diazepam • Diflunisal • Digoxin • 4-Dimethylaminoantipyrine • Diphenhydramine • Diphenoxylate • 5,5-Diphenylhydantoin • Disopyramide • Doxepin • Doxylamine • (+) & (–)-*ψ*-Ephedrine • (+), (±) & (–)-Ephedrine • (±) & (–)-Epinephrine • Erythromycin • Estriol • Estrone-3-Sulfate • Ethosuximide • Ethyl-*p*-Aminobenzoate • Ethylenediaminetetraacetic Acid • 2-Ethylidene-1,5-Dimethyl-3,3-Diphenylpyrrolidine (EDDP) • 2-Ethyl-5-Methyl-3,3-Diphenylpyrroline (EMDP) • Ethylmorphine[B] • Fenfluramine • Fenoprofen • Fentanyl[B] • Flunitrazepam • Flurazepam • Furosemide • Gentamicin • Gentisic Acid • *dl*-Glutethimide • Griseofulvin • Guaiacol Glyceryl Ester • Hemoglobin, Human • Heroin[B] • Hexobarbital • Hydrochlorothiazide • Hydrocodone • Hydromorphone • *dl*-*β*-Hydroxybutyric Acid • *o*-Hydroxyhippuric Acid • 5-Hydroxyindole-3-Acetic Acid • 5-Hydroxyindole-2-Carboxylic Acid • 11-Hydroxy-Δ^9-THC[C] • 3-Hydroxytyramine • Hydroxyzine • Imipramine • Indole-3-Acetic Acid • Indole-3-Butyric Acid • Indomethacin • (+), (±) & (–)-Isoproterenol • Isoxsuprine • Kanamycin • Ketamine • Ketoprofen • Labetalol • Levorphanol • Lidocaine • Lithium Carbonate • (±)-Lorazepam • Lormetazepam • Lysergic Acid Diethylamide (LSD)[D] • Medazepam • Melanin • Meperidine • Mephentermine • Meprobamate • Mescaline • *dl*-Metanephrine • (+)-Methamphetamine • Methaqualone • (S)-6-Methoxy-*α*-Methyl-2-Naphthaleneacetic Acid • 2-Methyl-3-(3,4-Dihydroxyphenyl)-*dl* & *l*-Alanine • (±)-3,4-Methylenedioxyamphetamine • (±)-3,4-Methylenedioxymethamphetamine • Methylphenidate • Methyprylon • Metoclopramide • (±)-Metoprolol • Morphine • Morphine-3*β*-D-Glucuronide • Nafcillin • Nalorphine • Naloxone • Naltrexone • Naphazoline • *α* & *β*-Naphthaleneacetic Acid • Netilmicin • Niacinamide • Nialamide • Nicotinic Acid • Nifedipine • Nitrazepam • Nomifensine • Norcodeine • Nordoxepin[B] • Norethindrone • Normorphine[B] • 11-Nor-Δ^8 & Δ^9-THC-Carboxylic Acid[C] • Nortriptyline • Noscapine • Nylidrin • Orphenadrine • Oxalic Acid • Oxazepam • Oxycodone • Oxymetazoline • Papaverine • Penicillin G • Pentazocine • Pentobarbital • Phencyclidine • Phenelzine • Pheniramine • Phenobarbital • Phenothiazine • Phentermine • Phenylacetone • *l*-Phenylalanine • Phenylbutazone • *trans*-2-Phenylcyclopropylamine • *l*-Phenylephrine • (R)-(+)-*α*, (±)-*α* & *β*-Phenylethylamine • (±)-Phenylpropanolamine • Piroxicam • Potassium Chloride • Prazepam • Prednisolone • Primidone • Procainamide • Procaine • Prochlorperazine • Promazine • Promethazine • (+)-Propoxyphene • 2-Propylpentanoic Acid • Protriptyline • Pyrilamine • Quinidine • Quinine • Ranitidine • Riboflavin • Salicylic Acid • (–)-Scopolamine • Secobarbital • Sodium Chloride • Sulindac • Temazepam • Terbutaline • Tetracycline • Tetraethylthiuram Disulfide • Δ^8 & Δ^9-Tetrahydrocannabinol • Tetrahydrozoline • Thebaine • Theophylline • (±)-Thiopental • Thioridazine • *cis*-Thiothixene • Tobramycin • Triamterene • Triazolam[E] • Trifluoperazine • Triflupromazine • *dl*-Trihexyphenidyl • Trimethobenzamide • Trimethoprim • Trimipramine • Triprolidine • Tyramine • Urea • Uric Acid • Vancomycin • (±)-Verapamil • Zomepirac

[A] No interference was observed when the compound was tested to 25 µg/mL.

[B] No interference was observed when the compound was tested to 10 µg/mL.

DRG International, Inc., USA Fax: (908) 233 0758 e-mail: corp@drg-international.com

[C] No interference was observed when the compound was tested to 5 µg/mL.
[D] No interference was observed when the compound was tested to 2.5 µg/mL.
[E] No interference was observed when the compound was tested to 10 µg/mL.

Bibliography & Suggested References

1. Federal Register, Department of Health and Human Services, Mandatory Guidelines for Federal Workplace Drug Testing Programs 53 (69) 1988
2. Urine Testing for Drugs of Abuse, NIDA Research Monograph 73, (1986)
3. Dasgupta A., Saldana S., Kinnaman G., Smith M., Johansen K., Clinical Chemistry, 39:104-108 (1993)
4. Liu R.H., Goldberger B.A., Handbook of Workplace Drug Testing, AACC Press (1995)
5. Jeffcoat A.R, et al, Drug Metabolism and Disposition, 17-2 (1989)
6. Inaba T., Journal of Canadian Physiology and Pharmacology, 67:1154-1157 (1989)
7. Karch S.B., Drug Abuse Handbook, CRC Press (1998)

Version 2011-03-17~rm