

# MEDTOX<sup>®</sup>

## DIAGNOSTICS, INC.

### SURE-SCREEN<sup>®</sup>

SURE-SCREEN<sup>®</sup> is a rapid qualitative screening test system for drugs of abuse in human urine. **All SURE-SCREEN products are covered by this insert. Refer to product labeling for the actual drugs assayed by the test system configuration.**

The Lateral Flow (LatFlo<sup>®</sup>) Adulterant Strip (LFAS) is a rapid qualitative screening assay for the detection of Oxidants, Nitrites, the Determination of Specific Gravity, and pH Values in human urine. It is used to evaluate specimens for adulteration prior to Drugs of Abuse urine (DAU) testing. **The LFAS strip is only for Forensic/Toxicology use and not for in vitro diagnostic applications. The LFAS test strip is not contained in every SURE-SCREEN product.**

#### 1. INTENDED USE

The SURE-SCREEN Drugs of Abuse Test System uses immunochromatographic test strips for the rapid, qualitative detection of one or more of the following: Amphetamines, Benzodiazepines, Cocaine, Methamphetamine, Methadone, Opiates, Phencyclidine and THC (Cannabinoids) in human urine. It is intended for prescription point-of-care use including workplace settings, criminal justice or forensic settings, drug rehabilitation clinics, physician offices and laboratory settings. SURE-SCREEN is not for over-the-counter sale.

Operators that may use this device are defined as individuals with at least a high school education, with no formal laboratory testing education or laboratory experience, and who have some experience running other tests similar to SURE-SCREEN. Additionally, individuals are to satisfy the following training and certification guidelines:

(1) Training should be conducted by a qualified professional and include a demonstration of the SURE-SCREEN test system and (2) the use of quality assurance samples for monitoring and confirming the performance of the test system. Trainers should observe and confirm that the operator (3) uses proper technique when running a test sample and quality assurance samples, (4) has a basic understanding of test results, including the potential for false positive and false negative results, (5) knows how to prepare a sample for shipment to the laboratory for confirmation testing, (6) has reviewed the information contained in the MEDTOX SURE-SCREEN Training and Certification Program (available at [www.medtox.com](http://www.medtox.com)) and that the operator (7) minimally achieves a score of 80% on the written exam provided by MEDTOX.

Operators achieving a score of 80% will be provided with a certificate of training participation. Quality assurance samples appropriate for training are available from MEDTOX Laboratories Inc. Additionally, MEDTOX Technical Support will provide access to assistance from individuals who are experienced in the interpretation of drug testing results.

SURE-SCREEN detects drug classes at the following cutoff concentrations:

|      |  |           |
|------|--|-----------|
| AMP  | Amphetamines (d-Amphetamine)                     | 300 ng/mL |
| BZO  | Benzodiazepines (Nordiazepam)                    | 200 ng/mL |
| COC  | Cocaine (Benzoyllecgonine)                       | 100 ng/mL |
| MAMP | Methamphetamine (d-Methamphetamine)              | 300 ng/mL |
| MTD  | Methadone (Methadone)                            | 200 ng/mL |
| OPI  | Opiates (Morphine)                               | 100 ng/mL |
| PCP  | Phencyclidine (Phencyclidine)                    | 25 ng/mL  |
| THC  | Cannabinoids (11-nor-9-carboxy- $\Delta^9$ -THC) | 40 ng/mL  |

Many of the cutoff concentrations for these tests are below those recommended by SAMHSA. Additionally, many of these tests are positive at levels significantly below the claimed cutoff concentration. The rate of false positive results with tests having sensitivities this low has not been studied. However, the rate of false positives generally increases as the cutoff concentration of the test is lowered. See the Precision/Sensitivity section for more information.

The SURE-SCREEN drugs of abuse test system provides only a 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/tandem mass spectrometry (LC/MS/MS) is the preferred confirmatory method. Clinical consideration and professional judgment should be applied to any drug of abuse test result.

It is the responsibility of those organizations required to follow Department of Transportation (DOT) or Substance Abuse Mental Health Services Administration (SAMHSA) Workplace Drug Testing Guidelines to determine that use of this product satisfies the criteria for workplace testing established under DOT and SAMHSA authority.

#### 2. SUMMARY AND EXPLANATION OF THE TEST

The qualitative SURE-SCREEN Drugs of Abuse Test System utilizes a solid phase immunoassay technology to provide a very rapid test requiring no instrumentation. This test may be used to screen human urine samples for one or more of the following drug classes prior to confirmatory testing:

Amphetamines (AMP) are central nervous system stimulants. This group of compounds includes amphetamine, methamphetamine, and related designer drugs MDMA (Ecstasy).

Benzodiazepines (BZO), a group of structurally related central nervous system depressants, are primarily used to reduce anxiety and induce sleep.

Cocaine (COC) is a central nervous system stimulant. Its primary metabolite is benzoylecgonine.

Methamphetamine (MAMP) is a central nervous system stimulant (see Amphetamines).

Methadone (MTD) is a synthetic opioid used clinically as a maintenance drug for opiate abusers and for pain management.

Opiates (OPI) are a class of natural and semi-synthetic drugs that include morphine, codeine and heroin.

Phencyclidine (PCP) is a hallucinogenic drug.

Marijuana (THC) is a hallucinogenic agent derived from the hemp plant. Marijuana contains a number of active ingredients collectively known as Cannabinoids.

Many factors influence the length of time required for drugs to be metabolized and excreted in the urine. A variety of factors influence the time period during which drugs are detected; the rate of urine production, the volume of fluid consumption, the amount of drug taken, the urine pH, and the length of time over which drug was consumed. Drinking large volumes of liquid or using diuretics to increase urine volume lowers the drug concentration and decreases the detection period. Although the detection period for these drugs varies widely depending upon the compound taken, dose and route of administration and individual rates of metabolism, some general times have been established and are listed below.<sup>1-4</sup>

| <u>Drug</u>         | <u>Detection Period</u> |
|---------------------|-------------------------|
| THC                 |                         |
| Single Use          | 1-3 days                |
| Chronic, Light Use  | 3-29 days               |
| Chronic, Heavy Use  | Up to 12 weeks          |
| Opiates             |                         |
| Heroin              | 1 day                   |
| Morphine            | 1-3 days                |
| Codeine             | 1-3 days                |
| Amphetamines        |                         |
| Acid Conditions     | 1-3 days                |
| Alkaline Conditions | 3-10 days               |
| Cocaine             | 1-3 days                |
| PCP                 |                         |
| Single Use          | 7-8 days                |
| Chronic Use         | 2-4 weeks               |
| Methadone           | 1-3 days                |
| Benzodiazepines     | 1-12 days               |
| Methamphetamine     |                         |
| Acid Conditions     | 1-3 days                |
| Alkaline Conditions | 3-10 days               |

The LFAS is a lateral flow strip with impregnated reagent test pads that detect specific analytes in human urine. The specific analytes detected are Oxidants and Nitrites. The strip also approximates specific gravity and pH values. The temperature strips on the cup may be used to detect potential adulteration of the sample. Urine samples with "abnormal values" should be submitted to a reference laboratory for additional testing.

Oxidants The detection is based on the oxidative activity of compounds (e.g. chromate salts and/or bleach) that catalyze the oxidation of an indicator by an organic hydroperoxide producing a blue/orange color. The color intensity is directly proportional to the concentration of oxidants present in the sample and is observed visually and compared to the color comparator chart to obtain a result.

Nitrites The test is based on the principles of the Griess reaction for the detection of Nitrites. The test paper contains an amine and a coupling component. A red/orange colored azo compound is obtained by diazotization and subsequent coupling. The color intensity is directly proportional to the concentration of nitrites present in the sample and is observed visually and compared to the color comparator chart to obtain a result.

pH The test paper contains indicators that change colors between pH 2 and pH 11. The color scale gives an approximate indication for pH values between those levels.

Specific Gravity The test paper reacts with ions in urine to indicate concentrations from 1.000 to 1.020. The color changes range from dark green with low ionic concentrations through green to yellow/orange in urines with high ionic concentrations. The color is observed visually and compared to the color comparator chart to obtain an approximate result.

### **3. PRINCIPLES OF THE PROCEDURE**

The SURE-SCREEN Drugs of Abuse Test System contains a device with rapid, competitive, membrane-based immunochromatographic test strips, a cup and a lid. A single urine sample can be evaluated for the presence of each of the specified classes of drugs in a single device. Each test strip contains antibody colloidal gold, a drug conjugate and a control line.

**ANTIBODY-COLLOIDAL GOLD** -- Mouse monoclonal antibodies were developed specifically targeted to the drugs listed in the Intended Use section. Each antibody only binds drugs from the tested drug classes. Antibody-colloidal gold solutions were prepared by absorbing each of the individual monoclonal antibodies to colloidal gold. The colloidal gold solutions were applied to the sample well pads on the test strip.

**DRUG-CONJUGATES** -- Drug from each tested class was individually conjugated to protein and immobilized as a line on a membrane at the location labeled "T" on the device.

**CONTROL LINE** -- Each test strip has anti-mouse immunoglobulin antibodies immobilized as a line on the membrane at the location labeled "C" on the device. The anti-mouse immunoglobulin antibodies bind the mouse antibodies coated on the colloidal gold.

Drugs in the urine and the drugs conjugated to the protein compete to bind to the antibody-colloidal gold. When the test system is tipped over, urine flows into the sample well of the device, the dried antibody-colloidal gold on the sample pad dissolves and the urine wicks up the white test strips carrying the red antibody-colloidal gold with it.

#### **Negative Samples**

When no drug is present in the urine sample, the red antibody-colloidal gold migrates up the test strip and binds to the drug conjugate immobilized on the membrane. The binding of the antibody-colloidal gold to the drug conjugate generates an easily visible reddish-purple line at the "T" location on the device. Negative results can be reported as soon as a line is visible.

#### **Non-Negative Samples**

When a drug is present in the sample the antibody-colloidal gold binds the drug before it migrates up the test strip. However, when the antibody-colloidal gold binds the drug in the urine, the antibody-colloidal gold cannot bind to the drug conjugate immobilized on the test strip. When the drug concentration is at or above the cutoff concentration, the majority of the antibody colloidal gold is bound to the drug from the urine. Therefore, as drug bound antibody-colloidal gold migrates up the test strip, it is unable to bind to the drug conjugate immobilized on the membrane. Therefore no line is generated at the "T" location on the device for a non-negative sample. Read non-negative results at 5 minutes. The test must be read within 15 minutes of the sample application. The test result after 15 minutes may not be consistent with the original reading.

#### **Control Line**

Each test strip has an internal procedural control. A line must form at the control "C" location on the device to indicate that the reagents are migrating properly. If a control line does not form, the test is considered invalid. A control line forms when the antibody-colloidal gold binds to the anti-mouse immunoglobulin antibody immobilized on the membrane as a line at the "C" location on the device.

### **4. MATERIALS PROVIDED/STORAGE CONDITIONS**

Each SURE-SCREEN Drugs of Abuse Test System contains all the reagents necessary to test one urine sample for one or more drugs simultaneously.

#### **Kit Contents**

The SURE-SCREEN Drugs of Abuse Test System kit contains twenty-five (25) test system bags and one instructional package insert.

#### **Test System Bag Contents**

1. One (1) test device in a foil package.
  1. The test strips each contain a membrane coated with drug conjugate and a pad coated with antibody dye complexes in a protein matrix.
  2. The test device may contain a membrane strip laminated with Adulterant test pads for testing the presence of Oxidants and Nitrites, as well as determining approximate values of Specific Gravity and pH in human urine. **The LFAS test strip is not contained in every SURE-SCREEN product.**
2. One (1) cup with temperature strip attached.
3. One (1) lid.
4. One (1) Color Comparator Chart (products with LFAS test strip only).

#### **Storage Conditions**

The kit, in its original packaging, should be stored at 2-25°C (36-77°F) until the expiration date on the label.

### **5. PRECAUTIONS**

1. Urine specimens and all materials coming in contact with them should be handled and disposed of as if infectious and capable of transmitting infection. Never pipette by mouth and avoid contact with broken skin.
2. The device should remain in its original sealed foil pouch until ready to use. If the pouch is damaged, do not use the test.
3. Do not store the test kit at temperatures above 25°C (77°F).
4. If devices have been stored refrigerated, bring to ambient temperature (18-25°C/ 64-77°F) prior to opening foil pouch.
5. Do not use tests after the expiration date printed on the package label.
6. The drug screen portion of the device is for in vitro diagnostic use only. The LFAS strip is for Forensic/Toxicology use only.

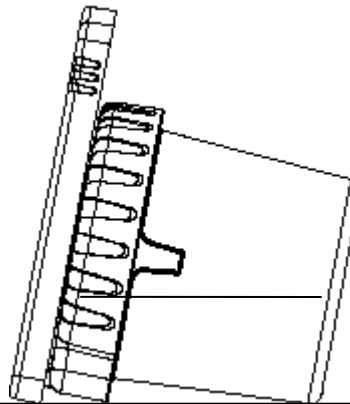
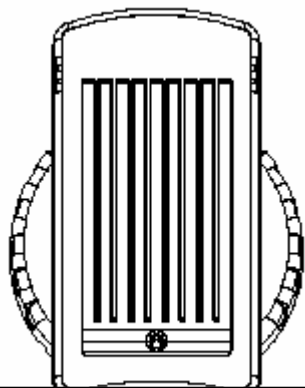
### **6. SAMPLE COLLECTION AND PREPARATION**

The urine sample should be collected in the provided cup. The urine volume should be above the minimum volume line. No preservatives should be added. Urine may be tested immediately following collection. If it is necessary to store the urine, store under refrigeration for no more than one day. Urine may be frozen for longer storage. Stored urine must be brought to ambient temperature (18 to 25°C/64 to 77°F) and mixed well to assure a homogeneous sample prior to testing.

### **7. TEST PROCEDURE**

1. Fill cup to above the minimum volume line.
2. Screw lid clockwise onto the cup until tight
3. Open pouch and label the device with the patient or sample identification.
4. Secure device snugly to lid as noted on the lid icon.
5. Tip the cup on its side as shown below to start flow (if less than 45 ml of urine, tilt the cup forward to begin flow).
6. Allow the test system to sit for 5 minutes.
7. Turn the test system upright and read the results. Negative results can be read as soon as a line is visible, non-negatives at 5 minutes. The test must be read within 15 minutes of the sample application. The test result after 15 minutes may not be reliable.

**Occasionally results at 5 minutes may vary from those observed at 15 minutes. If this occurs, you should repeat the test or send the sample to the laboratory for confirmation testing.**



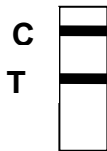
### 8. READING THE TEST RESULTS

**Negative:** The appearance of a reddish purple line at both the control area (C) and test area (T) indicates a negative test result. **The color intensities of the control lines (C) and test lines (T) may not be equal and may vary from test to test. The test line and control line positions may vary slightly from test strip to test strip. Any line of faint color intensity indicates a negative test result.**

**Non-Negative:** The appearance of a control line and the absence of a test line indicate a preliminary positive test result for that drug.

**Invalid:** The control line must be present for the test to be valid. The absence of a control line indicates the test is invalid. The urine sample should be retested on a new device.

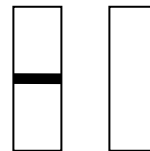
Examples of Negative, Non-Negative and Invalid results:



**Negative**



**Non-Negative**



**INVALID**

## 9. INTERPRETATION OF TEST RESULTS

A NEGATIVE test result for a specific drug indicates that the sample does not contain the drug/drug metabolite above the cutoff level.

A NON-NEGATIVE test result for a specific drug indicates that the sample may contain drug/drug metabolite near or above the cutoff level. Non-negative samples or those with abnormal LFAS tests should be sent to a reference laboratory for more definitive testing.

### Understanding the Test Results:

A non-negative test result does not always mean a person took illegal drugs and a negative test result does not always mean a person did not take illegal drugs. There are a number of factors that influence the reliability of drug tests. Certain drug of abuse tests are more accurate than others.

*In general, the Substance Abuse and Mental Health Services Administration (SAMHSA) reports the accuracy of drug tests as the following for Preliminary Positive Tests<sup>a</sup>:*

|   |
|---|
| <i>60 out of 100 times a "preliminary positive" result from an opiate test is a "false preliminary positive" result. This means that the result of the first test was "preliminary positive" even though the person did not take an illegal drug.</i> |
| <i>50 out of 100 times a "preliminary positive" test result from an amphetamine or methamphetamine test is a "false preliminary positive" result.</i>   |
| <i>50 out of 100 times a "preliminary positive" result from a PCP (phencyclidine) test is a "false preliminary positive" result.</i>  |
| <i>10 out of 100 times a "preliminary positive" result from a marijuana test is a "false preliminary positive" result.</i>  |
| <i>2 out of 100 times a "preliminary positive" result from a cocaine test is a "false preliminary positive" result.</i>   |

<sup>a</sup> Data was generated from laboratory tests that have the following cutoff concentrations: Marijuana, 50 ng/mL; Cocaine, 300 ng/mL; Phencyclidine, 25 ng/mL; Opiates, 2000 ng/mL; Amphetamines, 1000 ng/mL.

Many of the cutoff concentrations for SURE-SCREEN are below those recommended by SAMHSA. Additionally, many of these tests are positive at levels significantly below the claimed cutoff concentration. The rate of false positive results with tests having sensitivities this low has not been studied. However, the rate of false positives generally increases as the cutoff concentration of the test is lowered. See the Precision/Sensitivity section for more information.

*For Negative Tests: A negative result does not always mean a person did not take illegal drugs. For example, you will get a negative result if the test is for cocaine when the person tested has only smoked marijuana. There are a number of reasons why you can get a "false negative" test result. A false negative test result means the test result is negative when the person has actually taken the drug that this test is designed to detect. This might happen under the following circumstances:*

- 1. The drug may not have been in the sample at the time the sample was collected. It takes a while after taking a drug for it to appear in a specimen, and it only stays in the specimen for a limited amount of time. If the sample was taken too early or too late you can get a "false negative" result.*
- 2. The person, knowing that they were going to be tested, added something to the specimen to keep it from reacting with the test chemicals. This could cause a false negative result. There are products sold for this purpose.*
- 3. The drug may be in the specimen because the person took the drug, but it is there at such a low concentration that the drug cannot be detected by the test.*
- 4. The test may not be working properly. There are a number of things that could be wrong with any testing product. It might have been damaged during shipment or kept at the wrong temperature, either before or after you received it. Storing a product at temperatures that are too high or too low can damage the chemicals in the test.*

*If you get a negative test result but you still suspect someone is taking drugs you should test again at another time, or test for different drugs.*

## 10. QUALITY CONTROL

An internal procedural control is included on each test strip. A line must form at the control (C) position on the test strip to indicate that adequate sample volume has been added, the reagents migrated properly, and the test strip is intact. If a control line does not form, the test is considered invalid. The control line consists of immobilized anti-mouse antibody that reacts with the antibody-colloidal gold as it passes this region of the membrane. Formation of a visible line verifies the control line antibody antigen reaction occurred. A visible control line should always be present regardless of whether drug is absent or present in the sample.

Minimally, a QC program includes external negative and positive control material used to monitor the performance of each new lot of product, each new shipment of product and may be used to assess the competency of new operators.

For additional information concerning QC, forensic or workplace testing requirements, contact the appropriate regulatory authority. Users should follow federal, state, and local QC requirements.

## 11. LIMITATIONS OF THE PROCEDURE

1. The SURE-SCREEN Drugs of Abuse Test System is only for use with unadulterated human urine samples.
2. There is a possibility that other substances and/or factors, e.g. technical or procedural errors, may interfere with the test and cause false results.

### LFAS Strip

The purpose of the adulteration strip is to screen for abnormal conditions in human urine, such as dilution or the addition of drug-test interfering substances. Occasionally medications may discolor the urine making it difficult to read the result.

#### Oxidant

Nitrites acting as oxidizing agents will produce a blue/green color change on the Oxidant Pad.

#### Nitrite

Abnormal results can be caused by the presence of diagnostic or therapeutic dyes in the urine. Very high concentrations of oxidant such as 80% bleach will produce a brown color change on the Nitrite pad.

## 12. EXPECTED VALUES

### SURE-SCREEN TEST SYSTEM:

SURE-SCREEN Drugs of Abuse Test System qualitatively detects amphetamines, benzodiazepines, cocaine, methamphetamine, methadone, opiates, phencyclidine and THC (Cannabinoids) and/or their metabolites in human urine at or above their specified cutoff level. Illicit drugs should never be found in urine, and legal drugs (such as amphetamine, methamphetamine, benzodiazepine, opiates, or methadone) may appear in the urine for legitimate reasons. Confirmatory test results should be reviewed by a Medical Review Officer for interpretation.

## 13. PERFORMANCE CHARACTERISTICS

### 13A. Sensitivity, Accuracy, and Precision

#### Accuracy

The accuracy was evaluated by assaying a panel of blind coded clinical urine samples containing varying concentrations of drugs and comparing to GC/MS or LC/MS/MS results. The samples were obtained from MEDTOX Laboratories. Samples were screened at traditional laboratory cutoff concentrations by a commercial immunoassay system. Samples with negative results by both the commercial immunoassay system and SURE-SCREEN were not confirmed by GC/MS or LC/MS/MS. Samples with positive results by either the commercial immunoassay system or SURE-SCREEN were confirmed by GC/MS or LC/MS/MS. Most samples were unaltered clinical samples. In order to have samples with concentrations close to the cutoff, some samples were diluted with negative urine. The five minute results are shown in the following tables. The testing was performed by MEDTOX personnel.

#### ACCURACY COMPARED TO GC/MS OR LC/MS/MS (Amphetamines, Benzodiazepines, Cocaine, Methamphetamine, Methadone, Opiates, Phencyclidine and Cannabinoids (THC))

| 5 Minute  | Negative by immunoassay; if positive, no drug was detected above the limit of detection of the confirmatory method | Concentration range of up to 50% below the cutoff (ng/mL) | Concentration range between the -50% of the cutoff and the cutoff (ng/mL) | Concentration range between the cutoff and 50% above the cutoff (ng/mL) | Concentration range of greater than 50% above the cutoff (ng/mL) |
|---|--|---|---|---|--|
| <b>AMP</b>  |  |   | 180 – 255   | 334 – 402   | 474 – 11845  |
| Positive  | 0  | Not performed   | 4   | 4   | 32   |
| Negative  | 55   | Not performed   | 1   | 1   | 1  |
| Samples are categorized according to d-amphetamine concentrations.  |  |   |   |   |  |
| <b>BZO</b>  |  |   | 113 - 151   | 220 - 281   | 428 - 12491  |
| Positive  | 0  | Not performed   | 4   | 5   | 33   |
| Negative  | 54   | Not performed   | 0   | 0   | 0  |
| Nordiazepam, oxazepam, temazepam, alprazolam and $\alpha$ -hydroxy-alprazolam were added together to determine the total benzodiazepine concentration reported in the table. 6 samples were diluted with negative urine to obtain concentrations around the cutoff. |  |   |   |   |  |
| <b>COC</b>  |  |   | 55 - 91   | 110 - 140   | 153 - 96924  |
| Positive  | 0  | Not performed   | 6   | 5   | 36   |
| Negative  | 54   | Not performed   | 0   | 0   | 0  |
| Samples are categorized by benzoylcegonine concentrations (cocaine metabolite).   |  |   |   |   |  |
| <b>MAMP</b>   |  | 62 – 88   | 156 – 248   | 318 – 429   | 479 – 1499   |
| Positive  | 2  | 0   | 5   | 6   | 51   |
| Negative  | 98   | 2   | 0   | 0   | 0  |
| Samples are categorized according to d-methamphetamine concentrations   |  |   |   |   |  |
| <b>MTD</b>  |  |   | 112 - 114   | 249 - 283   | 307 - 9411   |
| Positive  | 0  | Not performed   | 2   | 6   | 44   |
| Negative  | 98   | Not performed   | 2   | 1   | 0  |

| <b>5 Minute</b>   | Negative by immunoassay; if positive, no drug was detected above the limit of detection of the confirmatory method | Concentration range of up to 50% below the cutoff (ng/mL) | Concentration range between the -50% of the cutoff and the cutoff (ng/mL) | Concentration range between the cutoff and 50% above the cutoff (ng/mL) | Concentration range of greater than 50% above the cutoff (ng/mL) |
|---|--|---|---|---|--|
| <b>OPI</b>  |  |   | 76 – 90   | 111 – 147   | 251 – 136360   |
| Positive  | 0  | Not performed   | 4   | 4   | 36   |
| Negative  | 54   | Not performed   | 0   | 0   | 0  |
| Morphine, codeine, hydrocodone and hydromorphone were added together to determine the total opiate concentrations reported in this table. |  |   |   |   |  |
| <b>PCP</b>  |  |   | 13 - 22   | 27 - 35   | 39 - 5439  |
| Positive  | 0  | Not performed   | 2   | 5   | 33   |
| Negative  | 55   | Not performed   | 3   | 0   | 0  |
| <b>THC</b>  |  | 3   | 21 - 37   | 42 - 54   | 62 - 761   |
| Positive  | 0  | 0   | 5   | 8   | 34   |
| Negative  | 55   | 1   | 1   | 0   | 0  |
| 11-nor-9-carboxy- $\Delta^9$ -THC concentrations are reported in this table   |  |   |   |   |  |

**ACCURACY AND RELIABILITY IN A POC SETTING  
(Amphetamines, Benzodiazepines, Cocaine, Methamphetamine, Methadone, Opiates, Phencyclidine and Cannabinoids (THC))**

The accuracy and reliability of the eight SURE-SCREEN tests was assessed by comparing the results generated by 44 POC operators at 13 POC sites and GC/MS or LC/MS/MS. The operators were provided with the package insert instructions to run the test system. Operators that used this device generally had at least a high school education, with no formal laboratory testing education or laboratory experience, and who had some experience running other similar tests to SURE-SCREEN. 93% of the participants had no laboratory testing education or laboratory experience; 88% used a point-of-care testing device before. 1000 samples were coded and evaluated in a blind study. The 1000 samples were divided into batches and distributed to the participants. The unaltered clinical samples were obtained from MEDTOX Laboratories Inc., a SAMHSA certified / CLIA-CAP Accredited Laboratory. Positive and negative samples were identified by initially screening at traditional cutoff levels with a commercial immunoassay system. Samples with negative results by both the commercial immunoassay system and SURE-SCREEN were not confirmed by GC/MS or LC/MS/MS. Samples with positive results by either the commercial immunoassay system or SURE-SCREEN were confirmed by GC/MS or LC/MS/MS.

| <b>The number of POC facilities and operators</b>  |  |   |   |   |  |
|--|--|---|---|---|--|
| Facility Type  | Criminal Justice   | Treatment Center  | Clinic/Physician Office Laboratory  | DAU Collection Site   | Total  |
| Sites  | 2  | 2   | 7   | 2   | 13   |
| Operators  | 18   | 3   | 11  | 12  | 44   |
| Samples  | 375  | 75  | 250   | 300   | 1000   |
| <b>ACCURACY COMPARED TO GC/MS OR LC/MS/MS<br/>(Amphetamines, Benzodiazepines, Cocaine, Methamphetamine, Methadone, Opiates, Phencyclidine and Cannabinoids (THC))</b>        |  |   |   |   |  |
| <b>POC Users</b>   | Negative by immunoassay; if positive, no drug was detected above the limit of detection of the confirmatory method | Concentration range of up to 50% below the cutoff (ng/mL) | Concentration range between the -50% of the cutoff and the cutoff (ng/mL) | Concentration range between the cutoff and 50% above the cutoff (ng/mL) | Concentration range of greater than 50% above the cutoff (ng/mL) |
| <b>AMP</b>   |  | 119   | 217-257   | 306   | 510-9489   |
| Positive   | 6  | 0   | 4   | 1   | 21   |
| Negative   | 967  | 1   | 0   | 0   | 0  |
| Samples are categorized according to d-amphetamine concentrations.   |  |   |   |   |  |
| <b>BZO</b>   |  | 34-38   | 113-174   | 245-268   | 315-32454  |
| Positive   | 0  | 1   | 5   | 2   | 17   |
| Negative   | 971  | 1   | 2   | 0   | 0  |
| Nordiazepam, oxazepam, temazepam, alprazolam and $\alpha$ -hydroxy-alprazolam were added together to determine the total benzodiazepine concentration reported in the table. |  |   |   |   |  |

| <b>POC Users</b>  | Negative by immunoassay; if positive, no drug was detected above the limit of detection of the confirmatory method | Concentration range of up to 50% below the cutoff (ng/mL) | Concentration range between the -50% of the cutoff and the cutoff (ng/mL) | Concentration range between the cutoff and 50% above the cutoff (ng/mL) | Concentration range of greater than 50% above the cutoff (ng/mL) |
|---|--|---|---|---|--|
| <b>COC</b>  |  | 16-48   | 57-96   | 113-133   | 200-39644  |
| Positive  | 1  | 1   | 4   | 5   | 28   |
| Negative  | 959  | 2   | 0   | 0   | 0  |
| Samples are categorized by benzoylecgonine concentrations (cocaine metabolite).   |  |   |   |   |  |
| <b>MAMP</b>   |  |   | 217   | 403   | 564-10858  |
| Positive  | 8  | Not performed   | 1   | 1   | 14   |
| Negative  | 976  | Not performed   | 0   | 0   | 0  |
| Samples are categorized according to d-methamphetamine concentrations.  |  |   |   |   |  |
| <b>MTD</b>  |  |   |   | 207   | 335-8377   |
| Positive  | 0  | Not performed   | Not performed   | 1   | 6  |
| Negative  | 993  | Not performed   | Not performed   | 0   | 0  |
| <b>OPI</b>  |  | 28  | 60  | 124-143   | 241-11724  |
| Positive  | 8  | 1   | 1   | 2   | 25   |
| Negative  | 963  | 0   | 0   | 0   | 0  |
| Morphine, codeine, hydrocodone and hydromorphone were added together to determine the total opiate concentrations reported in this table. |  |   |   |   |  |
| <b>PCP</b>  |  |   |   |   | 236-373  |
| Positive  | 0  | Not performed   | Not performed   | Not performed   | 4  |
| Negative  | 996  | Not performed   | Not performed   | Not performed   | 0  |
| <b>THC</b>  |  | 5-17  | 23-26   | 47-59   | 60-481   |
| Positive  | 8  | 4   | 3   | 6   | 30   |
| Negative  | 946  | 3   | 0   | 0   | 0  |
| 11-nor-9-carboxy- $\Delta^9$ -THC concentrations are reported in this table.  |  |   |   |   |  |

**Sensitivity/Precision**

Performance around the specific cutoff for each drug was evaluated by testing standard drug solutions diluted in drug-free urine in triplicate on 5 different intervals by 3 in-house operators. Drug-free urine was also tested on each interval. The results were interpreted at five minutes.

| <b>Amphetamine (d-Amphetamine) Cutoff = 300 ng/mL</b> |               |          |          |  |
|---|---------------|----------|----------|--|
| Conc. (ng/mL)   | Number Tested | Positive | Negative |  |
| 0   | 540           | 0        | 540      |  |
| 75  | 45            | 0        | 45       |  |
| 150   | 45            | 13       | 32       |  |
| 225   | 45            | 38       | 7        |  |
| <b>300</b>  | 45            | 44       | 1        |  |
| 375   | 45            | 44       | 1        |  |
| 450   | 45            | 44       | 1        |  |

| <b>Benzodiazepines (Nordiazepam) Cutoff = 200 ng/mL</b> |               |          |          |  |
|---|---------------|----------|----------|--|
| Conc. (ng/mL)   | Number Tested | Positive | Negative |  |
| Negative  | 540           | 0        | 540      |  |
| 50  | 45            | 30       | 15       |  |
| 100   | 45            | 40       | 5        |  |
| 150   | 45            | 45       | 0        |  |
| <b>200</b>  | 45            | 45       | 0        |  |
| 250   | 45            | 44       | 1        |  |
| 300   | 45            | 45       | 0        |  |

| <b>Cocaine (Benzoyllecgonine) Cutoff = 100 ng/mL</b> |               |          |          |  |
|--|---------------|----------|----------|--|
| Conc. (ng/mL)  | Number Tested | Positive | Negative |  |
| Negative   | 540           | 0        | 540      |  |
| 25   | 45            | 0        | 45       |  |
| 50   | 45            | 19       | 26       |  |
| 75   | 45            | 25       | 20       |  |
| <b>100</b>   | 45            | 35       | 10       |  |
| 125  | 45            | 44       | 1        |  |
| 150  | 45            | 41       | 4        |  |

| <b>Methamphetamine (d-Methamphetamine) Cutoff = 300 ng/mL</b> |               |          |          |  |
|---|---------------|----------|----------|--|
| Conc. (ng/mL)   | Number Tested | Positive | Negative |  |
| Negative  | 540           | 0        | 540      |  |
| 75  | 45            | 1        | 44       |  |
| 150   | 45            | 18       | 27       |  |
| 225   | 45            | 44       | 1        |  |
| <b>300</b>  | 45            | 45       | 0        |  |
| 375   | 45            | 45       | 0        |  |
| 450   | 45            | 45       | 0        |  |

| <b>Methadone (Methadone) Cutoff = 200 ng/mL</b> |               |          |          |  |
|---|---------------|----------|----------|--|
| Conc. (ng/mL)                                   | Number Tested | Positive | Negative |  |
| Negative  | 405           | 0        | 405      |  |
| 50  | 45            | 4        | 41       |  |
| 100   | 45            | 37       | 8        |  |
| 150   | 45            | 44       | 1        |  |
| <b>200</b>                                      | 45            | 45       | 0        |  |
| 250   | 45            | 44       | 1        |  |
| 300   | 45            | 45       | 0        |  |

| <b>Opiate (Morphine) Cutoff = 100 ng/mL</b> |               |          |          |  |
|---|---------------|----------|----------|--|
| Conc. (ng/mL)                               | Number Tested | Positive | Negative |  |
| Negative                                    | 540           | 0        | 540      |  |
| 25  | 45            | 20       | 25       |  |
| 50  | 45            | 38       | 7        |  |
| 75  | 45            | 44       | 1        |  |
| <b>100</b>                                  | 45            | 45       | 0        |  |
| 125   | 45            | 44       | 1        |  |
| 150   | 45            | 43       | 2        |  |

| <b>Phencyclidine (Phencyclidine) Cutoff = 25 ng/mL</b> |               |          |          |  |
|--|---------------|----------|----------|--|
| Conc. (ng/mL)  | Number Tested | Positive | Negative |  |
| Negative   | 540           | 0        | 540      |  |
| 6.25   | 45            | 1        | 44       |  |
| 12.50  | 45            | 0        | 45       |  |
| 18.75  | 45            | 17       | 28       |  |
| <b>25.00</b>   | 45            | 43       | 2        |  |
| 31.25  | 45            | 43       | 2        |  |
| 37.50  | 45            | 44       | 1        |  |

| <b>Cannabinoids (11-nor-9-carboxy-<math>\Delta^9</math>-THC) Cutoff = 40 ng/mL</b> |               |          |          |  |
|--|---------------|----------|----------|--|
| Conc. (ng/mL)  | Number Tested | Positive | Negative |  |
| Negative   | 105           | 0        | 105      |  |
| 10   | 45            | 0        | 45       |  |
| 20   | 45            | 0        | 45       |  |
| 30   | 45            | 1        | 44       |  |
| <b>40</b>  | 45            | 45       | 0        |  |
| 50   | 45            | 40       | 5        |  |
| 60   | 45            | 45       | 0        |  |

Precision POC Operators:

Performance around the cutoff for each drug was evaluated by testing drug-free negative urine that was spiked with drug at the various concentrations listed in the following tables. 3 POC operators tested 15 replicates of each sample. These 3 operators had at least a high school education, with no formal laboratory testing education or laboratory experience, and had some experience running other similar tests to SURE-SCREEN. The results are summarized in the table below:

| <b>Amphetamine (d-Amphetamine) Cutoff = 300 ng/mL</b> |               |          |          |  |
|---|---------------|----------|----------|--|
| Conc. (ng/mL)   | Number Tested | Positive | Negative |  |
| Negative  | 135           | 0        | 135      |  |
| 75  | 45            | 4        | 41       |  |
| 150   | 45            | 35       | 10       |  |
| 300   | 45            | 45       | 0        |  |
| 375   | 45            | 45       | 0        |  |

| <b>Benzodiazepines (Nordiazepam) Cutoff = 200 ng/mL</b> |               |          |          |  |
|---|---------------|----------|----------|--|
| Conc. (ng/mL)   | Number Tested | Positive | Negative |  |
| Negative  | 135           | 0        | 135      |  |
| 50  | 45            | 1        | 44       |  |
| 100   | 45            | 4        | 41       |  |
| 200   | 45            | 9        | 36       |  |
| 250   | 45            | 45       | 0        |  |

| <b>Cocaine (Benzoylecgonine) Cutoff = 100 ng/mL</b> |               |          |          |  |
|---|---------------|----------|----------|--|
| Conc. (ng/mL)                                       | Number Tested | Positive | Negative |  |
| Negative  | 135           | 0        | 135      |  |
| 25  | 45            | 0        | 45       |  |
| 50  | 45            | 6        | 39       |  |
| 100   | 45            | 26       | 19       |  |
| 125   | 45            | 45       | 0        |  |

| <b>Methamphetamine (d-Methamphetamine) Cutoff = 300 ng/mL</b> |               |          |          |  |
|---|---------------|----------|----------|--|
| Conc. (ng/mL)   | Number Tested | Positive | Negative |  |
| Negative  | 135           | 0        | 135      |  |
| 75  | 45            | 1        | 44       |  |
| 150   | 45            | 11       | 34       |  |
| 300   | 45            | 25       | 20       |  |
| 375   | 45            | 45       | 0        |  |

| <b>Methadone (Methadone) Cutoff = 200 ng/mL</b> |               |          |          |  |
|---|---------------|----------|----------|--|
| Conc. (ng/mL)                                   | Number Tested | Positive | Negative |  |
| Negative  | 135           | 0        | 135      |  |
| 50  | 45            | 4        | 41       |  |
| 100   | 45            | 22       | 23       |  |
| 200   | 45            | 25       | 20       |  |
| 250   | 45            | 45       | 0        |  |

| <b>Opiate (Morphine) Cutoff = 100 ng/mL</b> |               |          |          |  |
|---|---------------|----------|----------|--|
| Conc. (ng/mL)                               | Number Tested | Positive | Negative |  |
| Negative                                    | 135           | 0        | 135      |  |
| 25  | 45            | 0        | 45       |  |
| 50  | 45            | 0        | 45       |  |
| 100   | 45            | 7        | 38       |  |
| 125   | 45            | 43       | 2        |  |

| <b>Phencyclidine (Phencyclidine) Cutoff = 25 ng/mL</b> |               |          |          |  |
|--|---------------|----------|----------|--|
| Conc. (ng/mL)  | Number Tested | Positive | Negative |  |
| Negative   | 135           | 0        | 135      |  |
| 6.25   | 45            | 1        | 44       |  |
| 12.5   | 45            | 34       | 11       |  |
| 25.0   | 45            | 44       | 1        |  |
| 31.25  | 45            | 45       | 0        |  |

| Cannabinoids (11-nor-9-carboxy- $\Delta^9$ -THC) Cutoff = 40 ng/mL |               |          |          |     |
|--|---------------|----------|----------|-----|
| Conc. (ng/mL)  | Number Tested | Positive | Negative |     |
| Negative   | 135           | 0        |          | 135 |
| 10   | 45            | 2        |          | 43  |
| 20   | 45            | 14       |          | 31  |
| 40   | 45            | 25       |          | 20  |
| 50   | 45            | 45       |          | 0   |

### 13B. Non Crossreactive Endogenous Compounds

Listed compounds were initially dissolved in appropriate solvents and then added to drug-free urine for evaluation with all eight SURE-SCREEN tests. Most of the compounds were evaluated for reactivity with the SURE-SCREEN tests at 100  $\mu$ g/mL (albumin was evaluated at 20 mg/mL and bilirubin was evaluated at 200  $\mu$ g/mL). Samples were evaluated in triplicate by in-house operators. The listed compounds gave negative results with all eight of the SURE-SCREEN tests.

|                |                       |                     |
|----------------|-----------------------|---------------------|
| Acetaldehyde   | Creatinine            | Hemoglobin, Human   |
| Acetone        | Epinephrine           | Sodium Chloride     |
| Albumin, Human | $\beta$ -Estradiol    | Tetrahydrocortisone |
| Bilirubin      | Estriol               | d,1-Thyroxine       |
| Cholesterol    | Glucose Std. Solution | Uric Acid           |

### 13C. Unrelated Compounds, Prescription and Over-the-Counter Medications

Listed compounds were initially dissolved in appropriate solvents and then added to drug-free urine for evaluation with all eight SURE-SCREEN tests. Most of the compounds listed in Section 13C were evaluated for reactivity with the SURE-SCREEN tests at 100  $\mu$ g/mL. (Alprazolam, 1-hydroxy; Buprenorphine, Fentanyl, Lorazepam glucuronide, 11-Nor-9-carboxy- $\Delta^9$ -THC, Olanzapine, and Oxazepam glucuronide were evaluated at 10  $\mu$ g/mL. 11-Nor-9-carboxy- $\Delta^8$ -THC was evaluated at 5  $\mu$ g/mL). When a drug name is followed by an abbreviation such as "AMP", "BZO", etc, check the Related and Reactive Compounds listing in Section 13D for the reactivity of the drug with the appropriate test (AMP, BZO, etc). Samples were evaluated in triplicate by in-house operators. Highlighted compounds reacted with tests they were not chemically related to. Unless noted in the Related and Reactive Compounds Section, the listed compounds gave negative results with all eight of the SURE-SCREEN tests.

|                                   |  |  |                                       |   |  |
|-----------------------------------|--|--|---------------------------------------|---|--|
| Acecaidine (N-Acetylprocainamide) | Acetaminophen                                | Acetylsalicylic Acid                                 | Allobarbitol                          | Alprazolam-BZO                              | Alprazolam, 1-Hydroxy-BZO                  |
| p-Aminobenzoic Acid               | 7-Amino-clonazepam-BZO                       | 7-Amino-flunitrazepam-BZO                            | Aminoglutethimide                     | l-Aminopyrine (4-(dimethylamino)antipyrine) | Amitriptyline                              |
| Amobarbital                       | Amoxapine                                    | Amoxicillin  | d-Amphetamine-AMP, MAMP               | l-Amphetamine-AMP, MAMP                     | Ampicillin                                 |
| Aprobarbital                      | Apomorphine-OPI                              | l-Ascorbic Acid                                      | Aspartame                             | Atenolol                                    | Atropine Sulfate                           |
| Barbital                          | Barbituric Acid                              | Benzilic Acid  | Benzoic Acid                          | Benzocaine (ethyl-4-aminobenzoate)          | Benzoylcegonine-COC                        |
| Benzphetamine                     | Benztrapine                                  | Brompheniramine                                      | Buprenorphine (Methadone replacement) | Bupropion                                   | Butabarbital                               |
| Butalbital                        | Caffeine                                     | Cannabidiol-THC                                      | Cannabinol-THC                        | Captopril                                   | Carbamazepine                              |
| Carbamazepine-10,11 epoxide       | Carisoprodol (Meprobamate)                   | Cephalexin   | Chloral Hydrate                       | Chloramphenicol                             | Chlordiazepoxide-BZO                       |
| Chloroquine                       | Chlorothiazide                               | Chlorpheniramine                                     | Chlorpromazine                        | Chlorprothixene                             | Clobazam-BZO                               |
| Clomipramine                      | Clonazepam-BZO                               | Clonidine  | Clorazepate-BZO                       | Clozapine                                   | Cocaine-COC                                |
| Codeine-OPI                       | Cortisone                                    | Cotinine   | Cyclobenzaprine                       | Cyclopentobarbital                          | Deoxycorticosterone                        |
| Desalkylflurazepam-BZO            | Desipramine                                  | Desmethyl chlordiazepoxide (Norchlordiazepoxide)-BZO | Desmethylflunitrazepam-BZO            | Desmethylvenlafaxine                        | Dexamethasone                              |
| Dextromethorphan                  | Diacetylmorphine-OPI                         | Diazepam-BZO   | Diclofenac                            | Diethylpropion                              | Diflunisal                                 |
| Digoxin                           | Dihydrocodeine-OPI                           | Dimenhydrinate (Dramamine)                           | 1,3-Dimethylbarbituric acid           | Diphenhydramine                             | Domperidone                                |
| Dopamine                          | Doxepin                                      | Doxylamine   | Ecgonine-COC                          | Ecgonine Methyl Ester-COC                   | EDDP (Primary metabolite of methadone)-MTD |
| Efavirenz (Sustiva)               | EMDP (Secondary metabolite of methadone)-MTD | Ephedrine-AMP, MAMP                                  | Equilin                               | Erythromycin                                | Estrone                                    |
| Ethanol                           | Ethylmorphine-OPI                            | Fenfluramine   | Fenoprofen                            | Fentanyl (Synthetic opiate)                 | Flunitrazepam-BZO                          |
| Fluoxetine (Prozac)               | Flurazepam-BZO                               | Furosemide   | Fluvoxamine                           | Gentisic Acid (2,5-Dihydroxybenzoic acid)   | Glutethimide                               |
| Guaiacol Glyceryl Ether           | Haloperidol                                  | Hexobarbital   | Hippuric acid                         | Hydralazine                                 | Hydrochlorothiazide                        |
| Hydrocodone-OPI                   | Hydrocortisone                               | Hydromorphone-OPI                                    | Hydroxybupropion                      | Hydroxyhippuric acid                        | l-11-Hydroxy- $\Delta^9$ -THC-THC          |
| p-Hydroxyphenobarbital            | 4-Hydroxyphenacyclidine-PCP                  | 3-Hydroxytyramine                                    | Hydroxyzine                           | Ibuprofen                                   | Imipramine                                 |
| Iproniazid                        | (R)-Isoproterenol                            | Isoxsuprine  | Ketamine                              | Ketoprofen                                  | Labetalol                                  |
| Levorphanol-OPI                   | Lidocaine                                    | Lithium carbonate                                    | Loperamide                            | Lorazepam-BZO                               | Lorazepam glucuronide-BZO                  |

|  |                                |  |   |                                      |  |
|--|--------------------------------|--|---|--------------------------------------|--|
| Loxapine   | Lysergic Acid-BZO              | Lysergic Acid Diethylamide (LSD)         | Maprotiline                                       | MDA-AMP, MAMP                        | MDE (MDEA)-AMP, MAMP                     |
| MDMA-AMP, MAMP                                   | Melanin                        | Meperidine                               | Mephobarbital                                     | Mepivacaine                          | Mesoridazine                             |
| Methadone-MTD                                    | d-Methamphetamine-AMP, MAMP    | l-Methamphetamine-AMP, MAMP              | Methaqualone                                      | Methcathinone                        | Methocarbamol                            |
| Methoxyphenamine                                 | Methylphenidate                | Methylprylon                             | Metoprolol  | Midazolam-BZO                        | Mirtazapine                              |
| 6-Monoacetylmorphine-OPI                         | Morphine-OPI                   | Morphine 3-β-D-Glucuronide-OPI           | Morphine 6-β-D-Glucuronide-OPI                    | Nalidixic Acid                       | Naltrexone-OPI                           |
| Nalorphine-OPI                                   | Naloxone-OPI                   | Naproxen                                 | Niacinamide                                       | Nicotine                             | Nifedipine                               |
| Nitrazepam-BZO                                   | Nitrofurantoin                 | Norclomipramine                          | Norcodeine-OPI                                    | Nordiazepam-BZO                      | Nordoxepin                               |
| Norethindrone                                    | Norlysergic Acid               | Normeperidine                            | Norpropoxyphene-PPX                               | l-Norpseudoephedrine                 | 11-Nor-9-carboxy-Δ <sup>9</sup> -THC-THC |
| 11-Nor-9-carboxy-Δ <sup>8</sup> -THC-THC         | Nortriptyline                  | Noscapine                                | Nylidrin  | Octopamine                           | Ofloxacin                                |
| Olanzapine (Zyprexa)-TCA positive-Anti-Psychotic | Omeprazole                     | Orphenadrine                             | Oxalic Acid                                       | Oxaprosin                            | Oxazepam-BZO                             |
| Oxazepam glucuronide-BZO                         | Oxolinic Acid                  | Oxycodone-OPI                            | Oxymetazoline                                     | Oxymorphone-OPI                      | Papaverine hydrochloride                 |
| Pentazocine                                      | Pentobarbital                  |  | Perphenazine                                      | Phenallymal (Alphenal)               | Phenacetin (Acetophenetidin)             |
| Phendimetrazine                                  | Phenelzine                     |  | Phenethylamine-AMP, MAMP                          | Pheniramine                          | Phenmetrazine                            |
| Phenobarbital                                    | Phenothiazine                  | Phentermine-AMP, MDMA                    | Phentoin (Diphenylhydantoin)-BAR                  | Phenylbutazone                       | Phenylephrine                            |
| Phenylpropanolamine                              | Piroxicam                      | Prazosin                                 | Prednisolone                                      | Prednisone                           | Procaine                                 |
| Procinamide                                      | Prochlorperazine               | Promazine                                | Promethazine                                      | Propoxyphene                         | Propranolol                              |
| Protriptyline                                    | Pseudoephedrine-MAMP           | <b>Pyrilamine-BZO</b>                    | Quetiapine (Seroquel)-TCA positive-Anti-Psychotic | Quinidine                            | Ranitidine                               |
| Riboflavin                                       | Rifampin                       | Salicylic Acid                           | Secobarbital                                      | Selegiline (Deprenyl)                | Serotonin (5-Hydroxytryptamine)          |
| Sertraline (Zoloft)                              | <b>Sildenafil (Viagra)-BZO</b> | Sulfamethazine                           | <b>Sulindac-BZO</b>                               | Talbutal                             | Temazepam-BZO                            |
| Temazepam glucuronide-BZO                        | Tetracycline                   | Δ <sup>9</sup> -Tetrahydrocannabinol-THC | Δ <sup>8</sup> -Tetrahydrocannabinol-THC          | Δ <sup>6</sup> -Tetrahydrocannabinol | Tetrahydrozoline                         |
| Thebaine-OPI                                     | Theopyline                     | Thiamine                                 | Thiopental  | Thioridazine                         | Thiothixine                              |
| Tolbutamide                                      | Tolmetin (Tolectin)            | Trazodone                                | Triamterene                                       | Triazolam-BZO                        | Triazolam, 1-hydroxy-BZO                 |
| Trifluoperazine                                  | Trimethoprim                   | Trimipramine                             | Tripelennamine                                    | Tryptamine                           | Tryptophan                               |
| Tyramine-AMP, MAMP                               | Tyrosine                       | Valproic Acid                            | Venlafaxine                                       | Verapamil                            | Zomepirac                                |

### 13D. Related and Reactive Compounds

The following metabolites and compounds were initially dissolved in appropriate solvents and then added at varying concentrations to drug-free urine for evaluation with all eight SURE-SCREEN tests. Samples were evaluated in triplicate by in-house operators. Unless noted in the following tables, the listed compounds gave negative results with all eight of the SURE-SCREEN tests. Results are expressed as the minimum concentration of metabolite or compound required to produce a positive test result with the indicated SURE-SCREEN test. Percent cross reactivity of a compound is calculated by dividing the cutoff concentration by the minimum concentration required to obtain a positive result and then multiplying by 100%.

| <b>Amphetamine (d-amphetamine, cutoff = 300 ng/mL)</b> | <b>Result</b>             | <b>% Cross-Reactivity</b> |
|--|---------------------------|---------------------------|
|  | Positive at 300 ng/mL     | 100%                      |
| l-Amphetamine  | Positive at 100,000 ng/mL | < 1%                      |
| Ephedrine  | Negative at 100,000 ng/mL | < 1%                      |
| MDA  | Positive at 750 ng/mL     | 40%                       |
| MDE (MDEA)   | Negative at 100,000 ng/mL | < 1%                      |
| MDMA   | Negative at 100,000 ng/mL | < 1%                      |
| d-Methamphetamine                                      | Negative at 100,000 ng/mL | < 1%                      |
| l-Methamphetamine                                      | Negative at 100,000 ng/mL | < 1%                      |
| Phenethylamine   | Negative at 100,000 ng/mL | < 1%                      |
| Phentermine  | Positive at 1,000 ng/mL   | 33%                       |
| Tyramine   | Negative at 100,000 ng/mL | < 1%                      |

| <b>Benzodiazepines (Nordiazepam, cutoff = 200 ng/mL)</b> | <b>Result</b>             | <b>% Cross-Reactivity</b> |
|--|---------------------------|---------------------------|
|  | Positive at 200 ng/mL     | 100%                      |
| Alprazolam   | Positive at 25 ng/mL      | 800%                      |
| Alprazolam, 1-Hydroxy                                    | Positive at 500 ng/mL     | 40%                       |
| 7-Amino-clonazepam                                       | Negative at 100,000 ng/mL | < 1%                      |
| 7-Amino-flunitrazepam                                    | Negative at 100,000 ng/mL | < 1%                      |
| Chlordiazepoxide   | Negative at 100,000 ng/mL | < 1%                      |
| Clobazam   | Positive at 25 ng/mL      | 800%                      |
| Clonazepam   | Positive at 125 ng/mL     | 160%                      |
| Clorazepate  | Positive at 50 ng/mL      | 400%                      |

| <b>Benzodiazepines<br/>(Nordiazepam, cutoff = 200 ng/mL)</b> | <b>Result</b>             | <b>% Cross-Reactivity</b> |
|--|---------------------------|---------------------------|
| Desalkylflurazepam   | Positive at 200 ng/mL     | 100%                      |
| Desalkylflurazepam   | Positive at 100 ng/mL     | 200%                      |
| Desmethyl-chlordiazepoxide                                   | Positive at 250 ng/mL     | 80%                       |
| Desmethylflunitrazepam                                       | Positive at 50 ng/mL      | 400%                      |
| Diazepam   | Positive at 50 ng/mL      | 400%                      |
| Flunitrazepam  | Positive at 50 ng/mL      | 400%                      |
| Flurazepam   | Negative at 100,000 ng/mL | < 1%                      |
| Lorazepam  | Positive at 2500 ng/mL    | 8%                        |
| Lorazepam glucuronide  | Positive at 25 ng/mL      | 800%                      |
| Lysergic acid  | Positive at 25,000 ng/mL  | < 1%                      |
| Midazolam  | Negative at 100,000 ng/mL | < 1%                      |
| Nitrazepam   | Positive at 50 ng/mL      | 400%                      |
| Oxazepam   | Positive at 25 ng/mL      | 800%                      |
| Oxazepam glucuronide   | Positive at 750 ng/mL     | 27%                       |
| Pyrilamine   | Positive at 10,000 ng/mL  | 2%                        |
| Sildenafil   | Positive at 10,000 ng/mL  | 2%                        |
| Sulindac   | Positive at 10,000 ng/mL  | 2%                        |
| Temazepam  | Positive at 50 ng/mL      | 400%                      |
| Temazepam glucuronide  | Positive at 250 ng/mL     | 80%                       |
| Triazolam  | Positive at 75 ng/mL      | 267%                      |
| Triazolam, 1-hydroxy   | Negative at 10,000 ng/mL  | < 1%                      |

| <b>Cocaine<br/>(Benzoyllecgonine, cutoff = 100 ng/mL)</b> | <b>Result</b>             | <b>% Cross-Reactivity</b> |
|---|---------------------------|---------------------------|
| Cocaine   | Positive at 100 ng/mL     | 100%                      |
| Cocaine   | Positive at 300 ng/mL     | 33%                       |
| Ecgonine  | Positive at 100,000 ng/mL | < 1%                      |
| Ecgonine Methyl Ester                                     | Negative at 100,000 ng/mL | < 1%                      |

| <b>Methamphetamine<br/>(d-Methamphetamine, cutoff = 300 ng/mL)</b> | <b>Result</b>             | <b>% Cross-Reactivity</b> |
|--|---------------------------|---------------------------|
| d-Amphetamine  | Positive at 300 ng/mL     | 100%                      |
| d-Amphetamine  | Negative at 100,000 ng/mL | < 1%                      |
| l-Amphetamine  | Negative at 100,000 ng/mL | < 1%                      |
| Ephedrine  | Positive at 2,500 ng/mL   | 12%                       |
| Fenfluramine   | Positive at 25,000 ng/mL  | 1.2%                      |
| MDA  | Negative at 100,000 ng/mL | < 1%                      |
| MDE (MDEA)   | Positive at 5,000 ng/mL   | 6%                        |
| MDMA   | Positive at 500 ng/mL     | 60%                       |
| l-Methamphetamine  | Positive at 7,500 ng/mL   | 4%                        |
| Phenethylamine   | Negative at 2,500 ng/mL   | 12%                       |
| Phentermine  | Negative at 100,000 ng/mL | < 1%                      |
| Pseudoephedrine  | Negative at 100,000 ng/mL | < 1%                      |
| Tyramine   | Negative at 100,000 ng/mL | < 1%                      |

| <b>Methadone<br/>(Methadone, cutoff = 200 ng/mL)</b> | <b>Result</b>             | <b>% Cross-Reactivity</b> |
|--|---------------------------|---------------------------|
| Methadone  | Positive at 200 ng/mL     | 100%                      |
| EDDP   | Negative at 100,000 ng/mL | < 1%                      |
| EMDP   | Negative at 100,000 ng/mL | < 1%                      |

| <b>Opiates<br/>(Morphine, cutoff = 100 ng/mL)</b> | <b>Result</b>             | <b>% Cross-Reactivity</b> |
|---|---------------------------|---------------------------|
| Morphine  | Positive at 100 ng/mL     | 100%                      |
| Apomorphine                                       | Negative at 100,000 ng/mL | < 1%                      |
| Codeine   | Positive at 300 ng/mL     | 33%                       |
| Diacetylmorphine                                  | Positive at 300 ng/mL     | 33%                       |
| Dihydrocodeine                                    | Positive at 100 ng/mL     | 100%                      |
| Ethylmorphine                                     | Positive at 50 ng/mL      | 200%                      |
| Hydrocodone                                       | Positive at 300 ng/mL     | 33%                       |
| Hydromorphone                                     | Positive at 100 ng/mL     | 100%                      |
| Levorphanol                                       | Positive at 50,000 ng/mL  | < 1%                      |
| 6-Monoacetylmorphine                              | Positive at 100,000 ng/mL | < 1%                      |
| Morphine 3-β-D-Glucuronide                        | Positive at 100,000 ng/mL | < 1%                      |
| Morphine 6-β-D-Glucuronide                        | Negative at 100,000 ng/mL | < 1%                      |
| Nalorphine  | Positive 150 ng/mL        | 67%                       |
| Naloxone  | Positive at 25,000 ng/mL  | < 1%                      |
| Naltrexone  | Negative at 100,000 ng/mL | < 1%                      |
| Norcodeine  | Negative at 100,000 ng/mL | < 1%                      |
| Oxycodone   | Positive at 50,000 ng/mL  | < 1%                      |
| Oxymorphone                                       | Positive at 75,000 ng/mL  | < 1%                      |
| Thebaine  | Positive at 1,000 ng/mL   | 10%                       |

| <b>Phencyclidine<br/>(Phencyclidine, cutoff = 25 ng/mL)</b> | <b>Result</b>           | <b>% Cross-Reactivity</b> |
|---|-------------------------|---------------------------|
| Phencyclidine   | Positive at 25 ng/mL    | 100%                      |
| 4-Hydroxy-Phencyclidine                                     | Positive at 5,000 ng/mL | <1%                       |

| THC (Cannabinoids)<br>(11-nor-9-carboxy- $\Delta^9$ -THC, cutoff = 40 ng/mL) | Result<br>Positive at 40 ng/mL | % Cross-Reactivity<br>100% |
|--|--------------------------------|----------------------------|
| Cannabidiol  | Negative at 100,000 ng/mL      | < 1%                       |
| Cannabinol   | Negative at 100,000 ng/mL      | < 1%                       |
| 1-11-Hydroxy- $\Delta^9$ -THC  | Positive at 250 ng/mL          | 16%                        |
| $\Delta^9$ -Tetrahydrocannabinol   | Positive at 10,000 ng/mL       | < 1%                       |
| $\Delta^8$ -Tetrahydrocannabinol<br>( $\Delta^6$ -Tetrahydrocannabinol)      | Positive at 25,000 ng/mL       | < 1%                       |

### 13E. Interference

pH and Specific Gravity:

Every SURE-SCREEN test (Amphetamine, Benzodiazepine, Cocaine, Methamphetamine, Methadone, Opiates, Phencyclidine and Cannabinoids) was assayed with six negative clinical samples with pH values of 4.0, 5.0, 6.0, 7.0, 8.0 and 9.0  $\pm$  0.1. Each sample was assayed in triplicate. Clearly visible test lines formed with all eight SURE-SCREEN tests within five minutes of the sample contacting the test strip. The affects of these conditions on samples containing drug is not known. Every SURE-SCREEN test (Amphetamine, Benzodiazepine, Cocaine, Methamphetamine, Methadone, Opiates, Phencyclidine and Cannabinoids) was assayed with seven samples with specific gravity values of 1.003, 1.005, 1.011, 1.016, 1.019, 1.025 and 1.033. Each sample was assayed in triplicate. Clearly visible test lines formed with all eight SURE-SCREEN tests within five minutes of sample contacting the test strip. The affects of these conditions on samples containing drug is not known.

Common Drugs:

Following the study of M.L. Smith, et. al.<sup>7</sup> drug free urine samples were spiked with the targeted drugs to the concentrations of 25% and 150% of the cutoff concentrations. 100  $\mu$ g/mL of the common drugs were then added to the preparation and assayed by SURE-SCREEN. Samples were evaluated in triplicate by in-house operators. None of the common drugs listed in the following table affected the expected results.

#### COMMON DRUGS EVALUATED WITH ALL SURE-SCREEN TESTS

|                         |                   |                   |
|-------------------------|-------------------|-------------------|
| Acetylsalicylic Acid    | Chlorpheniramine  | Ibuprofen         |
| Acetaminophen           | Cocaine-COC       | Morphine-OPI      |
| Brompheniramine maleate | Dextromethorphan  | Phenobarbital     |
| Caffeine                | Diphenylhydantoin | d-Pseudoephedrine |
| Carbamazepine           | Doxylamine        | Salicylic Acid    |

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### 15. LIMITED EXPRESS WARRANTIES

The manufacturer makes no express warranty other than the diagnostic test kit will measure certain drugs and/or drug metabolites when used in accordance with the manufacturer's printed instructions. The use of the kit for any other purpose is outside the intended use of this product. The manufacturer gives no express warranty as to what the legal or clinical significance is of the levels of drug(s)/drug metabolites detected by the SURE-SCREEN Drugs of Abuse Test. The manufacturer disclaims any and all implied warranties of merchantability, fitness for use or implied utility for any other purposes. Any and all damages for failure of the kit to perform to its instructions are limited to the replacement value of the kit.

Covered by one or more patents.

U.S. Patent Nos. 5,202,268, 6,566,051, 6,376,251, 6,653,139

Patents pending.

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This product does not contain controlled substances

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