RANDOX

DRUGS OF ABUSE ARRAY BLOOD

—evidence—

MULTISTAT

INTENDED USE

The Evidence MultiSTAT DOA Blood Assays are tests for the qualitative determination of the parent molecule and metabolites of drugs in human whole blood. They are competitive enzyme immunoassays run on the automated biochip array analyser, Evidence MultiSTAT.

FOR FORENSIC USE ONLY. Not for use in diagnostic procedures

The Evidence MultiSTAT DOA Blood Assays provide only a preliminary analytical test result. A more specific alternative chemical method must be used to obtain a confirmed analytical result. Gas Chromatography/mass spectrometry (GC/MS) is the preferred confirmatory method[1]. Other chemical confirmation methods are available. Clinical consideration and professional judgement should be applied to any drug of abuse test result, particularly when preliminary positive results are used.

Cat. No. EV4195

Containing the following components:

1.	Blood Test Cartridge	12 x 1 Cartridge
2.	Blood Cut Off	6 x 1 ml
3.	Blood Positive Control	4 x 1 ml
4.	Blood Sample Diluent	1x10ml
5.	Reconstitution Buffer	2 x 10 ml
6.	Sample Droppers	24 x Dropper

Cat. No. EV4116

Containing the following components:

1.	MultiSTAT Tip Cartridge	12 x 1 Tip Cartridge

CLINICAL SIGNIFICANCE

Drug abuse in any form gives rise to serious negative consequences, not only for the abuser by devastating their mental and physical health, but also to the whole of society. It is an indirect and direct cause of many crimes and also in the spread of diseases. It is very costly, with costs related to crime, medical care, treatment and welfare programs for addicted individuals and wasted working hours[1]. Blood drug testing can provide a tool for detecting users and for monitoring the compliance of subjects in recovery programs.

PRINCIPLE

The Evidence MultiSTAT analyser is a fully automated Biochip Array System. It performs simultaneous detection of multiple analytes from a single sample. The core technology is the Randox Biochip, a solid-state device containing an array of discrete test regions containing immobilized antibodies specific to different DOA compound classes. A competitive chemiluminescent immunoassay is employed for the DOA assays with the drug in the specimen and drug labelled with horseradish peroxidase (HRP) being in direct competition for the antibody binding sites. Increased levels of drug in a specimen will lead to reduced binding of drug labelled with HRP and thus a reduction in chemiluminescence being emitted.

The light signal generated from each of the test regions on the biochip is detected using digital imaging technology and compared to that from the cut off material. The classification of test analyte present in the sample is determined from the cut off material.

LIMITATIONS

Note: Please store MultiSTAT cartridges with label facing upwards.

- If this is not adhered to the integrity of the cartridge may be compromised and could impact on test results.
- Visually check the cartridge foil for evidence of moisture or damage to the foil seal.
- If there is any concern that the integrity of the cartridge has been compromised, do not use and contact Randox Toxicology Support.

- The Evidence MultiSTAT DOA Blood Array is designed for use only with human whole blood samples.
- There is a possibility that other substances and/or factors may interfere with the assays and cause erroneous results (e.g. technical or procedural errors).
- These assays have been designed to reduce HAMA and other heterophilic antibodies interference. However, HAMA and other heterophilic antibodies can react with the immunoglobulins included in the assay components. Clinical consideration and professional judgement should be applied to any drugs of abuse qualitative test result.

SPECIMEN COLLECTION AND PREPARATION

- The Evidence MultiSTAT DOA Blood Array is designed for use with human whole blood samples.
- Sample preparation should be carried out in accordance with the collection tube manufacturer's recommendations.
- **All whole blood samples should be centrifuged up to 13000 rpm (11000 G) for 10 minutes prior to the 4-fold dilution in sample diluent. Alternatively, 4000 rpm (1000 G) for 20 minutes can be used.**
- Whole blood samples should be diluted 4-fold in sample diluent prior to analysis, e.g. 150 µl sample + 450 µl sample diluent. The diluted sample is now ready for application to the MultiSTAT cartridge and should be analysed immediately following preparation.

SAMPLE STORAGE AND STABILITY

- Toxicological results may be affected by the quality of the sample which may be influenced by how it is handled, the length of time it is stored and the storage conditions. Sample stability should be determined by the end user.

SAFETY PRECAUTIONS AND WARNINGS

For *in vitro* human forensic use only. Do not pipette by mouth. Exercise the normal precautions required for handling laboratory reagents.

Wash buffer and Reconstitution buffer contain preservative. Avoid ingestion or contact with skin or mucous membranes.

Human samples should be handled and treated as if they are potentially infectious.

Please dispose of all biological and chemical materials according to local guidelines.

Health and Safety data sheets are available on request.

On opening the cartridge foil bag, visually check the cartridge for evidence of moisture and the cartridge foil for signs of tearing. If there is any concern that the integrity of the cartridge has been affected, do not use and contact Randox Toxicology Support.

REAGENT COMPOSITION

Contents

1. **MULTISTAT DOA BLOOD ASSAY DILUENT**
   20 mM phosphate buffer, pH 7.2, containing protein, detergents and preservatives. This is contained within the cartridge.

2. **MULTISTAT DOA BLOOD CONJUGATE**
   20 mM Tris based buffer, pH 7.0, containing protein, preservatives and horseradish peroxidase - labelled drug derivatives. This is contained within the cartridge.

3. **MULTISTAT DOA BLOOD BIOCHIP**
   Solid substrate containing immobilized antibody discrete test regions. This is contained within the cartridge.

4. **MULTISTAT DOA BLOOD WASH BUFFER**
   20 mM Tris buffered saline, pH 7.4, containing surfactant and preservatives. This is contained within the cartridge.

5. **LUM-EV934/PX**
   Luminol-EV934 and Peroxide are contained within the cartridge and are mixed in a ratio of 1:1 by the analyser to give the working signal reagent

6. **MULTISTAT DOA BLOOD CUT OFF**
   Lyophilised, 20 mM phosphate buffer, pH 7.2 containing stabilizers, preservatives and drug concentrations as outlined below.

7. **MULTISTAT DOA BLOOD POSITIVE CONTROL**
   Lyophilised, 20 mM phosphate buffer, pH 7.2 containing stabilizers, preservatives and drug concentrations as outlined below.

8. **MULTISTAT RECONSTITUTION BUFFER**
   A solution at a neutral pH containing preservatives.

9. **MULTISTAT DOA BLOOD SAMPLE DILUENT**
   20 mM phosphate buffer, pH 7.2 containing detergents and preservatives

STABILITY AND PREPARATION OF REAGENTS

1. **MULTISTAT DOA BLOOD TEST CARTRIDGE**
   The test cartridge is ready for use and is stable up to the expiry date when stored at +2°C to +8°C, protected from light. Test cartridges must be brought to room temperature for at least 30 minutes before opening. Once an individual test cartridge is open and out of its foil bag, it should be used for testing immediately.

2. **MULTISTAT DOA BLOOD CUT OFF**
   Lyophilised cut offs are stable until the expiry date when stored unopened, at +2 to +8°C. Gently tap the vial on the bench to ensure all material is at the bottom of the vial. Open the vial by partially removing the rubber stopper, avoiding any loss of material. Reconstitute in 1ml of accurately measured reconstitution buffer. Replace the rubber stopper and the close vial. After 2 minutes, swirl the vial gently and complete 3 quick inversions to ensure that all the material is dissolved, then leave upright for 30 minutes out of bright light before use. Following reconstitution ensure that the vial is stored upright and does not come in contact with the bung or plastics. Once reconstituted the cut off material is stable for 14 days when stored at +2 to +8°C.

3. **MULTISTAT DOA BLOOD POSITIVE CONTROL**
   Lyophilised positive controls are stable until the expiry date when stored unopened, at +2 to +8°C. Gently tap the vial on the bench to ensure all material is at the bottom of the vial. Open the vial by partially removing the rubber stopper, avoiding any loss of material. Reconstitute in 1ml of accurately measured reconstitution buffer. Replace the rubber stopper and the close vial. After 2 minutes, swirl the vial gently and complete 3 quick inversions to ensure that all the material is dissolved, then leave upright for 30 minutes out of bright light before use. Following reconstitution, ensure that the vial is stored upright and does not come in contact with the bung or plastics. Once reconstituted, the positive control material is stable for 14 days when stored at +2 to +8°.

4. **MULTISTAT RECONSTITUTION BUFFER**
   Reconstitution Buffer is ready for use and is stable up to the expiry date when stored at +2 to +8°C protected from light.

5. **MULTISTAT DOA BLOOD SAMPLE DILUENT**
   Sample diluent is ready to use and is stable up to the expiry date when stored at +2 to +8°C protected from light.

PROCEDURE

BATCH UPDATE FROM USB

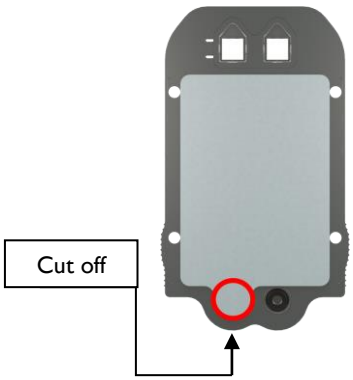
Upon receipt of a new batch of EV4195, it is necessary to complete a batch-specific update from the USB provided:

- Scan the cartridge barcode – when scanned for the first time this will prompt the user to import the batch details from the provided USB.
- Insert the USB in to the USB port located on the bottom right hand side of the analyser below the power button.
- Once the USB has been connected select the import data button on screen.
- Select the batch update and select OK.
- A loading screen will appear briefly and the batch update will now be complete.
- For each batch, an initial 'Batch QC' must be run on the analyser, this will consist of running the provided Cut off and positive control material as indicated in the assay protocol section.

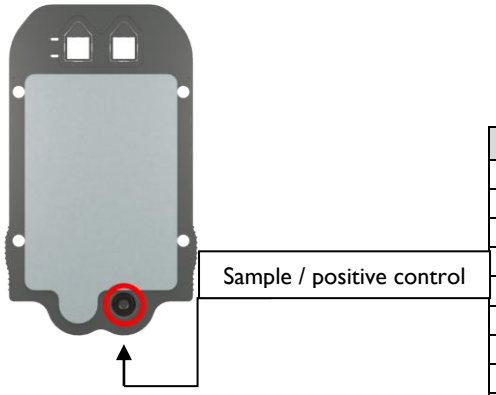
For further information please refer to the Evidence MultiSTAT Operators Manual.

ASSAY PROTOCOL

1. Pierce the foil and pipette a minimum of 200 µl of cut off into the left foil covered well as indicated below.



2. Pipette a minimum of 200 µl of sample / positive control into the open sample well on the right as indicated below.



3. The cartridge is now ready to be inserted carefully into the Evidence MultiSTAT analyser along with a new tip cartridge (Catalogue Number EV4116), ready for analysis.

CARTRIDGE ANALYSIS

Please refer to the Operators Manual for general operating procedure.

RESULTS PROCESSING

Results are processed automatically using the dedicated software.

MATERIALS PROVIDED

1.	Blood Test Cartridge	12 x 1 Cartridge
2.	Blood Cut Off	6 x 1 ml
3.	Blood Positive Control	4 x 1 ml
4.	Reconstitution Buffer	2 x 10 ml
5.	Sample Diluent	1x10ml
6.	Sample Droppers	24 x Dropper

MATERIALS REQUIRED BUT NOT PROVIDED

1. Pipette
2. Centrifuge

QUALITATIVE ANALYSIS

Each test sample is assayed against the provided cut off material of known concentration which is used to determine the classification of the samples. (Refer to Evidence MultiSTAT Operators Manual for additional information.)

QUALITY CONTROL

Evidence MultiSTAT® DOA Blood Positive Control Material is provided with the kit and is required to run the initial batch QC upon receipt of the kit. Following this, the Batch QC should be repeated at 30-day intervals. The positive control material can be assayed more frequently at the discretion of the user. Control results should be acceptable, otherwise corrective action should be taken as established by laboratory guidelines.

INSTRUMENT SETTINGS

Instrument settings are included in the batch update.

CUT OFF MATERIAL

In order to provide a qualitative result for a sample it must be assayed against a cut off of known concentration. Table 1 indicates the cut off concentrations for each of the assays on the Evidence MultiSTAT DOA Blood Array. If the concentration of drug in the sample is greater than the cut off the result will be reported as POSITIVE. If the concentration of drug in the sample is less than the cut off, the result will be reported as NEGATIVE.

Table 1. Cut Off Concentrations for the Evidence MultiSTAT DOA Blood Array.

Assay	Cut Off
Fentanyl	1 ng/ml
AB-PINACA	2 ng/ml
ETG	500 ng/ml
Methamphetamine	50 ng/ml
Barbiturates	50 ng/ml
Benzodiazepines	20 ng/ml
AB-CHMINACA	5 ng/ml
Methadone	10 ng/ml
Opiate	80 ng/ml
Phencyclidine	5 ng/ml
BZG/Cocaine	25 ng/ml
Oxycodone	10 ng/ml
Tramadol	5 ng/ml
Cannabinoids (THC)	10 ng/ml
TCA	60 ng/ml
Amphetamine	50 ng/ml
Buprenorphine	2 ng/ml
6-MAM	10 ng/ml
alpha-PVP	5 ng/ml
Pregabalin	1000 ng/ml

PERFORMANCE DATA
REPEATABILITY

The repeatability for all analytes on the Evidence MultiSTAT DOA Blood array was determined by assessing control material prepared at the cut off and at ±50% of the cut off. Each sample was assessed against the cut off material twice a day for 10 days, resulting in n=20 results for each sample. The % agreement is calculated for the number of samples that correctly reported negative and positive as shown in Table 2.

Table 2. Repeatability of Evidence MultiSTAT DOA Blood Array.

ASSAY		-50%	CUT OFF	+50%	% AGREE
FENT	+	1	1	20	97.5
	-	19	19	0	
AB PIN	+	0	5	20	100
	-	20	15	0	
ETG	+	0	10	20	100
	-	20	10	0	
MAMP	+	0	2	20	100
	-	20	18	0	
BARB	+	0	6	20	100
	-	20	14	0	
BENZ	+	1	6	20	97.5
	-	19	14	0	
AB CHM	+	0	20	19	97.5
	-	20	0	1	
MDONE	+	0	5	20	100
	-	20	15	0	
OPIATE	+	0	17	20	100
	-	20	3	0	
PCP	+	1	6	20	97.5
	-	19	14	0	
BZG	+	0	12	20	100
	-	20	8	0	
OXYC	+	0	12	20	100
	-	20	8	0	
TRAM	+	0	2	20	100
	-	20	18	0	
THC	+	1	4	20	97.5
	-	19	16	0	
TCA	+	1	9	20	97.5
	-	19	11	0	
AMP	+	0	12	20	100
	-	20	8	0	
BUP	+	0	16	20	100
	-	20	4	0	
6-MAM	+	0	0	20	100
	-	20	20	0	
PGB	+	0	0	20	100
	-	20	20	0	
A-PVP	+	0	12	20	100
	-	20	8	0	

LIMIT OF DETECTION

The limit of detection for all analytes on the Evidence MultiSTAT DOA Blood Array was established by analysing 20 authentic negative blood samples. Each sample was prepared and assessed against the cut off material to determine a positive or negative result as shown in Table 3.

Table 3. Limit of Detection of the Evidence MultiSTAT DOA Blood Array.

ASSAY	REPORT POSITIVE	REPORT NEGATIVE
FENT	0	20
AB PIN	0	20
ETG	0	20
MAMP	0	20
BARB	0	20
BENZ	0	20
AB CHM	0	20
MDONE	0	20
OPIATE	0	20
PCP	0	20
BZG	0	20
OXYC	0	20
TRAM	0	20
THC	0	20
TCA	0	20
AMP	0	20
BUP	0	20
6-MAM	0	20
PGB	0	20
A-PVP	0	20

ACCURACY

The accuracy for all analytes on the Evidence MultiSTAT DOA Blood Array was determined by assessing spiked samples at varying concentrations (50 spiked positive samples prepared at concentrations greater than the cut off, 10 negative spiked samples prepared at concentrations lower than the cut off and 40 blank negative samples). Each sample was prepared and assessed against the cut off material to determine a positive or negative result. The % agreement was calculated as the % of correct reports out of the total number of samples (n=100) analysed, as shown in Table 4.

Table 4. Accuracy of the Evidence MultiSTAT DOA Blood Array.

ASSAY		SPIKE +	SPIKE -	% AGREE
FENT	+	50	0	100
	-	0	50	
AB PIN	+	50	0	100
	-	0	50	
ETG	+	50	0	100
	-	0	50	
MAMP	+	50	0	100
	-	0	50	
BARB	+	50	0	100
	-	0	50	
BENZ	+	50	0	100
	-	0	50	
AB CHM	+	50	0	100
	-	0	50	
MDONE	+	50	0	100
	-	0	50	
OPIATE	+	50	3	97
	-	0	47	
PCP	+	49	0	99
	-	1	50	
BZG	+	49	0	99
	-	1	50	
OXYC	+	50	0	100
	-	0	50	
TRAM	+	50	0	100
	-	0	50	
THC	+	50	1	99
	-	0	49	
TCA	+	50	0	100
	-	0	50	
AMP	+	50	0	100
	-	0	50	
BUP	+	45	0	95
	-	5	50	
6-MAM	+	49	0	99
	-	1	50	
PGB	+	50	0	100
	-	0	50	
A-PVP	+	50	0	100
	-	0	50	

INTERFERENCE

The Evidence MultiSTAT DOA Blood Array was assessed for interference with the compounds listed in Table 5.

Method

- Two samples were spiked into the appropriate drug free matrix, one at -50% of the cut off and one at +50% of the cut off
- The sample was divided and 1 portion was prepared containing the interferent
- These samples were then analysed on the Evidence MultiSTAT analyser against the cut off material to generate a positive or negative result.

No interference was observed from the compounds shown in Table 5. Where the level of the interferent had to be titred down, the concentration where no interference was observed is shown in Table 6.

Table 5. Interference Assessed on the Evidence MultiSTAT DOA Blood Array.

Interferent	Level Tested
Haemoglobin	10g/L
Bilirubin	150mg/L
Triglycerides	1500mg/dL
Intralipids	2000mg/dL

Table 6. Interference with Reduced Concentrations of Interferent Tested on the Evidence MultiSTAT DOA Blood Array.

Assay	Interferent	Level Accepted
Buprenorphine	Bilirubin	120mg/L
Buprenorphine	Triglycerides	200mg/dL
Buprenorphine	Intralipids	200mg/dL

SPECIFICITY

The specificity for all analytes on the Evidence MultiSTAT DOA Blood Array was determined by identifying the concentration of a compound that would produce a positive response on the Evidence MultiSTAT DOA Blood Assays where analysed against the cut off material.

The specificity of each of the assays are shown in Tables 7 – 26 (**NOTE**: ND indicates no detection).

Table 7. Specificity of the Fentanyl Assay on Evidence MultiSTAT DOA Blood Array

Fentanyl Assay		
Compound	Approximate Concentration to Read Positive (ng/ml)	Approximate % Cross Reactivity
Fentanyl	1	100
α-Methylfentanyl	1.2	83.3
Thiofentanyl	1.4	71.4
Butyrylfentanyl	1.6	62.5
β-Hydroxythiofentanyl HCl	2	50
Parafluorofentanyl HCl	2.2	45.5
Benzylfentanyl	2.4	41.7
Methoxyacetyl Fentanyl	4	25
Ortho-Fluorofentanyl	4.8	20.8
Meta-Hydroxy-Acrylfentanyl	5	20
Furanylfentanyl	5.2	19.2
Acrylfentanyl	6	16.7
Norfentanyl Oxalate	8	12.5
Isobutyrylfentanyl	8	12.5
Ocfentanyl	8	12.5
Thienylfentanyl HCl	8	12.5
Para Fluoroisobutyrylfentanyl Hydrochloride (FIBF)	14	7.1
Valeryl Fentanyl	16	6.3
Tetrahydrofuran Fentanyl HCl	16	6.3
Cyclopentylfentanyl	20	5
ω-Hydroxyfentanyl	34	2.9
Ohmefentanyl	40	2.5
Cis-Mefentanyl	40	2.5
(±)-trans-3-methyl Fentanyl	40	2.5
Norfuranylfentanyl	60	1.7
3-Methylthiofentanyl	60	1.7
Acetylfentanyl	60	1.7
Remifentanil HCl	200	<1
Norocfentanyl	320	<1
Carfentanil	400	<1
Norcarfentanil	800	<1
Remifentanil Acid	800	<1
Sufentanil	400	<1
Norsufentanil	1200	<1
Alfentanil	400	<1
Despropionyl ortho fluorofentanyl	400	<1
4-ANPP	400	<1
Lofentanil Oxalate	400	<1
Para Methoxy-Butyryl Fentanyl HCl	2000	<1
Despropionyl para fluorofentanyl	ND	ND

Table 8. Specificity of the AB-PINACA Assay on Evidence MultiSTAT DOA Blood Array

AB-PINACA Assay		
Compound	Approximate Concentration to Read Positive (ng/ml)	Approximate % Cross Reactivity
AB-PINACA	2	100
AB-CHMINACA	5	40
ADB-PINACA Pentanoic Acid Metabolite	0.8	250
AB-PINACA N-(5-Hydroxypentyl) Metabolite	1	200
5-Fluoro ADB-PINACA	1	200
ADB-PINACA N-(5-hydroxypentyl) metabolite	1.2	166.7
5-Fluoro AB-PINACA	1.6	125
5-Fluoro AB-PINACA N-(4-hydroxypentyl) metabolite	1.6	125
AB-PINACA 5-pentanoic acid	2	100
AB-PINACA N-(4-Hydroxypentyl) Metabolite	2	100
4-hydroxycyclohexylmethyl AB-CHMINACA (AB-CHMINACA Metabolite M1A)	2	100
5-Fluoro ADBICA	6	33.3
AB-FUBINACA	28	7.1

Table 9. Specificity of the Ethyl Glucuronide Assay on Evidence MultiSTAT DOA Blood Array

Ethyl Glucuronide Assay		
Compound	Approximate Concentration to Read Positive (ng/ml)	Approximate % Cross Reactivity
ETG	500	100
Methylethyl glucuronide	820	61
Methyl β-D Glucuronide sodium salt	10000	5

Table 10. Specificity of the Methamphetamine Assay on Evidence MultiSTAT DOA Blood Array

Methamphetamine Assay		
Compound	Approximate Concentration to Read Positive (ng/ml)	Approximate % Cross Reactivity
S(+)-Methamphetamine	50	100
PMMA HCl	25	200
MDMA	75	66.7
(±)-Methamphetamine	120	41.7
MBDB	2500	2
(±)-MDEA	4000	1.3
BDB	5000	1
DL-Amphetamine	5000	<1
L-Amphetamine	5000	<1
Ephedrine HCl	5000	<1
(15,25)-(+)-Pseudoephedrine	5000	<1
Fenfluramine	ND	ND
(±)-MDA	ND	ND
Phenteramine	ND	ND
PMA	ND	ND
R(-) Methamphetamine	ND	ND

Table 11. Specificity of the Barbiturates Assay on Evidence MultiSTAT DOA Blood Array

Barbiturates Assay		
Compound	Approximate Concentration to Read Positive (ng/ml)	Approximate % Cross Reactivity
Phenobarbital	50	100
Secobarbital	25.5	196
Pentobarbital	36	139
Butabarbital	36	139
Cyclopentobarbital	60.2	83
P-OH Phenobarbital	80	62.5
Butalbital	90	55.6
Amobarbital	119	42
Barbital	151.5	33

Table 12. Specificity of the Benzodiazepines Assay on Evidence MultiSTAT DOA Blood Array

Benzodiazepines Assay		
Compound	Approximate Concentration to Read Positive (ng/ml)	Approximate % Cross Reactivity
Oxazepam	20	100
Alprazolam	2	1000
Estazolam	5.2	384.6
Nordiazepam	10.4	192.3
Diazepam	16	125
Oxazepam Glucuronide	16	125
Midazolam	16	125
Clobazam	30	66.7
Bromazepam	36	55.6
Temazepam	40	50
Temazepam Glucuronide	40	50
Chlordiazepoxide	40	50
Alpha-Hydroxyalprazolam	54	37
N-Desmethylflunitrazepam	80	25
Nitrazepam	80	25
Phenazepam	120	16.7
Triazolam	120	16.7
Lorazepam	140	14.3
Lorazepam Glucuronide	160	12.5
Flunitrazepam	280	7.1
Medazepam	320	6.3
Lormetazepam	600	3.3
Clonazepam	800	2.5
Prazepam	3200	0.6
2-OH-Ethylflurazepam	4000	<1
Flurazepam	16000	<1
Etizolam	16000	<1
7-Aminonitrazepam	8000	<1
7-Aminoclonazepam	8000	<1
7-Amino Flunitrazepam	8000	ND

Table 13. Specificity of the AB-CHMINACA Assay on Evidence MultiSTAT DOA Blood Array

AB-CHMINACA Assay		
Compound	Approximate Concentration to Read Positive (ng/ml)	Approximate % Cross Reactivity
AB-CHMINACA	5	100
ADB-CHMINACA	28	17.9
AMB-CHMINACA	30	16.7
MDMB-CHMINACA	48	10.4
APP-CHMINACA	192	2.6
MDMB-CHMICA	200	2.5
AB-CHMINACA metabolite N-[[1-(cyclohexylmethyl)-1H-indazole-2-yl]carbonyl]-L-valine	300	1.7
4-hydroxycyclohexylmethyl AB-CHMINACA	1000	0.5

Table 14. Specificity of the Methadone Assay on Evidence MultiSTAT DOA Blood Array

Methadone Assay		
Compound	Approximate Concentration to Read Positive (ng/ml)	Approximate % Cross Reactivity
Methadone	10	100
EDDP Perchlorate	1000	1
LAAM	1428.6	0.7

Table 15. Specificity of the Opiate Assay on Evidence MultiSTAT DOA Blood Array

Opiate Assay		
Compound	Approximate Concentration to Read Positive (ng/ml)	Approximate % Cross Reactivity
Morphine	80	100
6-Acetylmorphine	10	800
6-Acetylcodeine	12.8	625
Heroin	32	250
Ethylmorphine	191.8	41.7
Codeine	224	35.7
Desmorphine	1403.5	5.7
Dihydrocodeine	1904.8	4.2
Hydrocodone	2352.9	3.4
Hydromorphone	2580.6	3.1
Morphine-3βD-Glucuronide	3809.5	2.1
Levorphanol	4444.4	1.8
Morphine-6βD-Glucuronide	6153.8	1.3
Thebaine	6153.8	1.3
Dextromethorphan	32,000	<1
Meperidine	8000	<1
Norcodeine	32000	<1
Normorphine	8000	<1
Noroxycodone HCl	8000	<1
Noroxymorphone HCl	8000	<1
Oxymorphone	8000	<1
Naloxone	8000	<1
Oxycodone	ND	ND

Table 16. Specificity of the Phencyclidine Assay on Evidence MultiSTAT DOA Blood Array

Phencyclidine Assay		
Compound	Approximate Concentration to Read Positive (ng/ml)	Approximate % Cross Reactivity
Phencyclidine	5	100

Table 17. Specificity of the BZG/Cocaine Assay on Evidence MultiSTAT DOA Blood Array

BZG/Cocaine Assay		
Compound	Approximate Concentration to Read Positive (ng/ml)	Approximate % Cross Reactivity
Benzoylecgonine	25	100
Cocaethylene	15	166.7
Cocaine	18.8	133
m-Hydroxybenzoylecgonine	37.3	67
Ecgonine HCl	ND	ND
Norcocaine HCl	ND	ND

Table 18. Specificity of the Oxycodone Assay on Evidence MultiSTAT DOA Blood Array

Oxycodone Assay		
Compound	Approximate Concentration to Read Positive (ng/ml)	Approximate % Cross Reactivity
Oxycodone	10	100
Hydrocodone	8	125
Noroxycodone HCl	12	83.3
Morphine	1000	<1
Ethylmorphine	1000	<1
6-Acetylcodeine	1000	<1
Naloxone	1000	<1
6-Acetylmorphine	ND	ND
Codeine	ND	ND
Desmorphine	ND	ND
Dextromethorphan	ND	ND
Dihydrocodeine	ND	ND
Heroin	ND	ND
Hydromorphone	ND	ND
Levorphanol	ND	ND
Meperidine	ND	ND
Morphine-3βD-Glucuronide	ND	ND
Morphine-6βD-Glucuronide	ND	ND
Norcodeine	ND	ND
Normorphine	ND	ND
Noroxymorphone HCl	ND	ND
Oxymorphone	ND	ND
Thebaine	ND	ND

Table 19. Specificity of the Tramadol Assay on Evidence MultiSTAT DOA Blood Array

Tramadol Assay		
Compound	Approximate Concentration to Read Positive (ng/ml)	Approximate % Cross Reactivity
Tramadol	5	100
O-Desmethyltramadol HCl	38.5	13
(±) N-Desmethyltramadol HCl	500	1

Table 20. Specificity of the Cannabinoids Assay on Evidence MultiSTAT DOA Blood Array

Cannabinoids (THC) Assay		
Compound	Approximate Concentration to Read Positive (ng/ml)	Approximate % Cross Reactivity
11-nor-9-carboxy-Δ9-THC	10	100
(±)-11-hydroxy-delta-9-THC	50	20
Delta-9 THC	56	17.9
Delta-8 THC	140	7.1
Cannabidiol	ND	ND

Table 21. Specificity of the Tricyclic Antidepressants (TCA) Assay on Evidence MultiSTAT DOA Blood Array

Tricyclic Antidepressants (TCA) Assay		
Compound	Approximate Concentration to Read Positive (ng/ml)	Approximate % Cross Reactivity
Nortriptyline	60	100
Imipramine N-oxide	6	1000
N-desmethyl trimipramine	16	375
Imipramine	20	300
Amitriptyline	21	285.8
Trimipramine	25.2	238
Cyclobenzaprine	29.9	201
Desipramine	32	187.5
Promazine	34.2	175.4
Opipramol	35.9	167
Doxepin	42	142.8
Maprotiline	62	96.8
Dothiepin	80	75
Protriptyline	89.6	67
Cyproheptadine	92	65.2
Lofepramine	103.4	58
Clomipramine	108.1	55.5
Northiaden (nordothiepin)	120	50
Norclomipramine HCl	223.9	26.8
Chlorpromazine	250	24
Nordoxepin	250	24
2-hydroxyimipramine	307.7	19.5
Perphenazine	346.8	17.3

Table 22. Specificity of the Amphetamine Assay on Evidence MultiSTAT DOA Blood Array

Amphetamine Assay		
Compound	Approximate Concentration to Read Positive (ng/ml)	Approximate % Cross Reactivity
S(+)-Amphetamine	50	100
(±)-MDA	15	333
PMA HCl	21	238
BDB	45	111
DL-Amphetamine	100	50
Phentermine	208.3	24
L-Amphetamine	5000	1
(±)-MDEA	5000	1
Ephedrine	5000	1
(15,25)-(+)-Pseudoephedrine	5000	1
MDMA	5000	<1
(±)-Methamphetamine	5000	<1
MBDB	5000	<1
Fenfluramine	ND	ND
PMMA HCl	ND	ND
R(-)-Methamphetamine	ND	ND
S(+)-Methamphetamine	ND	ND

Table 23. Specificity of the Buprenorphine Assay on Evidence MultiSTAT DOA Blood Array

Buprenorphine Assay		
Compound	Approximate Concentration to Read Positive (ng/ml)	Approximate % Cross Reactivity
Buprenorphine	2	100
Buprenorphine-3βD-Glucuronide	7	28.6
Norbuprenorphine	585	<1
Norbuprenorphine-3βD-Glucuronide	2227.2	<1

Table 24. Specificity of the 6-MAM Assay on Evidence MultiSTAT DOA Blood Array

6-MAM Assay		
Compound	Approximate Concentration to Read Positive (ng/ml)	Approximate % Cross Reactivity
6-Acetylmorphine	10	100
Heroin	1200	0.8
6-Acetlycodeine	1000	<1
Codeine	4000	<1
Ethylmorphine	1000	<1
Naloxone	5000	<1
Morphine	ND	ND
Oxycodone	ND	ND
Desomorphine	ND	ND
Dextromethorphan	ND	ND
Dihydrocodeine	ND	ND
Hydrocodone	ND	ND
Hydromorphone	ND	ND
Levorphanol	ND	ND
Meperidine	ND	ND
Morphine-3βD-Glucuronide	ND	ND
Morphine-6βD-Glucuronide	ND	ND
Norcodeine	ND	ND
Normorphine	ND	ND
Noroxycodone HCl	ND	ND
Noroxymorphone HCl	ND	ND
Oxymorphone	ND	ND
Thebaine	ND	ND

Table 25. Specificity of the Pregabalin Assay on Evidence MultiSTAT DOA Blood Array

Pregabalin Assay		
Compound	Approximate Concentration to Read Positive (ng/ml)	Approximate % Cross Reactivity
Pregabalin	1000	100
DMAA	100,000	<1
L-Glutamic Acid	100,000	<1
Tigabine HCl	100,000	<1
Gamma-aminobutyric Acid	100,000	<1
N-Methylpregabalin	100,000	<1
Valproic Acid	100,000	<1
Levetiracetam	100,000	<1
Topiramate	100,000	<1
Carbamazepine	100,000	<1
Gabapentin	100,000	<1
Phenobarbital	ND	ND
Vigabatrin	ND	ND
Felbamate	ND	ND
Retigabine	ND	ND
Lacosamide	ND	ND
Stiripentol	ND	ND
Acetylcholine Cl	ND	ND
D-Glutamic Acid	ND	ND
Serotonin	ND	ND

Table 26. Specificity of the alpha-PVP Assay on Evidence MultiSTAT DOA Blood Array

alpha-PVP Assay		
Compound	**Approximate Concentration to Read Positive (ng/ml)**	**Approximate % Cross Reactivity**
Alpha-PVP	**5**	**100**
Pyrovalerone	**3.9**	**128.2**
Naphyrone HCl	**5**	**100**
α-Pyrrolidinopentithiophenone	**7.2**	**69.4**
MDPV HCl	**7.5**	**66.7**
4-MPHP	**34**	**14.8**
MPBP	**72**	**6.9**
MDPBP	**180**	**2.8**
Butylone HCl	**ND**	**ND**
Methedrone HCl	**ND**	**ND**
Methylone HCl	**ND**	**ND**
MDPPP HCl	**ND**	**ND**

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