

Oregon Health & Science University  
 Department of Pathology, Division of Laboratory Medicine  
 Core Laboratory

Summary of Compounds that may be detected  
 by OHSU Drugs of Abuse Screening Methods

**Amphetamine/Methamphetamine**

The tables below give the compounds this assay is designed to detect and the levels at which the compounds have been found to give a response approximately equivalent to that of the selected cutoff (300, 500, or 1000 ng/mL d-methamphetamine). Each concentration represents the reactivity level for the stated compound when it is added to a negative urine specimen. If a sample contains more than one compound detected by the assay, lower concentrations than those listed below may combine to produce a rate approximately equivalent to or greater than that of the cutoff calibrator.

Concentration of Amphetamines Producing a Result Approximately Equivalent to the selected cutoff (300, 500, or 1000 ng/mL d-methamphetamine):

Concentration (ng/mL) Giving a Response Approximately Equivalent to the Cutoff			
Compound	300 ng/mL cutoff	500 ng/mL cutoff	1000 ng/mL cutoff
d-Amphetamine	329	529	1286
d,l-Amphetamine	528	1058	2139
d,l-Methamphetamine	491	818	1564
l-Amphetamine	2509	4996	10407
l-Methamphetamine	526	1049	2273
Methylenedioxyamphetamine (MDA)	1515	2410	3537
Methylenedioxymethamphetamine (MDMA)	3729	9594	20538
Methylenedioxyethylamphetamine (MDEA)	3286	8359	18230

Concentration (µg/mL)			
Compound	300 ng/mL cutoff	500 ng/mL cutoff	1000 ng/mL cutoff
4-Chloramphetamine	2	5	10
Benzphetamine*	1	1	1
Bupropion	175	510	1038
Chloroquine	608	1687	3741
l-Ephedrine	355	1109	2242
Fenfluramine	17	45	105
Mephentermine	6	15	30
Methoxyphenamine	61	153	331
Nor-pseudoephedrine	40	93	188
Phenmetrazine	2	4	9
Phentermine	4	10	21
Phenylpropanolamine (PPA)	26	61	133
Propranolol	64	175	386
Pseudoephedrine	987	2834	5889
Quinacrine	1303	3776	8293
Tranylcypromine	28	59	126

Tyramine	98	232	503
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\*Benzphetamine metabolizes to amphetamine and methamphetamine.

Note: Selegiline, a prescription medication used in the treatment of Parkinson's disease, metabolizes to l-amphetamine and l-methamphetamine. Therefore, patients taking Selegiline may test positive by amphetamine assays.

Note: Specimens from patients taking chlorpromazine (Thorazine®) may produce positive results with this assay.

### Barbiturates

The table below gives the compounds this assay is designed to detect and the levels at which the compounds have been found to give a response approximately equivalent to that of the 200 ng/mL secobarbital cutoff.

Each concentration represents the reactivity level for the stated compound when it is added to a negative urine specimen. If a sample contains more than one compound detected by the assay, lower concentrations than those listed below may combine to produce a rate approximately equivalent to or greater than that of the cutoff calibrator.

Compound	Concentration
Allobarbital	345 ng/mL
Alphenal	284 ng/mL
Amobarbital	348 ng/mL
Aprobarbital	275 ng/mL
Barbital	1278 ng/mL
5-Ethyl-5-(4-hydroxyphenyl) barbituric acid	927 ng/mL
Butobarbital	274 ng/mL
Butalbital	304 ng/mL
Butobarbital	349 ng/mL
Cyclopentobarbital	304 ng/mL
Pentobarbital	252 ng/mL
Phenobarbital	509–971 ng/mL
Talbutal	194 ng/mL
Thiopental	28200 ng/mL

### Benzodiazepines

The table below gives the compounds this assay is designed to detect and the levels at which the compounds have been found to give a response approximately equivalent to that of the 200 ng/mL lorazepam cutoff. Each concentration represents the reactivity level for the stated compound when it is added to a negative urine specimen. If a sample contains more than one compound detected by the assay, lower concentrations than those listed below may combine to produce a rate approximately equivalent to or greater than that of the cutoff calibrator.

Compound	Concentration (ng/mL)
Alprazolam	65
7-aminoclonazepam	2600
7-aminoflunitrazepam	590

Bromazepam	630
Chlordiazepoxide	3300
Clobazam	260
Clonazepam	580
Clorazepate	*
Clotiazepam	380
Demoxepam	1600
N-Desalkylflurazepam	130
N-Desmethyldiazepam	110
Diazepam	70
Estazolam	90
Flunitrazepam	140
Flurazepam	190
Halazepam	110
$\alpha$ -Hydroxyalprazolam	100
$\alpha$ -Hydroxyalprazolam Glucuronide	110h
1-N-Hydroxyethylflurazepam	150
$\alpha$ -Hydroxytriazolam	130
Ketazolam	100
Lorazepam	600
Lorazepam glucuronide	>20000**
Medazepam	150
Midazolam	130
Nitrazepam	320
Norchlordiazepoxide	2600
Oxazepam	250
Oxazepam glucuronide	>50000**
Prazepam	90
Temazepam	140
Temazepam Glucuronide	6900**
Tetrazepam	70
Triazolam	130

\* Clorazepate degrades rapidly in stomach acid to nordiazepam. Nordiazepam hydroxylates to oxazepam.

\*\* Glucuronide metabolite of  $\alpha$ -Hydroxyalprazolam crossreact with this assay. Other glucuronide metabolites such as Lorazepam, Oxazepam and Temazepam cross-react to a limited extent. The cross-reactivity of other glucuronide metabolites with this assay is not known.

### Cocaine

The table below gives the compounds this assay is designed to detect and the levels at which the compounds have been found to give a response approximately equivalent to that of the 150 and 300 ng/mL benzoylecgonine (cocaine metabolite) cutoffs. Each concentration represents the reactivity level for the stated compound when it is added to a negative urine specimen. If a sample contains more than one compound detected by the assay, lower concentrations than those listed below may combine to produce a rate approximately equivalent to or greater than that of the cutoff calibrator.

Compound	Concentration 150 ng/mL Cutoff	Concentration 300 ng/mL Cutoff
Cocaine	18–53 µg/mL	40–119 µg/mL
Ecgonine	2–6 µg/mL	7–20 µg/mL

### Methodone

The METH method detects methadone in human urine. This method does not detect the metabolite

L- $\alpha$ -acetylmethadol (LAAM) in concentrations that would be found in urine of patients on LAAM therapy. The table below gives the compounds this assay is designed to detect and the level at which  $\alpha$ -acetyl-N,N-dinormethadol (dinor LAAM) has been found to give a response approximately equivalent to 300 ng/mL methadone cutoff.

Compound	Concentration
$\alpha$ -Acetyl-N,N-dinormethadol (dinor LAAM)	25 µg/mL

### Opiates

The table below gives the compounds this assay is designed to detect and the levels at which the compounds have been found to give a response approximately equivalent to that of the 300 and 2000 ng/mL morphine cutoff levels. Each concentration represents the reactivity level for the stated compound when it is added to a negative urine specimen. If a sample contains more than one compound detected by the assay, lower concentrations than those listed below may combine to produce a rate approximately equivalent to or greater than that of the cutoff calibrator.

Compound	Concentration (ng/mL) at 300 ng/mL cutoff level	Concentration (ng/mL) at 2000 ng/mL cutoff level
Codeine	102-306	660–1980
Dihydrocodeine	291	1872
Hydrocodone	247	1545
Hydromorphone	498	5349
Levallorphan	> 5000	> 120,000
Levorphanol	1048	7680
Meperidine	> 15000	> 800,000
6-Acetylmorphine	435	2100
Morphine-3-Glucuronide	626	6167
Nalorphine	5540	> 100,000
Naloxone	360,000	> 3,500,000
Oxycodone	1500	23,000
Oxymorphone	> 9300	> 100,000

### Oxycodone

The following table lists specific compounds that are positively detected in urine by the BIO-RAD TOX/See™ Drug Screen Test- OXY.

Compound	Concentration (ng/mL)
Oxycodone	100
Codeine	50,000
Dihydrocodeine	12,500
Ethylmorphine	25,000
Hydrocodone	1562
Hydromorphone	12,500
Oxymorphone	1562
Thebaine	50,000

Biorad conducted a study to determine the cross-reactivity of the test with compounds in either drug-free urine or Oxycodone positive urine. The following compounds show no cross-reactivity when tested with the TOX/See™ Drug Screen Test- OXY kit at a concentration of 100 µg/mL.

4-Acetaminophenol	d-Glucose	Kanamycin	l-Phenylephrine
Acetone	Diazepam	Ketamine	β-Phenylethylamine
Acetophenetidin	Diclofenac	Ketoprofen	(±)Phenylpropanolamine
6-Acetylcodeine	Dicumarol	Labetalol	Prednisolone
N-Acetylprocainamide	Dicyclomine	Lidocaine	Prednisone
Acetylsalicylic acid	Diflunisal	Lindane	Procaine
Albumin	Digitoxin	Lithium	Procyclidine
Albuterol	Digoxin	Loperamide	Promazine
Amantadine	Dihydrocodeine	l-Thyroxine	Promethazine
Amikacin	(+) cis-Diltiazem	Maprotiline	d,l-Propranolol
Aminopyrine	Dimenhydrinate	Meperidine	d-Propoxyphene
Amitriptyline	4-Dimethylaminoantipyrine	Mephentermine	Protriptyline
Amobarbital	Diphenhydramine	Meprobamate	d-Pseudoephedrine
Amoxapine	5,5-Diphenylhydation	Methadone	Quinacrine
Amoxicillin	Disopyramide	d,l-Methamphetamine	Quinidine
d,l-Amphetamine	Doxylamine	l-Methamphetamine	Quinine
Ampicillin	Droperidol	Methaqualone	R (-) Deprenyl
Apomorphine	Ecgonine	Methoxyphenamine	Ranitidine
Ascorbic acid	Ecgonine methylester	3,4-Methylenedioxy	Riboflavin
Aspartame	EDDP	amphetamine (MDA)	Salbutamol
Atenolol	Efavirenz	3,4-Methylenedioxy	Salicylic acid
Atropine	EMDP	methamphetamine (MDMA)	Secobarbital
Baclofen	Emetine	Methylphenidate	Serotonin
Benzilic acid	Ephedrine	Methyprylon	Sodium chloride
Benzoic acid	[1R,2S](-) Ephedrine	Metoclopramide	Spirolactone
Benzoyllecgonine	(-) ψ-Ephedrine	Metoprolol	Sulfamethazine
Benzphetamine	l-Ephedrine	Metronidazole	Sulfamethoxazole
Bilirubin	(±) Epinephrine	6-Monoacetylmorphine	Sulfisoxazole
Brompheniramine	l-Epinephrine	Morphine	Sulindac
Buprenorphine	Erythromycin	Morphine-3-β-D-	Temazepam
Bupirone	β-Estradiol	glucuronide	Tetracycline
Caffeine	Estrone-3-sulfate	Nalidixic acid	Tetrahydrocortisolone
Cannabidiol	Ethanol	Nalorphine	Tetrahydrocortisone,

Cannabinol	Ethylmorphine	$\alpha$ -Naphthaleneacetic acid	3-acetate
Carisoprodol	Ethyl-p-aminobenzoate	Naproxen	Tetrahydrozoline
Cephalexin	Etodolac	Niacinamide	Thebaine
Chloralhydrate	Famprofazone	Niacinamide	Theophylline
Chloramphenicol	Fenfluramine	Nifedipine	Thiamine
Chlordiazepoxide	Fenoprofen	Nimesulide	Thioridazine
Chloroquine	Fentanyl	Norcodeine	Thiothixene
Chlorothiazide	Fluoxetine	Norethindrone	Tobramycin
(+) Chlorpheniramine	Furosemide	Norfluoxetine	Tolbutamide
(±) Chlorpheniramine	Gentamicin	Normorphine	Cis-Tramadol
Chlorpromazine	Gentisic acid	d-Norpropoxyphene	Trans-2-phenyl
Chlorprothixene	Guaiacol glyceryl ether	Noscapine	Cyclopropylamine
Cholesterol	Haloperidol	d,l-Octopamine	Trazodone
Chlorpropamide	Hemaglobin	Orphenadrine	Triamterene
Cimetidine	Hydralazine	Oxalic acid	Trifluoperazine
Clindamycin	Hydrochlorothiazide	Oxazepam	Trimethobenzamide
Clomipramine	Hydrocortisone	Oxolinic Acid	Trimethoprim
Clonidine	p-Hydroxyamphetamine	Oxymetazoline	Trimipramine
Clozapine	o-Hydroxyhippuric acid	Papaverine	Tryptamine
Cocaine	p-Hydroxymethamphetamine	Pemoline	d,l-Tryptophan
Codeine	p-Hydroxynorephedrine	Penicillin-G	Tyramine
Cortisone	3-Hydroxytyramine (Dopamine)	Pentazocine	d,l-Tyrosine
(-) Cotinine	Hydroxyzine	Pentobarbital	Uric Acid
Creatinine	Ibuprofen	Perphenazine	Vancomycin
Cyclobarbitol	Imipramine	Phencyclidine	Vancomycin
Cyclobenzaprine	Indomethacin	Phenelzine	Verapamil
Deoxycorticosterone	Insulin	Pheniramine	Zomepirac
(-) Deoxyephedrine	Iproniazide	Phenobarbital	Zopiclone
Dexamethasone	(-) Isoproterenol	Phenothiazine	
Dextromethorphan	Isoxsuprine	Phentermine	

### THC / Cannabinoids

The table below gives the compounds this assay is designed to detect and the levels at which the compounds have been found to give a response approximately equivalent to that of the 50 ng/mL (11-nor- $\Delta$ 9-THC-9-carboxylic acid) cannabinoids cutoff. Each concentration represents the reactivity level for the stated compound when it is added to a negative urine specimen. If a sample contains more than one compound detected by the assay, lower concentrations than those listed below may combine to produce a rate approximately equivalent to or greater than that of the cutoff calibrator.

Compound	Concentration
8- $\beta$ -11-Dihydroxy- $\Delta$ 9-THC	58 ng/mL
8- $\beta$ -11-Hydroxy- $\Delta$ 9-THC	68 ng/mL
11-Hydroxy- $\Delta$ 8-THC	67 ng/mL
11-Hydroxy- $\Delta$ 9-THC	77 ng/mL
9-Carboxy-11-nor- $\Delta$ 9-THC-glucuronide	95 ng/mL

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