Understanding Substance Abuse Testing

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Choice Lab Services



Multiple Testing Sources









Choosing the correct method of testing

Screen (ELISA)

Confirmation (GC/MS)











METHAMPHETAMINE

PSEUDOEPHEDRINE EPHEDRINE Actifed, Contac, Sudafed, Drixoral Bronkald, Primatene PHENYLPROPANOLAMINE (PPA) Triaminic, Sinarest, Robitussin

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PHENTERMINE



PHENYLEPHRINE Dristan, Neo-Synephrine



PROPYLHEXEDRINE Dristan, Benzedrex

Confirmatory Test, GC/MS

Gas Chromatography



Serves as a separation technique to "extract" drug/metabolite for analysis

Specimen injected into a long column at a high temperature

Material converted into gas and separated with a unique "retention" time

Once separated, substance enters MS portion of instrument combination

Best practices is our GOAL

- I. Frequent, RANDOM Testing
- 2. Witnessed Testing
- 3. Valid Specimens
- 4. Breadth of Testing
- ▶ 5. Accurate and Reliable Testing Procedures

Frequent, RANDOM Testing

"Color" system is not random

Set collection days is not random

Not always having the same frequency

Witnessed Collections

Participants will attempt to Substitute, Adulterate or dilute samples if collections are not witnessed





Valid Specimens

AM collections are most accurate

EVERY urine sample collected MUST be tested for creatinine

Dilution is the #1 method used to alter results

Specific Gravity needs to be measured if creatinine is out of range



Accurate and Reliable Testing Procedures

Participants should receive clear and comprehensive explanation of their rights and responsibilities related to drug and alcohol testing

Stay consistent with who contacts the participant with nonnegative results and reporting results to team

Team members need to be support lab results

Two types of Urine specimen dilution

Pre-collection dilution

... consumption of LARGE quantities of fluids prior to collection

... excessive amounts of caffeine and products sold to enhance drug elimination, no evidence that these products actually mask or "remove" drug metabolites

Post-collection dilution

....adding fluid to specimen, such as bleach, vinegar, salt, soap, etc

Urine Creatinine & Dilute Samples

- Creatinine is produced as a result of muscle metabolism
- Creatinine measurements determine the "strength" or concentration of the urine sample. ALL testing measures have cut-off levels and diluted samples can lower the concentration causing false-negatives.
- Creatinine measurements ensure the sample IS urine
- Dilute results need to be addressed in participant contract and team needs to be on board

"Normal" Creatinine

- Normal urine creatinine is greater than 20 mg/dL, with the average population having a level around 130 mg/dL
- Some diseases that produce low urinary creatinine's are muscle wasting disease, Anorexia Nervosa, and very RARELY kidney aliments
- Low creatinine's ARE NOT routinely associated with Diabetes, exercise, highblood pressure, hepatitis, vegetarian
- Studies we have done have indicated that in rare situations that diuretic medications can cause a low creatinine, but NOT specific gravity
- When a participant continues to have a creatinine below 20 mg/dL, but specific gravity is within normal range creative solutions should be put into place by using an alternative specimen as in hair, nail or blood sample
- Sanctions for 1st abnormal result could be a verbal warning, community service, loss of privilege

Participants are going to deny "dilutes" with the same intensity as they deny "positives" so it is important to have a plan in place to address dilutes

What is Specific Gravity?

- Measure of total dissolved solids in a liquid
- Urine SpGr includes creatinine
- Common test performed with GC/MS testing

In your policy you can define "dilute" samples as creatinine less than 20 mg/dL but a participant should never be terminated for dilute samples that do not include testing for Specific Gravity.



Possible A	bnormal Result
Low Creatinine	Dilute
Low Sp. Gravity	Dilute
Pos Glutaraldehy	de Urine Aid
High Nitrites	Klear, Whizzies
Pos Oxidants	Bleach, chromate Iodate, Stealth, Urine Luck
High pH (Alkaline)	Bleach, ammonia, soap
Low pH (Acidic)	Vinegar, THC Free Amber 13
Products listed are mor	st common adulterants



Breadth of Testing

Most successful testing practices include multiple testing panels

Alcohol Biomarkers Synthetic THC, Opiates, Kratom OTC medications

Choosing The Right Drug Test:

Direct Alcohol Biomarkers and Other Substances of Abuse



Direct Alcohol Biomarker Testing Urine EtG/EtS

EtG (Ethyl Glucuronide) and EtS (Ethyl Sulfate) are metabolites formed by the body following exposure to ethanol, also called ethyl alcohol, making them direct alcohol biomarkers.



Testing for the combination of EtG and EtS in urine eliminates concern for things such as:

- False positive results due to fermentation following collection
- Presence of bacteria that may compromise results
- Potential problems caused by elevated enzymes.

If both biomarkers are present then ethanol has, in some way, been metabolized by the body.

Sensitivity

Window of Detection

Pros: Extremely sensitive, large number of substances detected, moderate advanced notice needed for collection. Cons: Very short window of detection



For urine testing, it is standard practice in the field of toxicology to include both EtS and EtG, because EtG is subject to bacterial production and degradation if a urine sample is contaminated (e.g. when the donor has a urinary tract infection). EtS is not subject to bacterial production or degradation, and provides a second, more reliable alcohol biomarker in these urine contamination scenarios.

Certain bacteria may interfere with drug detection but will not generate a false positive. Fermenting bacteria in the presence of excess glucose may produce ethanol in the bladder and in the specimen cup.

ETS is only measured and tested via GC/MS

Direct Alcohol Biomarker Testing Phosphatidylethanol (PEth)

During a series of processes, Phosphatidylethanol (PEth) accumulates in human red blood cells when the body is exposed to ethanol. Since it is formed only when the body is exposed to ethanol it is called a direct alcohol biomarker. The accumulation in red blood cells make it easy to test by collecting blood specimens.



Highly sensitive, collection can be done anywhere*, no notice needed for collection*, mid-term window of detection

1. Guido Viel, (et al.) (2012) International Journal of Molecular Sciences, 13,14788-14812, doi: 10.3390/ijms131114788 * When collected via USDTL BloodSpot® collection



The literature suggests that it requires multiple servings of ethanol on a single occasion to produce a positive PEth result. PEth has a half-life of approximately 4.5 days.

There are zero instances in the scientific literature (over 25,000 articles) of anything other than consumption of ethanol creating Peth results.

HAIDIAETO HairOtat 14 + ETG	Sample POSITIVE		
HAIR14ETG HairStat-14+ETC	Result Quantitation	Screen Cutoff Confirm Cutoff	
Test	negative	500 pg/mg	
AMPHETAMINES	negative	200 pg/mg	
BARBITURATES	negative	200 pg/mg	
BENZODIAZEPINES	negative	500 pg/mg	
COCAINES	negativo	200 pg/mg	
METHADONES	negativo	500 pg/mg	
MEPERIDINE	negative	200 pg/mg	
OPIATES	negative	200 pg/mg	
PCP	negative	200 pg/mg	
OXYCODONE	negative		
PROPOXYPHENE	negative	200 pg/mg	
CANNABINOIDS	negative	1 pg/mg	
TRAMADOL	negative	500 pg/mg	
FENTANYL	negative	25 pg/mg	
SUFENTANIL	negative	10 pg/mg	
ETHYL GLUCURONIDE	POSITIVE	20 pg/mg	
Ethyl Glucuronide LCMSMS	POSITIVE 87 pg/mg	20 pg/mg	

Additional Sample Information

Head Hair

20-PET-BLD	20-Phosphatidyl Ethanol (Bld)	Samp	DIE POSITIVE	
Test		Result	Quantitation	Screen Cutoff Confirm Cutoff
PHOSPHATIDY	LETHANOL	POSITIVE		20 ng/mL
Phosphatidyl Et	thanol LCMSMS	POSITIVE	>200 ng/mL	20 ng/mL
Sample Com	ments			

Tests Requested

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UEM-URINE	Urine Ethanol Metabolites	tes Sample POSITIVE		
Test		Result	Quantitation	Screen Cutoff Confirm Cutoff
ETG/ETS META	ABOLITES	POSITIVE		100 ng/mL
Ethyl Glucuroni	ide LCMSMS	POSITIVE	>10000 ng/mL	100 ng/mL
Ethyl Sulfate	LCMSMS	POSITIVE	>10000 ng/mL	25 ng/mL
VALIDITY CRE	ATININE/SPGR	Normal	, i i i i i i i i i i i i i i i i i i i	
Creatinine U	rine	Normal	34 mg/dL	
Sample Cor	nments			

ACTUAL VALUE: EthylGluc-0100 - 220562 ng/mL

ACTUAL VALUE: EthylSul-100 28288 ng/mL

Test developed and characteristics determined by United States Drug Testing Laboratories. Inc. 5

Quantitative levels should not be questioned when a specimen is confirmed positive

Let's keep our eye on the target. To help, improve and change our practices when needed to provide the best services for our participants.



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