

Drug Testing and Dilutes

Forensic Toxicology

- Toxicology is a science that deals with poisons and their effect.
- Forensic toxicology is the application of toxicology as it applies to law.

Different Subgroups of Toxicology

- Postmortem Forensic Toxicology
- Human Performance Toxicology
- Forensic Drug Testing

Testing Approach

- Screening

Step One – Screening

- often based on immunoassay technology
- more drug – more binding - more “color” produced – more instrument detector response
- numerous commercial manufacturers
- designed for high throughput instrumentation or on-site devices

Immunoassay

- Presumptive screening for the following drug/drug classes:
- Methamphetamines
- Benzodiazepines
- Barbiturates
- Cannabinoids
- Carisoprodol
- Cocaine
- Opiates
- Phencyclidine
- Zolpidem
- Methadone
- Tramadol
- Oxycodone
- Amphetamine
- Fentanyl

Drug Screening

- **Blank Plates**

Drug Screening

- **Addition of conjugate**

Drug Screening

- **Addition of color reagent**

Drug Screening

- **Addition of stop reagent**

Drug Screening

- **Reading the plates**

Step Two - Confirmation

- gas chromatography-mass spectrometry (GC/MS) or LC/MS or LC/MS/MS
 - drug molecules separated by physical characteristics
 - identified based on chemical “finger-print”
 - considered “gold standard”
- other chromatographic techniques

Why confirm ?

- Is it really necessary to confirm drugs that tested positive by initial screening tests?
- Why can't the court adjudicate cases based on the screening test results?
- FALSE POSITIVES

Drug tests & cross reactivity:

- screening tests can and do react to “non-target” compounds
 - amphetamines
 - benzodiazepines
- obtain list of interfering compounds from lab or on-site test vendor
- initial screening (“instant” tests) may only be 60-70% accurate
- confirm positive results

Drug Confirmation

- **Extraction**
- GC/MS and LC/MS
- Separation
- Identification
- Confirmation
- Various drugs classes

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- **Confirmation**

ETG/ETS Testing

- EtG is a direct metabolite of ethanol.
- In addition to EtG, recent scientific studies have identified ethyl sulfate (EtS) as a second specific metabolite or biomarker of ethanol.
- The detection of EtG and EtS offers greater sensitivity and accuracy for determination of recent ethanol ingestion, than by detection of either biomarker alone.

Benefits of ETG/ETS Testing

- Accurate
- Greater sensitivity and accuracy
- Concurrent with drugs

Sample Collection

Pre-collection Preparation:

- Site Selection
- Prepare Ahead
- Remove Outer Clothing

Sample Collection

- Wash Hands
- Witness
- Chain of Custody (label)

Sample Collection

- Accept sample and inspect
- Temperature, color, odor
- Labeled and proper storage
- Proper chain of custody

- Developing control strategies to prevent sample tampering is critical.
- Once clients understand that they cannot beat the system, they are more likely to engage in the therapeutic process towards recovery.

Valid Specimens

The Effective Use of Urine Creatinine Measurements in
Abstinence Monitoring

- EVERY urine sample collected for drug detection should be tested for creatinine

DILUTION GOAL

Client has a bladder full of urine with a drug concentration of greater than the cutoff level of the test - thus producing a positive result.

Urine in the bladder is diluted by the consumption of large amounts of non-drug containing fluid; which results in a drug concentration that is less than the cutoff level of the test - thus producing a negative result.

Water contains no drugs!

- easiest, cheapest, simplest
- urine with a creatinine of less than 20 mg/dL are considered “dilute” and rarely reflect an accurate picture of recent drug use
- dilute samples are more like water than like urine
- incidence of low creatinine in a population undergoing random drug testing is significantly (up to 10 times) greater than a non-drug tested population

The “Normal” Urine Creatinine

- normal urine creatinine: 2005 study “Urinary Creatinine Concentrations in the U.S. Population” determine the mean (based upon 22,245 participants) was 130 mg/dL
- study was not associated with drug testing
- subjects came from a variety of ethnic groups
- samples were collected AM, mid-day, and PM
- less than 1% below 20 mg/dL
- less than 1% greater than 400 mg/dL

More Creatinine Issues

- n rapid ingestion (90 minutes) of 2-4 quarts of fluid will almost always produce low creatinines & negative urine drug tests within one hour
- n recovery time of urine creatinine and drug concentrations can take up to 10 hours

“Dilute” Result Interpretation:

- n negative or none detected results should never be interpreted as indicating no drug use (abstinence), because if, in fact, drugs were present, they probably could not be detected by the test
- n positive drug test results from a dilute sample however, are considered valid (donor was not able to dilute the sample sufficiently to deceive the test)

Creatinine Sanctions

- verbal warning
- community service
- write paper on how the kidney works
- increased surveillance (therapeutic response)
- loss of privileges
- jail time

Dilutes & Therapeutic Goals

- Honesty – touchstone concept
- Dishonesty is a learned behavior
- Honesty is a proximal goal
- Honesty is a behavior that your clients can control
- Honesty should be a critical goal for phase advancement

Two final thoughts about dilute urine samples

- n a creatinine of less than 20 mg/dL (associated with a drug test) is nearly always an attempt by the donor to avoid drug use detection - REGARDLESS of how much liquid was consumed in order to achieve this result
- n place a dilute sample prohibition in your client contract and sanction for repeat dilute samples

Paint Roadmap for Success

- n Upon entering the Drug Court, participants receive a clear and comprehensive explanation of their rights and responsibilities related to drug and alcohol testing
- n outcomes are significantly better when Drug Courts specify their policies and procedures clearly
- n participants significantly more likely to react favorably to an adverse judgment if they are given advance notice about how such judgments are made

Specimen Tampering

Basics of Specimen Tampering - The Three Approaches

- dilution
- adulteration
- substitution

Urine Specimen Adulteration

- addition of foreign substances designed to “mask” drug presence
- post-collection tampering
- low-tech adulterants that cause “pH shift” (lime, vinegar, bleach, ammonia, lemon, drano)
- low-tech adulterants that disrupt testing chemistry (salt, methanol, detergent)
- “high-tech” adulterants

Urine Specimen Substitution

- replacing donor urine sample with another drug-free specimen
- biological substitution - someone else's "clean" urine
- non-biological substitution - replacing urine with urine "look-a-like" sample (diet Mountain Dew, water with food coloring)
- non-biologicals can be detected with creatinine testing

Payspi.org
(Weedinmypocket.com)

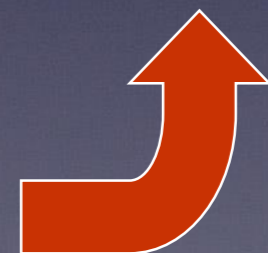
Quickfixurine.com

Specimen Validity Tests (SVT)

- creatinine, UUN
- specific gravity
- pH
- nitrites
- gluteraldehyde
- pyridine
- chromium



Request SVT from testing laboratory or use dip-stick SVT products for on-site testing



Controlling Specimen Tampering

- develop challenging collection strategy - ie. make the testing unannounced and RANDOM!
- directly observed collections is the most effective approach to preventing adulteration and substitution
- inspect sample - train collection staff
- keep abreast of tampering techniques
- take temperature measurements (90° - 100° F)
- use laboratory employs specimen validity tests & use with on-site devices

Myth or Fact

- I tested positive because of a poppy seed bagel.

Myth or Fact

- Vigorous working out will clear drugs from my system.

Myth or Fact

- THC can stay in your system for a month.

Myth or Fact

- I haven't had any pot. It was secondhand smoke.

Frequency Guidelines

- Twice per week until all other requirements have been reduced.
- When testing is reduced, near the end, the participants should still have enough time in the program to assess the impact of the reduction.

Question Time