

Alternative Drug Testing Methodologies

Alternative Drug Abuse Testing

The development of alternative methods for drug abuse detection was influenced by the need to eliminate sample adulteration, alter the detection window, decrease invasiveness and reduce cost.

We are currently using oral fluid for drug abuse testing in a limited capacity. Probation and Parole submits approximately one to three samples per month. Presently we use oral fluid collection kits from OralSure®. Samples are sent to LabOne for analysis and the turn-around time is approximately 24 hours. This alternative method has been particularly useful in cases of urine incontinence, prosthetic limitations and unusual collection situations.

The Agency is committed to utilizing the latest technology provided it accurately and consistently detects drug use, is cost effective, and leads to improved surveillance monitoring and treatment.

Sample Types

Urine

Urine as a matrix for drug abuse testing has been utilized extensively since 1975. There is a significant volume of toxicological literature studying this body fluid and the various methods used to analyze it. Until recently most screening methods were developed for urine. Analytically urine provides a relatively clean and concentrated sample for which most drugs can be detected.

Oral Fluid

Over the last few years use of alternative matrices has grown significantly. Oral fluid has gained a great deal of interest and is being used in many facilities. Advantages associated

with oral fluid are ease of use, non-invasiveness/non-intrusiveness, and detection of recent drug use. Oral fluid consists of a mixture of saliva, blood and other fluids in the mouth. Placing a swab between the cheek and gum for 2 to 5 minutes is how a sample is collected. The swab is then run in-house using ELISA or UPLINK technology or sent to the reference laboratory for analysis.

<u>Detection Times</u>	<u>Oral Fluid</u>
Marijuana	12-24 hrs
Opiates	12-24 hrs
Amphetamine	24-48 hrs
Methamphetamine	24-48 hrs
Benzodiazepines	24-48 hrs
Cocaine	12-24 hrs

Example of oral fluid collection

Place cursor on the following image and double click to start the PowerPoint program.
The slides will advance automatically.



Saliva

Saliva is the fluid material produced by the salivary glands in the oral cavity. It consists of serous fluid (watery, colorless, high electrolyte), and mucous fluid (amylases, mucoproteins, mucopolysaccharides). The advantages of saliva is similar to oral fluid, however, current measuring devices may not be sufficiently sensitive and specific enough for effective use.

Sweat

Sweat is the product of glands (eccrine and apocrine) in the dermis. It is important in maintaining consistent body temperature. It is composed of water, electrolyte, proteins, waste products, trace elements and other substances such as drugs. Sweat can be collected using a collection patch or by sweat induction. The sweat patch is the most common method of collection. Advantages of the sweat patch are: 1) can monitor use continuously 24/7 for a week or more, 2) can detect parent drugs and metabolites, 3) cannot be diluted or tampered with, and 4) retains drugs used during wear period.

Hair

Drugs are incorporated into hair by passive diffusion from blood, sweat excretion, and air contamination. It has the advantage of detecting drug use up to several months. It is non-invasive and non-intrusive. Analysis is relatively sophisticated and must be performed by trained laboratory personnel.

Blood

Blood is an excellent indicator of intoxication and impairment but is not used for monitoring criminal justice populations or workplace personnel for drug abuse. Analysis is complicated, expensive and must be performed by skilled laboratory personnel.

Breath

Breath is generally used for monitoring volatile material such as alcohol. There are numerous portable devices available that measure ethanol concentration.

Pupillometry

Pupillometry involves measuring the size of the pupil and its reaction of the pupil. From this one may be able to determine the type of drug used and the degree of influence. This measurement can be done manual (DRE) or by using automated devices (PMI's PassPoint or MCJ EyeCheck).

Pros and Cons for Alternative Testing Methods as Generally Compared to Urine

Oral Fluid

Pros	Cons
Non-intrusive sample collection	Limited sample volume
Collected anywhere	Generally requires GC/MS/MS for confirmation
Reduced facility and personnel cost	Less centralized control of collection
Reduced risk of adulteration	Limited Multiple testing
Good for new use detection	Possible increase in testing schedule
Reduced sample volume required (collection)	Requires 2 to 5 minutes collection time
Reduced sample disposal cost	
No hazardous waste issues	

Hair

Pros	Cons
Longer detection period	Relapse not detected in timely fashion
Non-intrusive sample collection	Intrusive if unable to collect head hair
Cost effectiveness*	
Useful in compliant cases	Current or new use difficult to determine without special analysis
Reduced sample disposal cost	
No hazardous waste issues	

Sweat

Pros	Cons
Extended sampling time (sweat patch)	Reduced sample volume
Decreased collection visits (sweat patch)	New use may be difficult to determine
	Limited multiple testing

Pupillometry

Pros	Cons
Detects under the influence or recent use	Must test frequently and randomly (monitoring programs)
Cost effective (reduced test cost for compliant individuals)	Some false negative results
Can reduce personnel cost (collection, laboratory)	May not be completely self administered