

# Forum

## SAM in MMT\*

### \*Substance-Abuse Monitoring in Methadone Maintenance Treatment

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#### The Vital Necessity of SAM

Drug screening and testing – described here as substance-abuse monitoring or “SAM” – is a vital aspect of methadone maintenance treatment (MMT) that has great potential for either helping or hindering therapeutic processes supporting addiction recovery. Yet, there is no manual for MMT programs to follow when it comes to SAM, and clinics are provided relatively little specific guidance from federal, state, or accreditation authorities.

Consequently, most MMT clinics follow procedures based on tradition or convenience, while adhering to the minimal regulations that currently exist. Monetary constraints also are a concern, but there often is acceptance of whatever SAM approaches are most readily available, rather than adopting more compelling patient-centered strategies.

This report examines evidence-based principles and expert opinions that can help define best practices for SAM in MMT.

#### Early-Warning System

Continued substance abuse, fostering noncompliance with therapy and undesirable dropout rates, is a common problem during addiction treatment overall and in MMT (Luty 2003). While *adequate* methadone doses can be effective in reducing or eliminating illicit-opioid abuse (Leavitt 2003b), some studies have found illicit-drug use of any sort persisting in 1 of every 5 MMT patients during any given month (Wechsberg et al. 2001), with about half of those persons also continuing to misuse opioids (Marion 1993).

Among MMT patients who do achieve drug abstinence, “lapses” (brief episodes of drug or alcohol use) and “relapses” (return to full-blown substance abuse) represent serious impediments to continued progress. A lapse does not necessarily lead to relapse, and relapse is not the end of recovery, *if* these events can be detected early via ongoing SAM practices and acted upon accordingly.

An *AT Forum* reader survey found that roughly half of MMT patients may experience lapses and about a third relapse at some point. Almost half of the lapses occur during the first month, as might be expected, and more than three-quarters of relapses come within 6 months of entering treatment. Beyond the first year, lapses decline but there is an ongoing danger of lapse and/or relapse (Leavitt 2003a).

Thus, SAM can have a crucial role in monitoring patients’ progress during MMT and as an early-warning system for detecting resumption of active substance abuse, which is a hallmark of addiction as a chronic relapsing disease (McCann et al. 1994).

There also are important *safety concerns*, since the misuse of many substances – illicit, prescribed, OTC, or herbal – may interfere with methadone metabolism, altering its effects and/or influencing drug overdose or possibly death (CSAT 2004; Leavitt 2003b, 2004). This is especially critical while the patient is being stabilized on methadone, which can take several months.

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In short, effective SAM policies and practices respond to clinical questions, such as:

- How is the patient responding to MMT?
- Which substances of abuse are new or continuing problems?
- Has a formerly stable patient run into trouble?

### Monitoring, Screening, Testing Defined

In general medicine, “monitoring” is an ongoing process allowing oversight of a patient’s response to and progress during therapy. In this regard, monitoring for substance abuse in MMT settings goes beyond initial diagnosis of a disorder and should not be a form of adversarial surveillance merely to detect misbehavior by the patient (Marion 1993).

Rather, it is *one important way* of assessing a patient’s clinical situation, progress in recovery, and compliance with the treatment plan; possibly suggesting a need for more effective pharmacologic or behavioral therapies, or both. Additionally, SAM can be used to advocate for the patient and to help encourage or maintain healthy behavioral changes (Gourlay et al. 2004).

SAM must be further divided into monitoring assessments that are designed either for *screening* or *testing* purposes (Casavant 2002; Cone and Preston 1999; Hammett-Stabler et al. 2002). These terms are sometimes used interchangeably in the literature; yet, distinctions between screening and testing are important from perspectives of MMT clinic operations, costs, and patient benefits.

### Presumptive Screening

Screening involves analyses (assays) that are used for broadly detecting the presence or absence of *targeted substances* – drugs, their metabolites, or drug classes (e.g., opiates) – in a specimen provided by the patient. These assays, sometimes called toxicology or “tox” screens or screening tests, have been described as an initial, preliminary, or “presumptive” approach.

That is, screening serves as a first step to relatively quickly exclude the possible presence of common substances of abuse; except for methadone, which should be present in the screens of all MMT patients (Marion 1993; Wu 2002). Typically, not all potential substances of abuse are assessed via screening and *drug-positive* results should be accepted cautiously; in some cases, further analyses to identify specific substances via testing procedures may be appropriate (Casavant 2002; Gourlay et al. 2004; SAMH-SA/DWP undated).

### Confirmatory Testing

Testing uses technically sophisticated methods to “*definitively confirm*” if a particular substance detected in a screened specimen is truly present; it is sometimes called identification testing (Casavant 2002; Simpson et al. 1997). This requires expensive

equipment and trained operators beyond the capabilities of almost all MMT clinics; so it entails shipping the specimen to a qualified laboratory and waiting for results.

These rigorous testing procedures are absolutely necessary when drug-positive results will be used to decide legal (forensic) issues, employment, licensing (e.g., medicine, law), sports qualification, or the like. In such cases, *any* drug-positive screening results must be confirmed by laboratory tests that are extremely precise and accurate; however, this is often unnecessary in MMT programs (Marion 1993).

### What Does SAM Accomplish in MMT?

Since underlying problems affecting substance abuse during MMT are often behavioral, psychological, socioeconomic, or a combination of these – possibly along with inadequate methadone dosing – there are important questions as to exactly what SAM can accomplish therapeutically. Some of the advantages and disadvantages are summarized in *Table 1*.

### Objective Perspective

In simplest terms, SAM serves as an *objective measure* of a patient’s ability to reduce or eliminate substance abuse; however, this alone should not be expected to either bring about or enforce abstinence (Health Canada 2002; Ward et al. 1998). MMT

programs are expected to offer treatment in a climate of trust that nurtures efforts by patients to improve and change their lives (Marion 1993). If SAM creates an atmosphere of tension, control, power, or punishment, then trust and patient growth are smothered – consequently, monitoring might become a waste of effort, time, and money (Leavitt 2005a; Ward et al. 1998).

The disadvantages listed in *Table 1* can be overcome or taken into account when creating an effective SAM program that is patient-centered and ultimately improves outcomes. Properly applied, objective data about substance use can serve to strengthen staff-patient bonds by enhancing mutual respect and confidence. Patients realize that when staff have such information they cannot be “conned” or “duped” (De Angelis 1972), which can help foster patient respect for staff and enhance the therapeutic relationship. Along with this, the objective information can bolster staff confidence in patients’ ongoing and successful efforts to reduce or eliminate substance abuse.

SAM results should not be the only means of detecting substance abuse problems and *programs need to be cautious about making decisions affecting patients’ lives based solely on monitoring reports* (Marion 1993). It was recognized long ago that placing too much reliance on drug screen or test results – whether positive or negative – can depersonalize a program to the point of working against all other aspects of rehabilitation (De Angelis 1972).

Table 1: Substance-Abuse Monitoring	
Advantages	Disadvantages
<ul style="list-style-type: none"> <li>• An objective measure of substance abuse or relapse on which to base clinical decisions and treatment planning.</li> <li>• Increases patient interaction with the MMT program on a regular basis.</li> <li>• Can serve as a basis for patient-staff dialogue and relationship-building.</li> <li>• Can contribute to reductions in substance abuse.</li> <li>• Can be a measure of patient progress in recovery and MMT program performance.</li> </ul>	<ul style="list-style-type: none"> <li>• If misused, it can create a climate of distrust and antagonism.</li> <li>• May be humiliating for patients and staff.</li> <li>• The quality and quantity of SAM information is limited.</li> <li>• Misinterpreted results can negatively affect therapeutic interactions.</li> <li>• Laboratory errors jeopardize patient-staff relationships.</li> <li>• Extra staff time required.</li> <li>• Added costs are involved.</li> </ul>
Adapted from: Cary 2004; De Angelis 1972; Health Canada 2002; Ward et al. 1998.	

## Limitations of SAM Information

SAM has some unavoidable limitations in terms of the quality and quantity of information it can provide (Carlson et al. 2004; Cary 2004; Mapa and Arnold 2004; Yang 2001):

- If performed infrequently, SAM cannot establish whether a patient has an acute or a chronic problem; that is, whether drug use has been often, sporadic, or only a single time.
- It does not indicate the purity or dose of drug used, exactly when it was last used, or mode of administration (e.g., IV, oral, inhaled).
- Results often cannot distinguish if new drug use has occurred or if drug presence is a carryover from prior exposure.

Due to these limitations it is both inappropriate and misleading to ask, “How positive or how negative is the patient’s drug screen or test?” SAM screens are intended to assign a *qualitative* outcome: either a result is *positive*, drug is present in sufficient amounts that can be clearly detected by the screen; or it is *negative*, below the standard level of detection or absent (Cary 2004; Mapa and Arnold 2004; Yang 2001).

Some researchers have contended that determining the exact *quantitative amount* of illicit substances in specimens during SAM, which is possible with many laboratory drug-identification tests (Cone 1997), can provide important information about the frequency and patterns of drug use (McCarthy 1994; Preston et al. 1997a, 1997b). Others – most prominently the National Drug Court Institute – have strongly argued that this is unreliable and has more potential for harm than good; in particular, drug concentrations in a specimen should not be misinterpreted as implying *a lot of or a little* drug use and are of no value for understanding a patient’s actual *involvement* in substance abuse (Cary 2004).

## Why Not Just Ask Patients?

Since SAM is limited in terms of the information that can be objectively obtained, communication with the patient for information-gathering purposes assumes a critical role in the therapeutic relationship. There is solid evidence suggesting that asking patients about their substance abuse, if any, along with SAM provides a powerful approach.

Patient-history taking is an essential component of the therapeutic process in MMT, yet it can require skill and experience (De Angelis 1972). Initially, most patients give valid self-reports since the very act of entering MMT is an admission of problematic drug use, with few social or clinical pressures on the patient to minimize drug use. Later in treatment, Zanis et al. (1994) evaluated patients’ self-reports of drug use and concluded they were still reliable; however, they and other researchers (Crosby et al. 2004; Howard et al. 1995; Perrone et al. 2001) have ardently stressed that *the combination of self-reports plus SAM detects more substance abuse than either method alone*.

Although there is usually, but not always, good agreement between SAM results and self-reports (Crosby et al. 2004; Jackson et al. 2004, Preston et al. 1997b), some investigations have found that patients actually may self-report *more* substance abuse than is detected via screening assays (Perrone et al. 2001; Zanis et al. 1994). This often relates to the frequency of SAM, since substances abused only sporadically may not be present in the body at the time of screening (Crosby et al. 2004).

Research experiments comparing self-reports with SAM approaches may be biased in that investigators create nonthreatening settings for patient response and usually assure them of confidentiality. The potentially intimidating environments of

some MMT clinics may not encourage the same outcomes (Preston et al. 1997b; Zanis et al. 1994). Patients must have confidence that provided information will be used therapeutically, not just punitively to deny privileges, and that MMT staff are genuinely trying to help them (Donovan 1999).

Ideally, SAM simply confirms what has already been determined during individual discussions with and clinical observations of the patient (De Angelis 1972). A number of techniques have been suggested for enhancing the reliability of self-reports among substance abusers and are listed in **Table 2**.

### Table 2: Enhancing Patient Self-Reports

- The patient should not be significantly drug/alcohol impaired at the time of the interview.
- The setting should be nonthreatening, nonjudgmental, and generally encourage honest reporting.
- The counselor/interviewer should have a good rapport with the patient and be able to communicate clearly.
- The patient should be assured of confidentiality.
- Questions should be clearly worded and open-ended.
- Reasons for distorting reporting (e.g., abstinence being a condition of continued therapy) should be minimized to the extent possible.
- The patient should be made aware that corroborating information is available or possibly obtained (e.g., urine screens, reports from relatives or friends) and may be used for confirmation.

Modified from Donovan 1999; McCann et al. 1994

Creating such conditions for accurate self-reporting by MMT patients can be challenging in everyday practice. However, by combining results from different strategies for assessing substance abuse, it is possible to go beyond a mere “snapshot” of what is going on with the patient and develop a more complete portrayal of ongoing or potential problems (Howard et al. 1995).

As mentioned earlier in this report, there also are important safety concerns associated with continued substance abuse during MMT. Since the diversity of substances – licit and illicit – that might be involved cannot all be assessed via SAM, careful history taking and patient self-reports have essential roles. The gathering of such information from patients, and possibly others close to them, should be an *ongoing* activity during MMT.

## What Specimens Are Best?

Urine is the “standard” specimen for monitoring the prevalence of illicit-drug use in MMT programs (Baxter 2003; Cone 2001; Wasserman et al. 1999). Other specimens for analysis have been discussed extensively in the literature, including: oral fluid (saliva), sweat, hair, and blood (Braithwaite et al. 1995; Caplan and Goldberger 2001; Cone 1997, 2001; Gourlay et al. 2004; Federal Register 2004; Moolchan et al. 2001; Ward et al. 1998; Warner 2003; Wolf et al. 1999; Wu 2002).

Each specimen type has advantages and limitations, most notably the length of time substances can be detected (**Figure 1**).

Urine is relatively easy to collect in sufficient quantities for screening and followup confirmatory testing. Urinalyses generally can detect substance use during the prior several days; however, some drugs if used frequently (e.g., marijuana) and longer acting agents (e.g., certain benzodiazepines or barbitu-

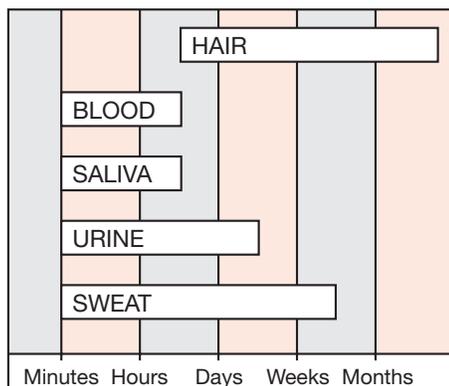


Figure 1. Relative detection times in various specimens. Adapted from Caplan and Goldberger 2001

rates) may be detected for extended periods of time (Cone and Preston 1999).

Oral fluid is easily collected with little embarrassment to the patient and it is difficult to adulterate. Drugs typically are detected in oral fluid at lower concentrations and for a shorter time than in

urine (Samyn et al. 1999); however, some researchers suggest the detection times in oral fluid of *chronically* abused drugs might be similar to those for urine (Cone 2001) and further research is needed to clarify this. While drugs are excreted and detected in saliva, the oral fluid collected also may contain mucus, food or drug particles, and other material that can possibly contaminate the sample (Wolff et al. 1999).

Drugs and their metabolites are detected in blood for variable periods of time (minutes or hours), depending on their half-life, and collection requires invasively drawing blood. Hundreds of substances in blood have been studied and screening results can have superior validity, although the expense is relatively high.

Hair and sweat specimen analyses for substance abuse are relatively newer, complex, and costly technologies, but they offer much longer detection times than other methods; months and weeks, respectively. Application of these assays might be appealing in stabilized patients with extended take-home methadone doses. In typical MMT patients, however, learning of substance abuse that might have occurred weeks or months earlier is likely to be of little therapeutic value.

## Understanding SAM Screens & Tests

### Measuring Assay Performance

The ideal assay – screen or test – for SAM during MMT would have certain performance qualities. It would be...

- **sensitive** – thoroughly detecting the presence of any and all target substances of interest in a specimen;
- **specific** – correctly identifying target substances by groups (e.g., opiates) as well as individually (e.g., morphine);
- **accurate** – providing only results that are true negative or true positive;
- **reliable** – consistently providing accurate results from one time to the next.

Few assays unvaryingly achieve 100% perfect scores on all performance measures. Also, there is always the remote possibility of human error in specimen handling or performing analyses, as well as flaws in assay chemicals or equipment calibration. Interference by substances that are similar to but not the same as the drug of interest – called “cross-reactivity” – may cause false-positive results (Casavant 2002; Cone 1997; Grönholm and Lillsunde 2001; Hawks 1986; Marion 1993; Mule 1969; SAMHSA/CSAP 1999; Wu 2002).

Complete performance data – sensitivity, specificity, accuracy, and reliability – should be available from testing laboratories

or manufacturers in order to compare one product or type of assay with another. It is important to note:

1. Drug **screens** are expected to have *high sensitivity* so that negative results can be relied upon to accurately *rule-out* the presence of target substances in the specimen. They should produce few if any false-negative results.
2. On the other hand, drug-identification **tests** used for confirmatory purposes must have *very high specificity* to accurately detect and identify (*rule-in*) target substances. No false positives should occur.

### Screen and Test Methodology

Methods used for SAM screening and testing may be broadly divided into 2 categories: immunoassays and chromatographic assays (Cone 1997). Within these, many variations in technology have been developed through the years and are listed in **Table 3**.

Table 3: Variations of Screen & Test Methodology

Immunoassays
EIA (Enzyme immunoassay)
EMIT® (Enzyme-multiplied immunoassay technique)
ELISA (Enzyme-linked immunosorbent assay)
FPPIA (Fluorescent polarization immunoassay)
RIA (Radioimmunoassay)
KIMS (Kinetic interaction of microparticles)
CMI (Colloidal metal immunoassay)
On-Site, POC Screens
Chromatographic Assays
TLC (Thin-layer chromatography)
HPTLC (High-performance TLC)
HPLC (High-performance liquid chromatography)
GLC (Gas-liquid chromatography)
GC (Gas chromatography)
GC-MS (Gas chromatography - mass spectrometry)



Sources: Cone 1997; Mapa and Arnold 2004; Marion 1993; Saxon et al. 1990; Swotinsky and Smith 2002; Wu 2002. EMIT is a trademark of Syva Co., Palo Alto, CA. Photo: GC-MS equipment.

### Immunoassays

Immunoassays are used most often for screening purposes since they tend to have less than perfect specificity for confirming the presence of individual substances. These assays employ specially-engineered antibodies\* against a particular target substance or drug class (Coffman and Fernandes 1991; Gourlay et al. 2004; SAMHSA/DWP undated; Schuckit 2000).

\***Technical note:** The antibodies are mixed with “labeling chemicals” that incorporate either enzymes, radioactive or fluorescent molecules, or other agents. If the target substance is present it will bind with the labeled antibodies and essentially inactivate them; conversely, when the substance is absent or present only in very low concentration, labeled antibodies remain unbound (free). The predominance of bound versus free labeled antibodies can be detected by the assay to indicate whether or not the target substance is present – that is, whether the result is positive or negative, respectively.

An advantage of immunoassays is their ability to rapidly and simultaneously screen for multiple target substances in urine or oral fluid. However, the range of compounds they are able to detect may vary – with some detecting individual drugs while others recognize only drug classes – and they can be subject to interference by substances that may cause false-positive results. Most immunoassay processes require laboratory equipment (instrumentation) and trained operators; the types of immunoas-

says available and their limitations may differ across laboratories. Less complex immunoassay methods are employed in devices for on-site screening purposes (discussed below).

## Chromatographic Assays

All of the chromatographic methods require sophisticated laboratory equipment and skilled technicians. While their principles are somewhat similar,\* each chromatographic technique has distinct performance advantages and disadvantages, and laboratory staff should be consulted regarding these. For example, thin layer chromatography (TLC) is one of the oldest assays for screening purposes and is faster and less expensive than GC-MS; however, false-negative results may occur due to its lower sensitivity. GC-MS is the “gold standard” against which other assay performance is compared and it provides “beyond a reasonable doubt” results suitable for criminal justice proceedings (Coffman and Fernandes 1991; Cone and Preston 1999; Hawks 1986; SAMHSA/DWP undated; Schuckit 2000, Simpson et al. 1997; Wu 2002).

**\*Technical note:** Chromatography involves separating and purifying various components of a specimen by processes involving the flow of liquid and/or gas. Individual drugs or their metabolites migrate at varying rates or move different distances and can be accurately identified using automated laboratory equipment. GC-MS goes a step further: After separation of specimen components using gas chromatography (GC), the final identification is done via mass spectrometry (MS). This allows analyses of substances at the molecular level, so it is extremely specific and also highly sensitive in being able to accurately detect and identify very small quantities of target substances.

## On-Site POC screens

Easy-to-use drug-screening devices – using urine or, less commonly, oral fluid specimens – have been developed to provide results on-site at the point-of-collection or -care (POC) in an MMT clinic. The devices are relative newcomers to SAM, although they have been available for more than a decade, and come in different formats: dip sticks, cups, cassettes, and card devices (*photo*). They can assess multiple target substances at one time and results are displayed visually as the presence or absence of colored lines appearing within 5 to 10 minutes while patients wait (Kadehjian 2001; Simpson et al. 1997, Wu 2002).



*On-site POC screens* offer important therapeutic advantages for MMT programs by allowing on-the-spot feedback to patients, which also helps to reduce the stress or anxiety associated with waiting for laboratory reports (Simpson et al. 1997). The devices come in self-contained, disposable “kits” that use well-established and validated immunoassay technologies (described earlier); however, they require no special equipment and results can be interpreted by staff with minimal training. (Kadehjian 2001; Wu 2002).

In recent years, costs of on-site screening devices have decreased while their quality has increased dramatically. Their

ability to produce results that are accurately either drug-positive or drug-negative compares favorably in head-to-head comparisons with much more sophisticated laboratory-based drug-screening assays (Cone and Preston 1999).

Various investigations evaluating on-site urinalysis devices found that their average **accuracy** – representing the percentage of all true positive plus all true negative results, and sometimes called “agreement” or “efficiency” – was excellent; typically in the mid-to-high 90% range (Grönholm and Lillsunde 2001; Peace et al. 2000). Similarly, manufacturers’ studies conducted for obtaining FDA clearance of their on-site urinalysis devices demonstrated overall accuracy percentages in the high 90’s (e.g., Global 2002; Mallinckrodt 2004). In many cases, results for individual substances (called *analytes*) reached near perfect levels of sensitivity, specificity, and accuracy – and with 100% reliability. Since the performance of different devices can vary, each manufacturer’s product literature should be examined.

## Cutoff Levels, Detection Times, & Cross-Reactivity

Critical factors affecting assay performance and whether their results can be trusted include: cutoff points used to determine a positive or negative outcome; how long after use the target substance can be detected in the specimen; and substances that might “fool” the assay and produce false-positive results. A compilation of current data is presented in **Table 4** (next page).

## Substances Monitored in MMT

The US Department of Health and Human Services (DHHS) has developed mandatory guidelines for federal employee workplace testing programs, administered by the Substance Abuse and Mental Health Services Administration (SAMHSA), that have largely been adopted by non-mandated workplace drug-testing programs (Federal Register 2004, Wu 2002). Many aspects also have been implemented in MMT programs.

Substances required by DHHS/SAMHSA for screening include: amphetamines, marijuana (cannabinoids or THC), cocaine, opiates, and phencyclidine (PCP) – known as the “Federal Five.” However, current federal regulations governing MMT programs do not indicate specific substances or the type of screening or testing that must be performed (Federal Register 2001).

About a third of State Methadone Authorities and MMT-program accreditation organizations defer to the federal MMT regulations and the remainder specify selected substances; however, there is no uniformity across states or organizations in their recommendations (CARF 2004; COA 2001; JCAHO 2005; Leavitt 2005b). Most of them do include a broad directive that *additional substances* should be screened based on community or regional variations in drug-abuse patterns or clinical indications for individual patients.

**Table 4** includes the “Federal Five” and those target substances or drug classes typically screened *at a minimum* by MMT clinics: amphetamines, benzodiazepines, cocaine, methadone, and opiates (or, morphine specifically). However, for supplementary screening or for confirmatory testing purposes, most laboratories offer a more extensive menu of target substances or their metabolites to choose among than are shown in the table.\*

**\*Technical note:** Typical opiate screens – designed to detect opium-derived agents (morphine, codeine) – do not detect opioids that are semisynthetic (e.g., buprenorphine, oxycodone, hydrocodone) or synthetic (e.g., meperidine, methadone, propoxyphene). If abuse of such

### Table 4: Assay Cutoff Levels, Detection Times, Cross-Reactive Substances

Target Substance (analyte) or Drug Class Screened/Tested	Positive Initial Screen Cutoff ng/mL Urine (Oral Fluid)	Positive Confirmatory Test Cutoff ng/mL Urine (Oral Fluid)	Duration of Detectability Urine* (Oral Fluid)**	Some Cross-Reactive Substances That May Cause Preliminary Misleading or False Positive Results***
<b>Amphetamines (AMP)</b>  Amphetamine Methamphetamine (MET) MDMA (Ecstasy, XTC)	1,000 <sup>1</sup> 500 <sup>2</sup> (50) <sup>2</sup>  500 <sup>1,2</sup> (50) <sup>2</sup>	500 <sup>1</sup> 250 <sup>2</sup> (50) <sup>2</sup> 500 <sup>1</sup> 250 <sup>2</sup> (50) <sup>2</sup> 250 <sup>1,2</sup> (50) <sup>2</sup>	2-4 days (20-50 hr) 2 days (>24 hr) 1.5-2 days	amantadine, bupropion, chloroquine, chlorpromazine, desipramine, dextro-amphetamine, ephedrine, fenfluramine, labetalol, mexiletine, n-acetyl procainamide, phentermine, phenylephrine, phenylpropanolamine, propranolol, pseudoephedrine, quinacrine, ranitidine, selegiline, trazodone, tyramine
<b>Barbiturates (BAR)</b> • short-acting • intermediate • long-acting	300 <sup>3</sup>	200 <sup>3</sup>	1 day 2-3 days 7+ days (up to 30)	phenytoin
<b>Benzodiazepines (BZD)</b> • ultra-short-acting <sup>a</sup> • short-acting <sup>b</sup> • intermediate <sup>c</sup> • long-acting <sup>d</sup>	300 <sup>3</sup>	200 <sup>3</sup>	12 hours 1 day ~2-3 days 7+ days (up to 30)	oxaprozin, sertraline
<b>Cannabinoids (THC)</b> (marijuana metabolite) • light smoker • moderate (4x/wk) • heavy use (daily) • chronic heavy use	50 <sup>1,2</sup> (4) <sup>2</sup>	15 <sup>1,2</sup> (2) <sup>2</sup>	(4-10 hr)  Up to 3 days 4-5 days 10 days 20-28 days (up to 36)	dronabinol, efavirenz, hemp seed oil
<b>Cocaine (COC)</b> (parent drug)  Cocaine metabolites (benzoylecgonine)	300 <sup>1</sup> 150 <sup>2</sup> (20) <sup>2</sup>	150 <sup>1</sup> 100 <sup>2</sup> (8) <sup>2</sup>	6-8 hours (4-12 hr)  2-4 days; up to 8 days in heavy use (12-24 hr)	topical anesthetics containing cocaine (e.g., TAC solution)
<b>Methadone (MTD)</b> during MMT	300 <sup>3,4</sup>	300 <sup>3,4</sup>	7-9 days (>24 hr)	
<b>Opiates (OPI)</b> (excluding methadone)  6-acetylmorphine (MAM) (metabolite of heroin)  Morphine/heroin <sup>e</sup> (MOR)  Codeine (COD)	2,000 <sup>1,2</sup> (40) <sup>2</sup>	10 <sup>1,2</sup> (4) <sup>2</sup>  2,000 <sup>1,2,4</sup> (40) <sup>2</sup> 2,000 <sup>1,2,4</sup> (40) <sup>2</sup>	1-3 days  2-4 hours (1-4 hr)  2-3 days (12-24 hr) 2-3 days (24-36 hr)	fluoroquinolones, ofloxacin, papaverine, poppy seeds, rifampicin/rifampin
<b>Phencyclidine (PCP)</b> • Chronic use	25 <sup>1,2</sup> (10) <sup>2</sup>	25 <sup>1,2</sup> (10) <sup>2</sup>	7-14 days Up to 30 days (avg. 14)	dextromethorphan, diphenhydramine, thioridazine

Data assimilated from: Cone 1997; Cone and Preston 1999; Federal Register 2004; Gourlay et al. 2004; Heit and Gourlay 2004; Med Letter 2002; STL 2004; Samyn et al. 1999; Schuckit 2000; Simpson et al. 1997; Strang 1999; Warner 2003; Wolff et al. 1999.

<sup>a</sup> half-life 2 hours (e.g., midazolam); <sup>b</sup> half-life 2-6 hours (e.g., triazolam); <sup>c</sup> half-life 6-24 hours (e.g., temazepam/chlordiazepoxide);

<sup>d</sup> half-life 24 hours (e.g., diazepam/nitrazepam); <sup>e</sup> heroin is usually detected as its longer-lasting morphine metabolite.

<sup>1</sup> Cutoffs in DHHS guidelines for Federal Workplace Drug Testing Programs (urine); last revised November 13, 1998 (63 FR 63483).

<sup>2</sup> Cutoffs as proposed by DHHS for **urine** and **oral fluid**; Federal Register, 2004 (April 13);69(71):19644-19732. APPROVAL PENDING as of March 2005.

<sup>3</sup> Sources: Cone 1997; Cone and Preston 1999. Note: Thresholds may vary by laboratory and/or the assay used.

<sup>4</sup> The threshold for some methadone screens is 150 ng/mL, with confirmatory testing cutoffs for methadone and EDDP at 120 ng/mL or less. Confirmatory clinical testing for morphine and codeine in urine is more typically at 300 ng/mL

\* *General guidelines only* – Interpretation of retention times must take into account cutoff values for assay and variability of testing specimens, drug metabolism and half-life, patient physical condition, fluid intake, and route, frequency, and duration of drug administration.

\*\* Detection times noted in **oral fluid** are via GC-MS or RIA after limited drug dosing and at cutoff levels lower than DHHS guidelines (Samyn et al. 1999).

\*\*\* Sources: Med Letter 2002; Warner 2003. Products containing the generic compounds listed are marketed under a variety of brand names. Not all screens or tests share the same cross-reactivity and it is best to check with the particular assay manufacturer.

prescription opioids is suspected, specialized screens or tests must be performed (Gourlay et al. 2004; Heit and Gourlay 2004). Heroin use can be difficult to pinpoint via SAM assays because it is quickly metabolized to morphine, as are some other drugs, and heroin's more distinguishing 6-MAM metabolite is detectable for only hours.

### Clinical Implications of Cutoff Points

The cutoff point of a particular assay is the drug concentration established as a breakpoint or threshold for labeling a SAM result as either negative or positive. Substances that are present in quantities clearly above or below the cutoff (or absent) generally provide unambiguous true positive or true negative results, respectively, which is usually the case with MMT patients. However, if substances are present in borderline concentrations very close to the cutoff point, some assays may become less accurate (Casavant 2002; Hawks 1986; Warner 2003, Wu 2002).

Newly proposed DHHS guidelines (Federal Register 2004) establish maximum cutoff values for screening and confirmatory testing, and for urine and oral fluid specimens (*Table 4*). Cutoff concentrations for assays not included in federal guidelines are set by the manufacturer, who must justify them to the FDA (Wu 2002), and others have been suggested by researchers (e.g., Cone 1997; Cone and Preston 1999). Individual testing laboratories may use lower cutoff levels in their assays, so close communication between MMT programs and their laboratories is advised (Gourlay et al. 2004; Saxon et al. 1990).

False-negative outcomes are troublesome by allowing patients to “cheat the system,” since illicit drug use goes undetected. Too many of these can be damaging to an MMT program as patients soon realize they might be able to take drugs, go unnoticed, and remain in good standing (De Angelis 1972).

Despite this, most drug-screen cutoff points are set to allow an “analytical cushion.” This conservatively errs on the side of reporting false-negative results, rather than false positives, to help avoid erroneous and potentially defamatory accusations of drug use (Hawks 1986; Warner 2003). Furthermore, standard cutoff points are usually set high enough to avoid falsely flagging “accidental” exposure as being drug-positive; such as, eating poppy seeds in breakfast bagels (STL 2004; Wu 2002).

A false-positive result is of concern since it means either enough drug is present to be *close to* the cutoff point or the patient may be consuming a cross-reacting substance (discussed later below). Any positive result should trigger a non-threatening consultation with the patient to help determine possible causes. A careful review of the patient's prescriptions, OTC product use, and dietary habits is essential.

From a clinical perspective during MMT, it seems reasonable that confirmatory *testing* might *not always* be necessary. One researcher has suggested that false positives actually may have some clinical value when there are *no automatic punitive consequences* (Kadehjian 2001). For example, such results might help to engage the patient in supportive counseling that encourages more accurate self-reports of drug use than otherwise would be possible (McCann et al. 1994).

However, if false-positive screening results potentially lead to confrontations, punitive actions, legal proceedings, or even dismissal from the MMT program the morale and trust of the particular patient as well as other patients is greatly diminished (De Angelis 1972; Saxon et al. 1990). Followup confirmatory testing by the most accurate laboratory procedures available could be appropriate in such cases to assure the patient that every effort is being made to rule out the possibility of false results (Marion 1993).

**Table 5: Factors Influencing Drug Detection Times in Urine Assays**

Factor	Effects on Drug Detection
<b>Drug Quantity Consumed</b>	Increased doses usually lengthen detection times, especially with drug accumulation.
<b>Drug-Use Frequency</b>	Increased frequency has little effect on heroin, cocaine, or amphetamine detection times; substantially lengthens marijuana and PCP detection times.
<b>Assay Cutoff Concentration</b>	Lowering the cutoff level of the assay increases the detection time period.
<b>Water Consumption (Hydration)</b>	Increased water may dilute specimen and reduce drug concentration, thereby decreasing ability to detect it by some assays.
<b>Herbal Product Consumption</b>	No evidence of change in drug detectability times.
<b>Adulteration</b>	Some products can produce false-negative results.
<b>Individual Factors</b>	Drug metabolism and excretion, body weight, sex, and health status can make a difference.

Modified from: Cone and Preston 1999; Wolff et al. 1999.

### Factors Affecting Drug Detection Times

Detection times for urine noted in *Table 4* are general guidelines only, and timeframes for many drugs in oral fluid after *chronic* administration actually may be similar to those for urinalysis (Cone 2001). A number of factors may affect these times (*Table 5*), so it is impossible to determine just when drug use took place without confirmation by the patient or others.

### Cross-Reactivity

Cross-reactivity occurs when substances with chemical structures similar to the targeted substance produce misleading or false-positive results, especially if assays with less specificity are used (Wu 2002). Some medications, herbal-remedy ingredients, or foods that have been mentioned in recent clinical literature are listed in *Table 4* (Med Letter 2002; Warner 2003). Products containing the listed generic compounds are marketed under a wide variety of brand names. Certain agents – e.g., dronabinol (THC), medical cocaine solutions, poppy seeds (opiate) – can be misleading because they actually do contain the target substance of interest but not in the abused form that is of concern.

This is a complex and often confusing area. All screen and test assays do not share the same cross-reactivity potential, so it is best to check with the particular assay manufacturer or testing laboratory for an updated list of culpable substances. However, it has been suggested that such lists may be incomplete and some discretion in their use is advised (Grönholm and Lillsunde 2001). Furthermore, presentations of allegedly cross-reacting substances available via the Internet, and often consulted by patients, can be sources of much misinformation leading to disagreements. Disputes over whether a positive SAM result might be due to a cross-reacting substance usually can be resolved via laboratory assays that are highly specific, such as GC-MS (Cone and Preston 1999).

### Specimen Tampering

Tampering with specimens to falsely produce negative results by persons who have abused drugs has always been of concern. Today, the Internet provides substance abusers with a virtual shopping mall for ways to “trick” or exploit the limitations of SAM assays.

To avoid the consequences of drug-positive results, primarily in urine, patients may resort to the following (Casavant 2002; Mapa and Arnold 2004; Robinson 2004; STL 2004; Warner 2003; Wu 2002):

- **Dilution** — seeks to reduce the concentration of illicit substance in the sample below the detection limit of the assay, either by adding water or other fluid after collection, or by consuming liquids to stimulate excess water secretion. Certain clinical ailments may contribute to naturally dilute urine, such as diabetes.
- **Adulteration** — entails adding an agent intended to mask or destroy the illicit drug or drug metabolite in the specimen, or to adversely affect the action of assay chemicals.
- **Substitution** — involves replacement of the donor sample with one from a different source or donor known to be drug free.

Detection of tampering can be challenging. For example, absolute verification of a substituted specimen would require DNA analysis, which is costly and beyond the scope of many testing laboratories. There are relatively simple on-site urine assays for evaluating temperature, dilution, and certain chemical adulterants; however, these add inconvenience, time, and cost to the SAM process.

Random collection procedures and certain unobtrusive measures during urine collection (discussed below) can help to minimize tampering, although the best deterrent may be a therapeutic climate that makes such attempts of little value for patients. In this regard, MMT guidelines have noted, “Falsification is best minimized if patients do not feel that the results will be used to punish them” (Marion 1993).

## Putting SAM Into Practice

Unless they are properly conducted, SAM practices have a potential for turning helpful and caring therapeutic relationships into adversarial struggles between patients and staff. Beyond the minimal requirements of federal, state, and accreditation agencies, there are few barriers to MMT programs modifying and improving SAM policies and practices on their own. In fact, CSAT’s National Advisory Council (NAC) has recommended, “*Drug testing is a medical service and therefore decisions about how it should be done, or when/whether it can be changed, are completely within the purview of the program’s Medical Director*” (Baxter 2003).

## On-Site Versus Laboratory Approaches

The drug-screening stage of SAM may be performed either on site or the specimen might be shipped to a laboratory (Wu 2002), which would entail a delay in receiving results plus added costs for shipping and handling. Remote-laboratory processing of drug-screening specimens from MMT patients is not specifically required by federal or accreditation agencies, or most states (CARF 2004; COA 2001; Federal Register 2001; JCAHO 2005; Leavitt 2005b).

Revisions to DHHS guidelines for workplace drug-testing programs acknowledge the utility of on-site screening methods (Federal Register 2004). Therefore, this suggests that such assays will become more commonly used in that highly-regulated environment and also should be acceptable for MMT programs (Cone and Preston 2002).

On-site *urine* screens are the standard against which other POC technologies are compared, and CSAT’s National Advisory

Council (NAC) has stated, “Properly conducted POC urine testing [i.e., point-of-collection on-site screening] ... is adequate and probably offers clinical benefits, in terms of rapidity of clinical feedback, over and above those of laboratory testing of either OF [oral fluid] or urine” (Baxter 2003). Furthermore, they recommend that additional monitoring should be performed whenever there is an appearance of patient intoxication, and “POC testing of urine may be especially helpful for this purpose.”

There is increasing interest among MMT programs in on-site oral fluid screening devices. It was initially required that the analysis of oral fluid should be laboratory-based; as CSAT noted, “*Off-site drug testing using oral fluids may be adequate, at least in some patients for purposes of 42CFR8 [federal MMT regulations]*” (Clark 2003).

However, more recently introduced POC oral fluid screening devices – employing technology similar to on-site urinalysis devices and not requiring shipment to a laboratory – appear to achieve very good performance overall (e.g., ABMC 2004; Syntron 2004; Walsh et al. 2003). These devices could be particularly useful for mobile-methadone programs when no laboratories are available, and they might be a helpful alternative if patient tampering during urine specimen collection is suspected.

In general, the rapid results possible with on-site POC screens can be crucial for assessing MMT patients, providing immediate feedback to them, and initiating timely therapeutic responses by staff, if necessary. Laboratories can perform screening procedures as a first step in the SAM approach; however, with the availability of on-site screening devices and their accuracy this would not be necessary in most situations.

Laboratory assessments might be reserved for cases requiring unquestionable confirmation of positive screening results (Wu 2002). For example, rigorous and exacting laboratory methods for screening *and/or* testing might be necessary when there is a potential for harsh consequences of positive findings or when specimen tampering or interference by cross-reacting substances are suspected.

## Frequency of Monitoring

How often should screening be performed for effective SAM in MMT?

Federal regulations governing MMT in force today only require 8 random drug screens/tests each year during MMT (Federal Register 2001), and this *minimum* number appears to have become a “standard” in many programs. Yet, a scientific rationale for 8 per year was never established (personal communication, Robert Newman, MD, January 2005), and this amount or less would seem most suitable only for patients with well-established stability in MMT, including illicit-drug abstinence (Ward et al. 1998).

Individual states and accreditation organizations can specify screening frequencies exceeding federal regulations but it appears that relatively few do so (CARF 2004; COA 2001; JCAHO 2005; Leavitt 2005b). Some merely note that the frequency beyond the minimum should be based on a patient’s progress in MMT, with more frequent monitoring advised early in treatment.

A routinely lower frequency of SAM can make MMT programs look more effective by underestimating actual rates of substance abuse (Carlson et al. 2004; Wasserman et al. 1999). But this overlooks substantial numbers of patients needing either more or less intensive monitoring and care during specific stages

of change during recovery (Hagman 1997; Moolchan and Hoffman 1994).

It seems reasonable that, if substance abuse can be detected sooner rather than later, more effective and timely interventions might be implemented. In that regard, researchers performed an extensive computer simulation to examine how drug use patterns and different monitoring schedules would affect the timeliness of detecting substance abuse (Carlson et al. 2004). They found that 8 yearly screens would reliably detect substance abuse only in patients using drugs on an almost daily basis; in contrast, a patient relapsing to sporadic drug use could possibly go 11 months or longer before it is detected.

This is logical, since on a truly random basis all 8 screens could come in the first month. Even if screening is once per month, the remainder of each month and 4 months each year are unmonitored – which would be inappropriate. The researchers also noted that increasing screening frequency to 12 times yearly offered very little improvement (Carlson et al. 2004).

It has been suggested that patients continuing to abuse substances or with negative methadone reports should have weekly monitoring, while those visiting the clinic less often than weekly should be screened at every visit (Marion 1993). However, it has been estimated that once-weekly random urinalyses could detect only about 12 of 30 days (40%) of drug using behavior; assuming that each urine specimen can measure about 3 days of drug use (Zanis et al. 1994).

In one study, twice-weekly monitoring as compared with once per week identified 50% more opioid-abusing and 70% more cocaine-using patients (Wasserman et al. 1999). As expected, those screening positive during more frequent SAM, but negative on less frequent schedules, tended to be sporadic drug abusers.

Some researchers have proposed that urinalyses less than 3 times per week could lead to an underestimation of drug use in some patients, while sampling more often might lead to overestimation due to carryover effects of drug remaining in the body from previous but discontinued drug use (Compton et al. 1996). However, they cautioned that this might not pertain to cocaine or other drug use that more characteristically occurs in binges rather than the daily use patterns observed with opioids. For patients with positive results for any illicit substance, repeat screening at regular intervals could improve interpretation of substance abuse patterns, since multiple positives during a period of time indicate ongoing drug use (Cary 2004).

Overall, then, it seems that a greater frequency of drug screening, even if for limited time periods, could produce more accurate profiles of substance abuse in an MMT clinic population or individual patients. However, *increases in SAM should be part of a comprehensive patient-centered strategy for achieving supportive therapeutic goals rather than being used merely to exert control over patients or for punitive purposes* (Gourlet et al. 2004).

### **What is Random Monitoring?**

Since the early days of MMT it has been suggested that, unless SAM is done every day, sampling must be random

## **Increases in SAM should be part of a comprehensive patient-centered strategy for achieving supportive therapeutic goals rather than being used merely to exert control over patients.**

(Goldstein and Brown 1970). All current regulations and recommendations specify that monitoring should be performed on a random basis; however, little guidance is provided for accomplishing this.

Substance-abusing MMT patients may alter their use patterns based on their knowledge of routine drug-

screening frequencies that they encounter. For example, when tests are performed only 1 day each week, even randomly, patients may be able to time their drug use to avoid positive results in many cases (Howard et al. 1995). However, some researchers have observed that urinalysis results can be similar whether or not patients know in advance of testing; more than half (53%) of patients in one study said that prior notice did not deter them from using drugs (Baker et al. 1995).

Early recommendations were for using a mechanical device with a randomizing action to determine sampling schedules (Goldstein and Brown 1970). Later, it was suggested that a computer-generated random list might be used (Marion 1993). Elaborate schemes have been described – using fixed- or random-interval schedules – requiring sophisticated computer programming (Ward et al. 1998).

Complex randomization schemes seem to lose focus on the *primary objective* of a random approach. Quite simply, a truly random scheme means that on any given day there would be an equal chance of an MMT patient being screened.

The day of the screening should be *unexpected* and the patient should be *unable to anticipate* when monitoring will occur to plan substance-using behavior accordingly. Furthermore, patients desiring to “beat the test” with diluents, adulterants, or “fake urine” would become frustrated by never knowing when they need to be prepared and would most probably give up such attempts.

Achieving this sort of serendipitous approach, however, requires adequate frequency of SAM. In regard to the federally mandated 8 screens per year, CSAT’s NAC advised that randomization requires that patients be “at risk” for a second screening in any given month, and that occasionally, to be truly random, a second screen may follow a first one by less than a week (Baxter 2003). Thus, all of the required screens might conservatively fall randomly within a few months or less, leaving the remainder of the year entirely unmonitored.

To contain costs of more frequent random monitoring, it may *not* be necessary to analyze every collected specimen either on site or at a laboratory. One large study found it was accurate and cost-efficient to randomly assay only 1 of 3 specimens collected each week (Compton et al. 1996).

Along those lines, some clinicians have suggested that during the early months in MMT, and possibly for all patients coming to the clinic less than daily, specimens for monitoring purposes might be collected at *every* clinic visit; but only a random portion of those collected samples need to be actually assayed (personal communication, Mary Jeanne Kreek, MD, December 2004). Thus, specimen collection becomes a *routine* and customary part of the therapeutic regimen in MMT; although, this may be impractical in some clinics.

To further limit costs and staff time, whether or not a specimen is collected could be determined randomly at each visit and then a random portion of those assayed. For example, using a simple coin toss to determine sampling and then a second toss after specimen collection to determine assaying would provide a 1 in 4 chance of an actual screening assay during *any* visit to the MMT clinic. Similar schemes might be devised using numbered cards or other mechanisms to lower the odds further, yet increase the frequency of SAM assays from their present level.

### Are Observed Urinalyses Necessary?

The perceived need for “observed urines” – that is, a staff member actually watching the patient void urine – has been a significant impediment to the acceptance of routine and more frequent urinalyses during MMT. This process creates inconvenience and embarrassment for both patients and staff, making the simple act of specimen collection a significant burden.

Federal MMT regulations and guidelines from state agencies and accreditation organizations signify that specimen collection methods should protect the patient’s dignity and privacy, yet minimize risks of specimen adulteration or falsification. Exactly how this is to be accomplished is left open-ended, and it has been recognized that it is probably impossible to devise absolutely tamper-proof urine collection procedures (Ward et al. 1998).

At one time it was recommended that *all* urine samples collected during MMT *must* be under supervision (Braithwaite et al. 1995; De Angelis 1972; Goldstein and Brown 1970). However, in most cases, direct observation of urine voiding itself might not be appropriate in the MMT setting (McCann et al. 1994), unless chain-of-custody procedures for legal purposes are a concern (Marion 1993). These procedures require comprehensive documentation to account for the identity of the donor, the collection process, and all persons who handle or have access to the specimen (Casavant 2002; Coffman and Fernandes 1991; Federal Register 2004).

Today, there is a trend away from routinely recommending direct observation during MMT and, instead, employing other methods to help assure reliability of the specimen. The objective is to prevent patient-tampering with the specimen – e.g., adding chemicals or fluid – or substituting another person’s urine. **Table 6** offers suggestions in this regard (Marion 1993; Ward et al. 1998).

In some cases, video surveillance of lavatories has replaced the physical presence of a staff member, and this is allowed by some accreditation organizations if it is not standard practice or misused (CARF 2004; JCAHO 2005). However, knowing that one might be observed at any time at a remote location might be of little comfort to patients concerned about their privacy. MMT staff also should be sensitive to the possibility of “shy-bladder syndrome” (paruresis), which is a valid and distressful medical

condition estimated to affect at least 7% of the general population (Soiffer et al. 2004).

### The Value of Punishments vs Rewards

MMT programs have used drug-positive SAM reports for negatively modifying patient privileges – including reducing methadone doses or decreasing take-home allowances – or discharging patients from treatment entirely (Marion 1993; Saxon et al. 1990). However, when SAM is used primarily as a basis for punitive actions, barriers are created between patients and MMT clinic staff; consequently, patients might be expected to respond accordingly in a negative fashion (Marion 1993). Research evidence generally does not support the value of punishments for promoting substance-abuse reductions during MMT and such aversive control techniques may significantly increase treatment dropout rates (Luty 2003; Ward et al. 1998).

From a more positive perspective, a properly designed SAM program with accurate record-keeping can be used as documentation of the patient’s compliance with treatment. These data can help to advocate on behalf of MMT patients (with their permission) in family, workplace, judicial, and other situations in which a patient’s progress in recovery might be questioned (Gourlay et al. 2004).

Furthermore, there is an extensive body of evidence in the field of “contingency management” supporting the value of reward reinforcements in promoting the attainment of various worthwhile recovery goals during MMT, including decreases in substance abuse measured via SAM (Health Canada 2002; Kellogg et al. 2005; Petry and Bohn 2003; Preston et al. 2002; Ward et al. 1998). Reinforcements have varied from increased privileges, to vouchers for cash, prizes, or services (which can be costly overall), to inexpensive tokens or commodity items usually affordable by any MMT program.

While it might be questioned whether tangible reinforcements for behaviors that should be self-rewarding are a form of bribery, the evidence suggests that they do serve as effective clinical tools for positive reinforcement in shaping desired behaviors (Kellogg et al. 2005; Petry and Bohn 2003). Along with that, basic principles of behavior modification dictate that desired reductions in substance abuse or continuing abstinence need to be frequently measured and quickly reinforced for greatest impact (Kellogg et al. 2005; Saxon et al. 1990).

Petry and Bohn (2003) have specifically noted that *on-site drug screening* is most appropriate if rewards are used to reinforce reductions in substance abuse. The lag time in receiving results back from laboratories, they contend, defeats establishing a direct connection between SAM and the reward. Additionally, they advocate that on-site screening should be performed at least several times per week for adequately monitoring and reinforcing desired changes in substance-using behaviors.

**Table 6: Reducing Possible Tampering During Urine Collection**

- Only one patient at a time in the lavatory.
- Patient should only carry a urine cup – no coat, purse, or other personal items.
- If staff member is present, must be same sex as patient; observed urine voiding usually unnecessary.
- Sink water turned off (pre-moistened hand-wipes provided) or hot water turned off (if health dept. allows).
- All janitorial products removed from lavatory.
- Colored dye might be added to toilet water.
- Color (paleness) and temperature (warmth) of urine should be noted when container is presented by patient (test strips are available to check temp and dilution).

Adapted from: Marion 1993; Ward et al. 1998.

## Summary: SAM Essentials

**Table 7** presents a summary of essential principles for SAM in MMT. An effective SAM strategy should help reduce or eliminate continuing substance abuse by including a sufficient frequency of random assays, primarily urinalyses, coupled with immediate feedback to patients that can be best facilitated by on-site drug screening. Patient safety is enhanced by SAM, since the undetected misuse of many substances – illicit and licit – can lead to drug overdose and/or interfere with methadone effects.

Thus, SAM is an important part of a comprehensive therapeutic program for safeguarding patients, providing better care, and supporting rehabilitation and recovery from addiction. CSAT's National Advisory Council observed:

*“Over time, we may expect to see the evolution of more complex testing protocols that offer clinicians and their patients a choice; or combinations of POC [on-site] urine testing, lab-based OF [oral fluid] testing, and perhaps even hair testing (for instance, in patients with 30 day take homes), based on clinical indications, and individual patient, physician, and program preferences” (Baxter 2003).*

At the time of those observations they were forward-looking. Today, MMT programs – as well as federal, state, and accreditation authorities – are encouraged to adopt SAM principles and practices supported by current evidence, which this report has attempted to provide.

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## Table 7: Summary SAM Essentials in MMT Practice

- There is little advantage in substance-abuse monitoring unless it is known in advance how results will be used therapeutically in a patient-centered approach to SAM.
- Properly educate staff about SAM procedures so that their benefits and limitations can be appreciated.
- Only 8 screens/tests per year, or even monthly, have minimal value for accurately assessing patient or program performance, or in guiding treatment planning.
- Frequent, unexpected (random) on-site POC screening with immediate feedback to the patient is conducive to therapeutic effect and behavioral change.
- Obtain urine specimens in a treatment atmosphere that conveys trust and dignity; rather than punishment and power.
- Take patient's denials of drug use seriously and investigate the possibility of false-positive results.
- Screening results should be combined with patient self-reports of substance use for greatest accuracy.
- SAM alone is rarely enough to convince a patient to reduce substance abuse or remain abstinent. Positive reinforcements can have vital roles.
- Punishment is usually ineffective; rather, methadone-dose review, casework, counseling, and other interventions are needed when substance abuse continues.
- Even the most complete SAM data tell only part of a patient's real progress in recovery. Behavioral, psychological, and socioeconomic problems cannot be directly detected by SAM.
- Over-reliance on SAM can go against other aspects of MMT. *It is important to remember that MMT programs' primary focus should be on individual patient needs; rather than on screen or test results.*

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