Chapter 11

Workplace

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Synopsis

11.1 Introduction

Substance abuse has been called the nation's number one health problem, causing more illness, disability, and death than any other preventable health condition (Horgan, 2001). It seriously undermines almost every aspect of society including our economy and public safety, especially safety in the workplace. Alcohol and substance abuse poses a substantial safety risk to the abusers, co-workers, and general public. The National Institute on Alcohol Abuse and Alcoholism estimates that alcohol and substance abuse results in approximately 100,000 deaths per year, and costs society $100 billion dollars annually (Mersy, 2003).

Most alcohol and substance abusers are employed. Of the 16.4 million illicit drug users aged eighteen or older, 12.3 million (75.2 percent) were employed either full-time or part-time (DHHS, 2004). Alcohol and substance abuse has been correlated with a decline in business profitability and an increase in the occurrence of work-related accidents and injuries. Increased absenteeism, workers' compensation claims, medical costs, and decreased productivity result from workplace substance abuse, and all negatively affect the economy.

11.2 Current Tracking Methods

A. National surveys

National statistics are gathered by tracking trends annually through self-reports of substance abuse and other patterns such as emergency room visits and treatment, and the statistics reported from national surveys. The National Household Survey on Drug Abuse is a large national survey that began in 1971 and continues annually. It reports drug classification, divides users into age ranges, and compares usage to prior years. The survey changed its name recently to the National Survey on Drug Use and Health (NSDUH) and today includes data from 67,760 interviews of Americans ages twelve years and older, each having been paid thirty dollars to complete the survey. Because the survey focuses on residents of households, the homeless, active duty military, residents of institutions, and inmates in jails or prisons are not included in the sample. Epidemiological data suggest the substance use patterns of employed individuals resemble those for society in general (Hammer, 1992).

Although some research suggests that unemployed persons have the highest rates of substance use, virtually all experts agree that a majority of users, and quite possibly a majority of those experiencing substance-related problems, are in the workforce (Hanson, 1993). The 2004 study showed that 19.2 percent of unemployed adults aged eigh-

teen or older were current illicit drug users, compared with 8 percent of those employed full-time, and 10.3 percent of those employed part-time. Finally, of the 16.4 million illicit drug users aged eighteen or older in 2004, 12.3 million (75.2 percent) were employed either full- or part-time.

Other data show that one in ten Americans used marijuana during the past year, and 14.5 percent used an illicit drug of some type during the past year. These figures were virtually unchanged from 2002 to 2003. Alcohol use also was unchanged from the previous year, as was the case in the 2003 survey. The rates of underage drinking, underage and adult binge drinking, and overall alcohol consumption were also similar to the 2002 and 2003 rates. The category with the greatest number of new users was non-medical use of prescription drugs. An estimated 2.4 million Americans began abusing prescription drugs within the past year with the average age of new users being 23.3 years.

The Monitoring the Future Survey is another large study, conducted by the Institute for Social Research at the University of Michigan. This study is an ongoing study of the behaviors, attitudes, and values of American secondary school students, college students, and young adults. Approximately 50,000 students in the eighth, tenth and twelfth grades are surveyed each year. Twelfth graders have been surveyed since 1975, and eighth and tenth graders since 1991. In addition, annual follow-up questionnaires are mailed to a sample of each graduating class for a number of years after their initial participation (Johnston, et al., 2005).

B. History of drug-free workplace programs

Alcohol and other drugs have had an extended and varied association with the workplace. In the late nineteenth century, industrialists in the United States were concerned about their employees' health and such activities as heavy drinking, which endangered the operations of their factories. They hired welfare secretaries to shape a "new, improved and contented" workforce that would not disrupt factory life. A major automobile manufacturing company hired investigators to probe employees' drinking habits during their off-work hours. Persons who would not, or could not, abide by corporate expectations often were summarily dismissed (Brandes, 1976; Conrad and Walsh, 1992; Hanson, 1993). During the 1940s, management and workers' groups developed occupational alcoholism programs, the forerunners of modern employee assistance programs, to identify alcohol-related problems among workers and to persuade alcohol-impaired employees to seek assistance (Hanson, 1993).

Recent responses to alcohol and other drug use by employees represent a continuation of earlier cycles of concern. A major difference in current activities, however, is a growing sensitivity to the adverse consequences of illicit drug use by members of the workforce. In the 1960s, heroin addiction was deemed a threat to worker health and safety (Ackerman, 1991). In the 1970s and 1980s, attention shifted to other illicit drugs, most notably marijuana and cocaine. Regardless of the specific drug, the focus switched away from alcohol use, which continues to be the drug most widely used and abused by employees, to illicit drug use. The illicit drug problem's severity was uncertain, however, and ways to resolve it were unclear (Hanson, 1993).

With the shift in attention to illegal drugs, enterprises confronted a new set of issues. In addition to concern about the impact of drug use on work performance, productivity, and business costs, questions arose about workplace security, public confidence, and unlawful activities by organization members. As traditional methods for dealing with substance use in the workplace were challenged, new and more comprehensive strategies were developed. In some countries, most notably the United States, the workplace was designated as a crucial battlefield in a "war on drugs" (Hanson, 1993).

Many of the large estimates of workplace users and early drug testing programs were derived from programs set up by the United States military. The military had initially introduced urine drug screening to identify heroin users returning from military duty in Vietnam in the late 1960s and early 1970s. That program was extended to soldiers reporting for active duty in the early 1970s. In 1980, the United States Department of Defense published the findings from a survey of substance abuse among active duty military personnel, reporting overall drug use in the military services at approximately 26 percent (Burt, et al., 1980). Among enlisted men age eighteen to twenty-five, usage was as high as 47 percent in the United States Navy and Marine Corps.

In May of 1981, a Marine Corps aircraft crashed aboard the aircraft carrier Nimitz. Fourteen people died, and the autopsies for nine of them showed evidence of cannabinoids. Also, the pilot had been taking a prescribed antihistamine without the knowledge of his commanding officer or flight surgeon. The negative publicity resulting from the crash hastened the decision by the Navy to implement a drug-screening program (Zwerling, 1993).

The United States Government began full-scale efforts in 1986 to advocate urine drug testing in the workplace. The President's Commission on Organized Crime released its report on American drug abuse, drug trafficking and organized crime. After outlining the relation between organized crime and illegal drug use, the Commission turned towards solutions. Since attempts to limit the supply of drugs had

failed, the Commission advocated a series of measures to decrease demand. In particular, it called upon the government to "provide an example of the unacceptability of drug use. The President should direct heads of all federal agencies to formulate immediately clear policy statements with implementing guidelines, including suitable drug testing, expressing the utter unacceptability of drug use by federal employees" (President's Commission on Organized Crime, 1986).

On September 15 1986, President Ronald Reagan issued Executive Order 12564 on the Drug Free Federal Workplace. He stated that drugs were causing billions of dollars of lost productivity each year, and that federal employees who used illegal drugs were less productive, less reliable, and more prone to absenteeism. He asserted that the profits from illegal drugs provide the single greatest source of income for organized crime, fuel violent street crime, and otherwise contribute to the breakdown of our society. He called on all federal employees to refrain from using illegal drugs and mandated each executive agency to establish a program to test for the use of illegal drugs by employees in sensitive positions (Reagan, 1986). Federal agencies moved quickly to set up drug-screening programs (Zwerling, 1993).

This federal initiative defined a model drug-free workplace (DFW) program that included the following components (Bush and Autry, 2002).

1. A written policy describing the employer's expectations about drug use and consequences of policy violations;
2. An employee assistance program (EAP) to provide confidential problem assessment, counseling, referral to treatment, and follow-up support after treatment;
3. Supervisor training to orient supervisors to the employer's drug abuse policy, to define the supervisor's responsibility to refer employees when job performance deficits are noted, and to recognize and respond to employees with problems;
4. Employee education to describe the signs and symptoms of drug abuse and its effects on performance and to explain the program;
5. Drug testing on a controlled and carefully monitored basis.

Following the federal initiative, private employers and public sector agencies adopted DFW programs. Reliable data on the use of DFW programs are not available. Survey data suggest, however, that prevention activities, especially drug testing, are in place in one-half to two-thirds of major United States businesses (Bush and Autry, 2002). Despite the importance attached to substance abuse prevention, little formal evaluation of DFW programs has been conducted (Wickizer, et al., 2004).

On January 21, 1987, a passenger train crashed at Chase, Maryland killing sixteen passengers, injuring 174, and causing millions of dollars in property damage. The urine specimens from both the engine driver and brakeman of the train were positive for marijuana. On 21 January 1987, the United States Department of Transportation proposed rigorous drug testing programs, requiring pre-employment, post-accident, and random testing of airline pilots, railroad workers, air traffic controllers, and other employees in safety-related positions (Zwerling, 1993; Walsh and Trumble, 1991).

In addition to the military and the transportation industry, drug testing has now been extended to other areas including pre-employment screening for private industry (workplace market), testing of inmates and parolees (criminal justice market), toxicology screening in the emergency room (clinical market), monitoring of addicts (rehabilitation market), and testing of student athletes (education and sports market). In his 2006 fiscal year budget, President George W. Bush set aside $25.4 million in grant funds for high schools to set up random drug testing programs as a primary method for substance abuse intervention. The workplace is the largest market segment in the United States, and most workplace programs follow the guidelines established by the Department of Health and Human Services' Substance Abuse and Mental Health Services Administration (SAMHSA). The Department of Transportation (DOT) established separate guidelines for programs under its jurisdiction (U.S. Dept. of Health and Human Services, 1988; U.S. Dept. of Transportation, 1999; Wong, 2002).

The current workplace trend is toward increased drug testing. The number of U.S. corporations that use drug testing has risen 277 percent since 1977. A total of 90 percent of Fortune 500 Companies screens potential employees with drug tests and conducts on-the-job screening.

At present, approximately 35 million drug tests are performed each year at a direct cost exceeding $1 billion (Anonymous, 1995.). This money is distributed among the numerous parties within an enormous drug testing industry, which includes laboratories, third party administrators (TPAs), medical review officers (MROs), substance abuse professionals (SAPs), specimen collectors, and others. Additionally, the indirect costs of this effort, which are rarely calculated, involve decreased productivity as a result of time lost for testing. Tests are typically performed before employment, after accidents, for suspicious behaviors, in a

random fashion, or for follow-up of individuals with a history of drug use. It is estimated that companies with drug testing requirements employ half of the American workforce, and the majority of employees believe that the testing deters drug use. Most also believe that drug tests reduce the number of accidents and product defects (Anonymous, 1995; Institute for a Drug-Free Workplace Gallup Survey, 2005).

11.3 Identification of Impaired Employees

A. Behavioral observations

Fellow employees and supervisors are often the first to identify impaired co-workers. Given their proximity to fellow workers, they are able to observe changes in behavior or appearance. Behavioral changes may include mood swings, angry outbursts, hyper-activity, antagonism with co-workers or supervisors, avoidance, paranoia, hallucinations, apathy, or depression. Changes in appearance may include poor hygiene, weight change, smell of alcohol or burnt rope on clothing or breath, irritation of the conjunctivae, ptosis, slow or raspy speech, erythematous nasal mucosa, or track marks on various body sites (AAOHN, 2004; McAndrew and McAndrew, 2000; Mersy, 2003).

It is a supervisor's responsibility to document observations and to remove the employee from an unsafe situation, which means removal from the worksite. The supervisor may first contact a manager or HR administrator, and the employee then is confronted about his or her behavior. Administrators and supervisors are not qualified and are not expected to diagnose problems or provide substance abuse counseling. If a supervisor suspects an employee has alcohol, drug, or other problems, she or he is expected to refer the employee for evaluation by professionals who have appropriate expertise. Employees may be referred directly to EAP programs or to collection sites for drug and alcohol testing, but it is preferable to refer them first to a healthcare provider, who is experienced in substance abuse symptomatology, for a physical examination.

B. Clinical observations

Healthcare providers impact drug free workplace programs in many ways. They can identify a troubled employee by direct observation of behaviors or by recognition of specific medical conditions consistent with substance abuse (AAOHN, 2004; Mersy, 2003; Lambert, 2002). The Medical Review Officer (MRO) can be informed of a positive drug screen, which will trigger a conversation with the employee (Lambert, 2002). Administrative personnel may refer an employee with behavioral or work performance problems or excessive absenteeism to the healthcare provider for evaluation (McAndrew and McAndrew, 2000; Lambert, 2002). Employees may themselves seek healthcare services due to medical conditions related to or originating from substance abuse (Mersy, 2003; Stevens and Addison, 1999).

Detection by healthcare professionals can also occur through screening for high-risk behaviors or risk factors, by detection of specific diseases or processes that result from chronic alcoholism or substance abuse, during evaluation for work fitness, or when a patient appears for services while acutely intoxicated (Cohagan, 2005; Mersy, 2003; AAOHN, 2004). Whenever it is suspected an employee is impaired, refer that person to a healthcare provider for evaluation. An evaluation can lead to a diagnosis and treatment plan based on presenting symptoms, which may be due to impairment by a substance, to a previously undiagnosed medical or psychiatric problem, or to co-morbidities found with chronic substance abuse (Moses, 2005; Mersy, 2003; AAOHN, 2004). The referral for an evaluation should occur expeditiously, so the healthcare provider can observe the employee in close to the same condition that caused the suspicion.

11.4 Drug Testing

A. Testing methods: history

Methods for drug and alcohol detection have existed for centuries. Visual inspection of urine specimens dates from the time of Hippocrates (Haber, 1988). The time of the first workplace drug testing has been established as 1916, coinciding with the rise of American occupational medicine (Miller, et al., 1990). Tests for the detection of alcohol in the early twentieth century were based on physical assessment, crude biochemical measures, and behavioral observations (Montagne, et al., 1988; Hanson, 1993). By the 1920s, glass capillary kits were used by some police departments to test suspected alcohol-impaired drivers. Portable devices were developed during the 1930s. Breath tests began to replace blood tests, and chemical tests for alcohol became more widely accepted (Montagne, et al., 1988; Borkenstein, 1988).

Hospitals, drug treatment programs, and the criminal justice system relied on observational and clinical tests for detecting narcotic use prior to 1950. During the latter half of the 1950s the nalorphine pupil test emerged as the standard means to detect narcotics use by parolees (Montagne, et al., 1988; Borkenstein, 1988).

The technology that enabled relatively accurate mass urine screening in the workplace was not developed and refined until the early 1960s (American College of Occupational Medicine, 1991; Willette, 1991). For the most part, these initial methods were moderately specific in that they

correctly identified drugs, but they were relatively insensitive. That is, they did not detect low concentrations of drugs (Willette and Kadehjian, 1992). Drug, and to a lesser extent alcohol, testing emerged as a major workplace issue during the 1980s. Several converging forces were catalysts for a renewed interest in drug testing, especially mass, compulsory testing of current employees and job applicants:

1. Technology developed to the point where inexpensive and reliable means were available for identifying drugs and their metabolites.
2. Concern about the adverse consequences of drugs in the workplace reached a critical point (R.H. Coombs and West, L.J., 1991; American Management Association, 1992).
3. Rising healthcare costs and liability insurance became critical factors in some countries, including the United States (American Management Association, 1992).
4. United States governmental policy and regulations, such as the Drug-Free Workplace Act of 1988 and mandates by the Defense and Transportation Departments, encouraged drug testing to reduce and prevent drug-related harm in the workplace. Employers who thought they were accountable under the Drug-Free Workplace Act were much more likely than other employers either to have or to be planning a testing program: 81 percent of those who believed they were accountable compared with 56 percent of all respondents (Hawks, R.L. and Chiang, C.N., 1886; Younger, B., 1991).

As interest in employment-related drug testing continues to increase, the technologies and the interpretive skills of analysts continue to evolve. Although recent literature indicates that significant refinements and modifications have been made in drug testing technology, the complexity of drug effects creates problems in the interpretation of test results. Methods and technology are needed that can determine how much drug was taken and when it was taken, how long the tests can detect drug presence after the time of use, the causes and rates of false positives and false negatives, and how employees beat the tests (Kapur, 1993).

Methods of drug ingestion include drinking (alcohol), injecting (heroin), smoking (marijuana), snorting (cocaine), and sniffing (glue). Detection of a drug depends largely on its absorption, distribution, and elimination properties. Absorption is slowest when drugs are taken orally whereas injection into a vein or inhalation results in the fastest absorption. After the drug enters the bloodstream, it is rapidly distributed throughout the body. The amount of drug stored in tissues depends on the characteristics of the drug, the quantity ingested, the time period of ingestion, the characteristics of the tissue holding the drug, and the frequency of use (Kapur, 1993).

A false positive finding can have a serious negative impact on the life of the person tested. For that reason, special attention needs to be paid to testing methods. The analytical method should be specific for the drug being tested to minimize the likelihood of a false positive, and it should be easy and inexpensive to use. Confirmation methods should be readily available. Of course, the availability of qualified technical and scientific personnel to perform the tests is also essential (Kapur, 1993).

The interpretation of analytical results must be undertaken with care. Even a normal diet can sometimes result in positive drug identification. For example, the ingestion of poppy seed can result in a true-positive analytical report (Selavka, 1991), but that finding is a false positive for drug use. Some ethnic diets may also lead to such confounding problems (Kapur, 1993). Ideally, analyses detect the parent drugs rather than their metabolites, but this is not always possible. For example, a sample is not analyzed for heroin, because it is rapidly metabolized to morphine.

The focus of the analytical procedure should be dictated by the pharmacological properties of the drugs. If a drug is shown to be devoid of abuse potential, then its detection beyond the time of its pharmacological activity, although important in the clinical management of the patient, does not necessarily serve a useful purpose in a workplace drug screening program (Kapur, 1993).

The guidelines developed by the National Institute on Drug Abuse (NIDA), in April 1988, are for five illicit drugs: marijuana, phencyclidine (PCP), amphetamine, cocaine, and heroin (National Institute on Drug Abuse, 1989). Methods that allowed rapid mass screening and confirmation were available for those drugs at the time the guidelines were developed. (Kapur, 1993).

The workplace segment of the drug testing market includes the employer, the employee, a collection site, express delivery service, the testing laboratory, the medical review office (MRO), and third-party administrator (TPA). An employer may contract the services of the various components or retain the service of a TPA to oversee the entire process (Wong, 2002).

Most worksite drug testing is performed with urine. When an employer requests a drug test from an employee, he or she goes to a collection site and provides a specimen in a cup that can be sealed and secured with tamper-resistant tape. The cup is then sent by express delivery service to a testing laboratory (Wong, 2002).

At the laboratory, the urine is split into two aliquots. One aliquot is screened for drugs by immunoassay. If the urine tests positive, then the other aliquot is used for a confirmation test by gas chromatography—mass spectrometry (GC-MS). The test results are relayed to a MRO for review. If the result of the screen is negative, the MRO informs the employer that the employee had no detectable drug in the urine. If the test result of the immunoassay and GC-MS are positive, the MRO contacts the employee to determine whether there is a legitimate reason such as medical treatment or prescription for the positive result. If it is determined the positive result is truly due to drug use, the MRO informs the employer of the positive result. About 5 percent of the urine samples tested in the United States are positive for drugs. With the improvement in the accuracy of on-site test devices (notably the lateral flow test devices), an increasing number of collection sites are running the tests themselves instead of sending the samples to a laboratory for analysis. In this new scenario, the employee goes to the collection site where the urine is collected and tested by the staff using an on-site test device. The results are known within minutes. If the results are negative, the employee can return to work. Since about 95 percent of tests are negative, most employees can be cleared quickly. If on-site testing identifies a positive sample, it is sent to a laboratory by express delivery service for confirmation testing. The result of the laboratory test goes to the MRO before the employer is informed (Wong, 2002).

On-site testing has become more feasible with the development of more reliable testing devices. Such devices now are widely accepted by the scientific and regulatory communities. Testing on-site is simple and a timesaver. It can be completed in about half an hour in contrast to a turnaround time of at least twenty-four hours for the older method. Also, for 95 percent of the testing, the employer realizes substantial savings due to the elimination of express delivery, laboratory testing, and the MRO (Wong, 2002).

B. Drugs tested

Most testing uses urine samples and follows the Substance Abuse and Mental Health Services Administration (SAMHSA) guidelines, which mandate testing for five drugs including marijuana (THC), cocaine (COC), morphine (MOR), amphetamine (AMP), and phencyclidine (PCP). Testing may include additional drugs, most commonly methamphetamine (MET), methadone (MTD), barbiturates (BAR), benzodiazepines (BZO), tricyclic antidepressants (TCA), and methylenedioxymethamphetamine (MDMA or Ecstasy). In some cases, the parent drugs do not exist or exist only in minute amounts in the urine. It is for that reason that tests for THC and cocaine, for example, actually detect their metabolites THC carboxylic acid (THC-COOH) and benzyecognonine (BE), respectively.

Some cutoff concentrations for the confirmatory GC-MS processes are lower than the cutoff concentrations for the screening immunoassays. This is because GC-MS detects the actual drug or drug metabolite whereas immunoassays also detect cross-reactivity due to structurally closed metabolites.

The screening method of choice during the 1960s and 1970s was thin-layer chromatography (TLC). It is inexpensive and quick, and it permits the simultaneous detection of many substances, but it is not specific and not adaptable to mass screening. The appearance of radioimmunoassay (RIA) and enzyme multiplied immunoassay technique (EMIT) allowed automation and lower costs. EMIT and other non-radioactive immunoassays have been adapted to large analyzers capable of running thousands of samples per day (Wong, R, 2002).

Currently, simple on-site tests are beginning to replace large automated instruments. The most common on-site test uses the lateral flow immunoassay format in which an immobilized drug competes with the drugs in the samples for limited antibody binding sites. Lateral flow immunoassay technology allows simultaneous testing of multiple drugs on a single test device. This approach simplifies testing and decreases costs. Because of its simplicity, speed, and accuracy, lateral flow immunoassay has been gaining popularity and SAMHSA now allows on-site drug screening (Wong, 2002).

C. Issue of adulterants

One of employers' concerns about drug testing is the validity of the urine sample. Drug users may attempt to defeat drug tests by adding adulterants to the urine to invalidate the test results. Such adulterants act either by interfering with the immunoassay or by converting the target drugs to other compounds. It is estimated that approximately one million adulterant products were purchased in 2001. Currently, most laboratories that perform drug screens routinely test for adulterants. On-site adulterant test strips that use urinalysis technology evaluate a sample against several parameters. These parameters include testing for creatinine and specific gravity conditions, testing for nitrite and glutaraldehyde, checking pH for the addition of basic or acidic adulterants, and testing for oxidizing substances such as bleach and pyridinium chlorochroate. Adulteration testing is gaining importance, because some of the new generations of adulterants are quite effective. Recent data show that a

few of these adulterants are not detectable after five to six hours. In this instance, rapid testing to check for adulterants can be effectively done on-site with an adulterant dipstick device (Wong, 2002).

The substitution of "clean" or drug-negative urine for drug-positive urine is the most common way that individuals attempt to fool the drug-screening system. A company in Florida sells lyophilized (freeze-dried) "clean" urine samples through newspaper and magazine advertisements. Hiding condoms containing "clean" urine on the body or inside the vagina is another common trick. Recently, a patient at an addiction clinic attempted a substitution of "clean" urine, but the supervising nurse discovered a glass bottle that had fallen into the toilet bowl. The bottle had been sealed with a thin aluminum wrap and had been inserted into the patient's vagina (Kapur, 1993).

Other methods are to substitute apple juice or tea or add a household product, such as bleach, liquid soap, or eyedrops, to the urine sample to mask the presence of a drug or drugs. Still other methods include concealing a masking substance under the fingernails for release into the urine specimen, or poking a small pinhole into the sample container so the urine will leak out of the container before it reaches the laboratory (Kapur, 1993).

Since adding table salt (NaCl) or bleach to urine samples is a common practice, many laboratories routinely test for sodium and chlorine. Liquid soap and crystalline drain cleaners, strong alkaline products containing sodium hydroxide (NaOH), are also used adulterants. These can be detected by checking for high pH levels in urine samples. In vivo alkalizing or acidifying the urine pH can also change the excretion pattern of some drugs, including amphetamines, barbiturates, and PCP (Kapur, 1993).

Water loading poses a challenge to laboratories. Specific gravity can be used to detect dilution, but the measurement range is limited. Creatinine levels have been studied as a method for detecting water loading, but the method has not shown much success (Kapur, 1993).

To reduce the opportunities for specimen contamination, some workplaces require that employees provide urine samples under direct supervision. This practice may be challenged, however, as an invasion of privacy. The temperature of a sample provides another way to detect adulteration. Within one minute of voiding, the temperature range of a sample should be 34° to 36.5°C, reflecting the body core temperature. It is difficult to achieve this narrow temperature range when a condom filled with urine is hidden in the armpit or when water from a tap or toilet bowl is added to the urine sample. The temperature must be measured immediately after voiding, however, since the temperature drops rapidly (Kapur, 1993).

D. Urine testing

The Department of Health and Human Services mandated urine as the specimen for workplace drug testing. Most non-regulated programs followed suit. Detection with conventional drug testing instruments is easier with urine, because the concentrations are higher than in blood. Since most workplace testing is pre-placement and random, information about recent use is sought, typically usage over the last seventy-two hours. Urine tests provide that information.

E. Hair testing

Hair analysis is a relatively new technique, considered less invasive than urinalysis. The technique, which was developed by Dr. Warner and Annette Baumgartner, is a radioimmunoassay (RIAH) test of hair specimens taken from close to the scalp. Drugs are deposited in the hair as it grows, and the amount of drug in the hair correlates with the amount ingested by the individual. Analysis of hair that grew during a particular week or month will show drug use during that specific period and, therefore, it is possible to distinguish between frequent, heavy, and occasional use. Other advantages of hair as a specimen is the inability to adulterate the samples with dye or bleach, as well as the fact that obtaining it is less invasive than the collection of body fluids. Ceasing drug use before testing will not prevent detection of prior use. Several days elapse, however, before drugs are deposited in the hair. As a result, hair analysis can show long-term drug use or patterns of drug use over time but cannot detect recent drug use or immediate impairment (Stevenson and Williamson, 2001).

In addition, there is a question about environmental exposure to drugs. The Naval Research Laboratory conducted a study of this issue and found that non-drug using persons can contact sufficient quantities of drugs to contaminate sweat, which will in turn be absorbed by the hair. This does not wash out quickly and potentially can cause incorrect results of a drug test (U.S. Congress 92). Perhaps the biggest drawback of hair analysis is its cost, which is almost twice that of urinalysis (Stevenson and Williamson, 2001). Hair analysis involves laborious and tedious procedures, and the method is unwieldy for most laboratories other than research laboratories (Stevenson and Williamson, 2001).

F. Saliva testing

Saliva-based testing appears to be gaining importance due to the challenges of adulteration and monitoring murine-

based testing. Development of the tests has been slow, largely because of the low concentrations of drugs in oral fluids and the complexity of the matrix. The first generation of oral fluid tests have an analytical sensitivity down to 5-50 ng/mL. The sensitivity of the next generation of tests is down to less than one ng/mL, which makes them comparable to urine and expands the usefulness of the technology (Wong, 2002). Saliva testing is approved by DHHS for first line alcohol testing, but confirmatory testing must be performed with an approved breath alcohol device within thirty minutes of the positive saliva test.

G. Blood testing

Blood testing is sometimes performed post accident or for reasonable suspicion by employers who do not fall under federal programs. Drug screens are also performed with blood in emergency rooms in cases of overdose and major accidents. It is preferable in these situations, because the degree of intoxication or overdose can be approximated based on the amount of substance in the blood. In addition, the ratio of metabolites to the parent drug can be calculated as an estimate of the time of drug ingestion. A blood draw is in invasive procedure, however, and it exposes the collector to possible blood-borne pathogens. Drug concentrations are lower than in urine, and the analysis is more expensive.

H. Alcohol testing

Alcohol testing can be performed under four workplace conditions: random testing, post accident, return to work and follow up, and reasonable suspicion. Pre-employment screening is currently not allowed. Alcohol tests use either breath or saliva. If the initial test shows an alcohol concentration greater than 0.02 percent, (g/100mL), a confirmation test must be performed within thirty minutes of the initial test using a breath alcohol test device. A Breath Alcohol Technician or screening test technician (SST) must conduct the test, and the test instrument must be on the National Highway Traffic Safety Administration's list of conforming products for evidential instrumental instruments (ImObersteg, 2003).

I. Sweat testing

Sweat tests can be used for pre-employment testing and also in non-work related settings, such as custody cases, parole, probation, and social services. Testing with sweat is not appropriate for workplace impairment or post accident testing. The patch that collects sweat is affixed and worn for a week or more, and thus it is not possible to relate the drug found in the sweat to a particular time of impairment. A major benefit of sweat collection with patches is that they are non-invasive and can detect use over an extended period instead of at a single point in time. Attempts to tamper with them will be detected, because they will tear (Burns and Baselt, 1995).

Parent compounds are excreted in sweat, but the levels are difficult to compare with levels found in other fluids due to the fact some drugs are deposited into adipose tissue (Levisky, et al., 2000). Although the manufacturing method prevents contamination of the patches, there is a possibility for contaminations during application and removal. The latter have been shown to cause false positive results (Kidwell and Smith, 1999).

J. Trends

According to national statistics, prescription drug abuse is increasing at alarming rates. From 1992 to 2002, prescriptions written for controlled drugs increased more than 150 percent, almost twelve times the rate of increase in population and almost three times the rate of increase in prescriptions written for all other drugs. From 1992 to 2003, the number of people abusing controlled prescription drugs increased seven times faster than the increase in the U.S. population. From 1992 to 2003, abuse of controlled prescription drugs grew at a rate twice that of marijuana abuse; five times that of cocaine abuse; and sixty times that of heroin abuse (CASA, 2004).

Currently, the federal drug panel does not include commonly abused prescription drugs. Voluntary programs are free to use panels that include prescription drugs and other substances available in the workplace. A drug panel for use by medical facilities can greatly assist in the accurate identification of substances. Healthcare providers in the workplace, however, will have to rely on identification of inappropriate behaviors and clinical evaluation for signs and symptoms of impairment by drugs not on the limited panels.

11.5 Policies and Procedures

Thorough policies and procedures that cover the theory and process for a drug free workplace program need to be written and shared throughout the organization. It needs to include program requirements, expectations, treatment options including self-reporting, consequences of non-compliance, and contract requirements for return to work. For federal programs, the law requires the policy to include a statement of reason for the drug free program, a description of prohibited behaviors, and an explanation of the consequences of policy violations. Whether the employer falls under the federal mandates established by the Act or is free

to develop separate guidelines, the following program components needs to be included (ImObersteg, 2003; DHHS, 2004):

- a clear description of prohibited substances and unacceptable behaviors;
- the type of drug tests that will be used and under what circumstances they will be performed (random, post accident, reasonable cause, and so on);
- procedures that will be used for the determination of policy violation;
- consequences of policy violation and the available appeals process;
- a description of when the policy will be enforced;
- documentation of the types of employees the policy covers; e.g., safety-sensitive employees, contractors, during pre-employment, or all employees;
- the treatment and rehabilitation services that will be available to employees; and
- issues of confidentiality for substance abuse and medical treatment.

11.6 Employee Assistance Programs

Employee Assistance Programs (EAPs) provide an array of services to employees, including alcohol and substance abuse counseling, referral for treatment and rehabilitation, and education for employees, administrators, supervisors, and managers (Hanson, et al., 2005). EAP services are offered as an alternative to termination in cases of workplace impairment or other positive drug screens. They also are available to employees who self-refer for treatment, referral, or evaluation.

An EAP is a key component of any comprehensive program and is also required in DHHS-regulated testing. The Act states specifically that the workplace or agency shall provide an EAP to help resolve substandard work performance related to alcohol, drugs, or other personal problems. In addition, it should disseminate educational information about the effects of substance abuse and alcohol, about the impact of drug use in the workplace, and about access to available services. The EAP must assure that its services, including test results and referral and treatment, are provided within the constraints of strict confidentiality.

11.7 Training

A. Employee awareness training

All company employees should receive education and training about alcohol and substance abuse and its impact on overall health, and on the workplace. It should cover drug free workplace policies and procedures and should heighten employees' awareness of the signs and symptoms of impairment. It should specifically address employees' roles and responsibilities within the policy and define the consequences of workplace substance abuse. The training should include information about the availability of assistance for self or family related substance abuse problems, and how to access that assistance.

B. Supervisor training

Because supervisors provide the first line of drug detection in the workplace, the Act requires Federal Agencies develop a training course covering the follows issues (DHHS, 2004):

- overall policy;
- employee problems with drugs and alcohol;
- the supervisor's role and the EAP's role;
- recognition of employees with drug or alcohol problems;
- documentation of performance or behavior problems;
- skills in confronting employees;
- agency procedures regarding referral to the EAP;
- disciplinary action, and removal from safety-sensitive positions (Section 5 of the Executive Order);
- reintegration of the employee into the workforce; and
- written materials for the supervisor.

Supervisors should be trained to understand substance abuse problems and to recognize and take action when work performance is substandard. Making sure an employee is able to perform his or her job duties is their key responsibility and should be their focus, rather than trying to diagnose alcohol and drug abuse or other causation. Documentation of performance problems and responsible action, including confrontation of the employee about the behavior and swift referral for appropriate assistance, will assist the employee in obtaining assistance for recovery and return to work.

C. Healthcare provider training

Healthcare providers need continuing education in the field of substance abuse and impairment throughout their careers. This includes all healthcare professionals including physicians, doctors of osteopathy (DOs), nurse practitioners, and physicians' assistants. It is acknowledged that healthcare providers are increasingly exposed to patients abusing drugs and alcohol. National studies indicate, however, that although physicians report a high level of confidence about their working knowledge and diagnostic skills regarding drug abuse, alcoholism, and related diseases, they

actually scored much lower in diagnosing, providing treatment for, and educating their patients on the subject (CASA, 2000). These surveys were performed on physicians who practiced in primary care and did not include healthcare providers in specialty areas such as occupational and environmental medicine, emergency, pain management or addiction medicine, all of which typically have more exposure and experience with substance abusing and addictive patients. In a more recent study by CASA looking at training in prescription drug abuse, only 19.1 percent of physicians reported they had been trained in medical school to recognize prescription drug diversion. Just over 39 percent reported such training during residency and 34.2 percent reported they had sought continuing medical education in this area (CASA, 2005). Given that this topic encompasses so much of society's healthcare and safety resources, it needs to be added to undergraduate, graduate, and postgraduate curriculum for all healthcare providers.

11.8 Return to Work

Before an employee who has been on substance abuse leave returns to the workplace, a specific return to work plan should be in place. The employee must be cleared for return by whoever is medically managing the case: occupational and environmental health provider, the EAP, or an outside healthcare professional. When medical clearance has been obtained, a meeting can be scheduled with the returning employee, the supervisor, a human resources representative, and possibly a union representative. At the meeting, a written document that details the conditions of returning to work will be provided to the employee. The document, to be signed by the employee, may specify random drug testing, treatment, and performance expectations; the consequences if the employee does not remain drug and alcohol free; and the time period of the agreement.

11.9 Summary

Substance abuse continues to be a growing public health problem in our nation. Though there are slight dips in usage now and then, overall, we seem to be losing the battle. There are many dedicated professionals who are making an impact individually in the fight against alcohol and substance abuse. Interdisciplinary work, however, would allow for better outcomes as a result of sharing expertise, thereby widening the knowledge base of all collaborating professionals who strive to combat this growing public health threat.

Our nation's educators, law enforcement, healthcare providers, and scientists are charged with the responsibility for controlling this serious international problem. If they are to be effective, the reduction of alcohol and substance abuse will have to become a national priority. The desire to serve that brought them into their professions will not suffice unless financial, educational, and research resources are adequate. This nation's alcohol and substance abuse epidemic is truly a threat in the workplace, to individuals, to communities, and to homeland security.

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Medical-Legal Aspects of Drugs

Second Edition

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(800) 209-7109 • FAX (800) 330-8795
e-mail: sales@lawyersandjudges.com
www.lawyersandjudges.com

Library of Congress Cataloging-in-Publication Data

Medical-legal aspects of drugs / compiled and edited by Marcelline Burns ; contributors Donald J. Bartell ... [et al.]. -- 2nd ed.
p. ; cm.
Includes bibliographical references and index.
ISBN-13: 978-1-933264-08-0 (hardcover)
ISBN-10: 1-933264-08-X (hardcover)
1. Forensic pharmacology. 2. Drugs of abuse. 3. Pharmacology. I. Burns, Marcelline.
[DNLM: 1. Pharmacology--legislation & jurisprudence--United States. 2. Drug and Narcotic Control--legislation & jurisprudence--United States. 3. Forensic Medicine--United States. QV 33 AA1 M489 2007]
RA1160.M43 2007
614'.1--dc22

2006027372

ISBN 1-933264-08-X
ISBN 978-1-933264-08-0
Printed in the United States of America
10 9 8 7 6 5 4 3 2 1

online
www.lawyersandjudges.com

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