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The limitations of drug screening in the workplace

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The purpose of this paper is to provide an overview of the major research issues and perspectives related to drug screening in the workplace in order to help governments, employers and unions make informed decisions regarding its utility. To assist in this task, a critical analysis of the strengths and weaknesses of drug screening as a workplace intervention will be made. In describing these issues, reference will be made largely to the North American situation, but many issues are also relevant in other industrialized countries. Substance abuse and dependency problems have no particular link to the industrialized world and, in fact, few countries have been untouched by the problem. However, the impact of substance abuse in the workplace is more clearly defined and documented in industrialized countries.

I. Drug screening: History, rationale and types

History

Screening or testing for drugs in the workplace is the process whereby bodily samples (e.g. urine, blood, hair or breath) are obtained from employees and laboratory analyses are made to detect the presence of certain drugs (including illicit drugs such as marijuana, cocaine, and amphetamines; and sometimes licit drugs such as alcohol or prescription drugs) and their metabolites. It was first practised in the United States in the 1960s and early 1970s, when the Department of Defense (DOD) used urinalysis to screen military personnel returning from Vietnam and when treatment programmes started including drug screening in the rehabilitation of persons with dependency problems. The 1980s saw a massive increase in

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drug screening following the development of more reliable technology to test for the presence of marijuana and because of heightened awareness about apparently high rates of drug use among certain populations (e.g. military personnel). A highly publicized fatal aircraft carrier accident that had involved the use of drugs served to intensify public fear about the harmful effects of drugs. In 1982 the United States Navy started testing its personnel for drugs (Walsh and Trumble, 1991). In the same period, private companies began to inquire about the legality of screening employees and, in particular, the Greyhound Corporation announced the automatic screening of all its bus drivers. The mid-to-late 1980s saw important legislative developments that opened the door to the widespread implementation of drug screening. In 1986, federal regulations established by Ronald Reagan required that efforts towards creating a drug-free workplace be initiated within all federal executive branch agencies. President Reagan ordered compulsory testing of employees and job applicants for illegal drug use. In 1988 the Drug-free Workplace Act required all companies obtaining contracts worth US$25,000 or more from any federal agency to promote a drug-free working environment. During this period the Anti-Drug Abuse Act was passed, Mandatory Guidelines for Federal Workplace Drug Testing Programs (NIDA) were issued, and the Supreme Court made a number of important decisions in support of drug screening.

By the mid-1980s screening had become common in large and medium-sized companies. In 1986, about 25 per cent of the largest 500 companies in the United States had drug screening programmes (Mani and Burns, 1986). In 1988, the Department of Transport put into effect rules for screening employees in the private sector, which required drug screening programmes to be carried out in aviation, marine, rail, public transport, long-distance haulage and pipelines (*Occupational Health and Safety Reporter*, 1989). Between 1988 and 1990 out of all companies the proportion implementing such programmes increased from 3.2 to 4.4 per cent (International Labour Office, 1991).

Although most studies indicate an overall increase in the percentage of companies with drug screening programmes during the past decade, there are also signs that a large proportion of companies in the United States have been abandoning drug screening. In a survey of 145,000 businesses that ran screening programmes in 1988, only two-thirds still ran them in 1990 (Cornell/Smithers, 1992). The high costs of the programmes and the threat of litigation are thought to have contributed to this decline.

Little is known about the prevalence of drug screening programmes outside the United States. The percentage of companies undertaking such screening depends on the country in which the company is registered and on the type of company. Internationally, haulage companies and companies in safety-sensitive sectors (where the safety of the employee and/or the public can be endangered by impaired work performance) and with routes through the United States or contracts with American firms are most likely to run

such programmes. Drug screening appears to be on the increase in Canada. In 1990, about 19.5 per cent of federally regulated Canadian haulage companies with 100 or more employees ran drug screening programmes and 14.5 per cent alcohol screening programmes (Macdonald and Dooley, 1991). Federal legislation is pending in Canada for compulsory screening in federally regulated haulage companies. Unfortunately, the extent to which such screening is undertaken in Europe is largely unknown, but it is believed to be much less prevalent than in North America. As yet, no legislation rendering drug screening compulsory has been enacted in any of the European countries.

The rationale for screening and the types of programme used

The most commonly cited reason for drug screening is to reduce industrial accidents in the workplace. The use of many drugs and of alcohol causes reduced motor coordination and perceptual abilities (Nicholson and Ward, 1984; Addiction Research Foundation, 1987). Therefore, it is commonly argued, if drug use in the workplace can be eliminated, especially for those in safety-sensitive positions, there will be a reduction in occupational accidents.

A second reason given for drug screening is to reduce other problems in the workplace that are associated with low productivity, such as absenteeism, lateness and staff turnover, and that are also assumed to be related to drug use (Addiction Research Foundation, 1990; Normand et al., 1990). It is also argued that costs associated with company health care plans can be reduced because the employees considered likely to use such programmes are also likely to be heavy drug and/or alcohol users (Walsh and Hawks, 1986). A similar reason has been advanced by United States companies that have adopted employment policies prohibiting tobacco use on and/or off the job. This is not a widespread practice, although some firms are beginning to introduce it in order to reduce their health care costs.

A third reason for drug screening is to reduce the use of illicit drugs in society at large. This purpose has been clearly articulated in United States government documents: Since most people are employed "... the work place may be the most strategic point in society from which to combat the scourge of drugs" (Office of National Drug Control Policy, 1990, p. 1). The government strategy for a "war on drugs" had a major impact on the implementation of drug screening programmes across the United States (Fishbein, 1989). It is argued that such programmes provide a means to detect and monitor drug use in society. In many industrialized countries, constitutional safeguards concerning, for example, the right to privacy and due process can be bypassed through government regulation or agreements between employers and employees. These measures can make drug

screening in the workplace a very powerful tool to track down drug use in society in general.

The fourth reason explaining why some employers adopt such programmes is simply that the law requires them to do so. For example, in the United States as mentioned above, federal regulations require that drug screening be compulsory for certain federal employees.

Screening is also used in order to address environmental concerns. In workplaces where hazardous materials are used, screening programmes are employed to minimize the risk of accidents occurring. Employers also implement screening to prevent legal problems. Since safety in the workplace must be ensured by the employer and safety of the public can be jeopardized by employee accidents, an employer who does not take action to prevent accidents can be sued for negligence.

Drug screening can be conducted in the workplace in several different ways (Decresce et al., 1989; Macdonald and Dooley, 1991, Stennett-Brewer, 1988). The degree to which it can achieve its objectives is probably related to the type of approach selected. Several types of programmes exist:

- *pre-employment:* job applicants are tested for drugs;
- *random basis:* employees are unaware of when drug screening will take place until the day of the test;
- *periodic basis:* employees are tested for drugs according to a predetermined timetable, usually at a yearly medical check-up;
- *probable cause:* such as after a work accident or in the presence of obvious behavioural symptoms;
- *reasonable suspicion:* such as lateness or high absenteeism (the grounds for tests for reasonable suspicion are less rigorous than for probable cause);
- *on return from treatment or rehabilitation;*
- when an employee is *transferred or promoted* to a new position; and
- *voluntary basis:* employees submit to screening but it is not a requirement of work.

There are three typical consequences for those job applicants or employees who test positive (Macdonald and Dooley, 1991). If screening occurs prior to employment, the job applicant is not usually hired. In the case of the other types of screening, employees who test positive are usually either dismissed or given the opportunity to receive drug rehabilitation or treatment. Clearly, from the point of view of both employee and employer, dismissal has very different repercussions than does the provision of treatment. Dismissal implies that drug screening is governed by a punitive enforcement model grounded in principles both moralistic and pragmatic. There are disadvantages for both parties: when someone is dismissed, the employer must hire and train a new employee; the dismissed employee, on

the other hand, may have difficulty obtaining new employment and may not receive treatment if a drug problem exists.

The treatment option is more analogous with a constructive confrontational model first used with Employee Assistance Programmes. It suggests a more humanitarian approach to dealing with drug problems among employees. However, this approach may be considered less effective in terms of reducing drug problems in the workplace, since treatment is not 100 per cent effective in combating drug problems. Although the different types of treatment vary in their success rates, no single treatment or combination of treatments can be considered perfect for all patients with alcohol problems (see Holder et al., 1991, for a review).

II. Drugs, alcohol and the workplace

Clearly, all of the arguments in favour of drug screening are based on the assumption that it will result in reduced drug use – not necessarily a scientific approach. Most employers who have implemented screening programmes have done so in the hope of reducing the risk of workplace problems, such as accidents and absenteeism, associated with drug use. In order to assess the likely usefulness of screening programmes, the strength of the relationship between the consumption of varieties of drug or alcohol and workplace problems must therefore be determined. It is also important to assess the extent of alcohol and drug problems in the workplace in order to determine whether intervention can be justified.

The magnitude of the problem

The extent of alcohol and drug usage among the employed is not well known. This is largely because survey participants are reluctant to admit to using drugs, since in the case of many drugs their use is illegal and most businesses forbid drinking during working hours. From a sample of 2,500 employees at 20 firms in the United States, Nelson (1981) found that 17 per cent indicated they had used or were still using illegal or non-medical drugs. Almost 7 per cent of these individuals were still using them. Another study of long-distance lorry drivers indicated that over 62 per cent reported they used drugs at least occasionally (Guinn, 1983). In his study of 1,716 employed adults, Cook (1989) reported that 11 per cent were taking marijuana and 2 per cent cocaine. He also reported that age, sex, education and job category were significant predictors of drug use.

Some researchers suggest that illegal drug use is not significantly prevalent in the workplace. According to one study, companies running screening programmes in the United States have found that fewer than 1 per cent of employees tested positive for drug use (Cornell/Smithers, 1992). Markus examined the percentage of employees testing positive for alcohol

and various types of drugs in several workplace settings. Employees were most likely to test positive for alcohol (4.53 per cent), THC (3.63 per cent), and benzodiazepines (2.09 per cent) (Markus, 1992).

A number of researchers point out that the use of *legal* drugs may be a problem in the workplace. It has been suggested that the use of prescribed drugs, such as stimulants and tranquillizers, is high among employees (Mithers, 1986). Alcohol is far more prevalent (in Canada) than any other legal or illegal drugs both off and on the job (Health and Welfare Canada, 1988; Addiction Research Foundation, 1991). A report on substance use in the Canadian transport sector revealed that alcohol is the substance "that shows the highest reported usage and negative effects" (Heffring Research Group, 1990, p. 26). It has also been found that up to 10 per cent of employees report they drink excessively (Addiction Research Foundation, 1991).

Types of drugs and their effect on work performance

Much of the evidence suggesting that drug use is associated with increased industrial accidents and decreased performance is based on *laboratory* studies showing that motor coordination and perceptual abilities fall with the ingestion of different types of drugs. The immediate effects of alcohol, hallucinogens and barbiturates clearly reduce performance. Narcotics and cannabis are less impairing. Cocaine and nicotine have little effect on psychomotor performance, while amphetamines can increase performance, especially for tasks that require endurance (see Addiction Research Foundation, 1991, and Descresce et al., 1989, for an overview). In one laboratory study, the delayed effects of alcohol intake in simulated work environments were examined. The authors found that "the motion patterns of individuals in industrial work situations remain drastically changed for several hours after blood alcohol levels have returned to zero and the individual is legally sober" (Wolkenberg et al., 1975, p. 117).

Field studies show that some industrial accidents have probably been caused by *impairment*[1] from alcohol, hallucinogens or barbiturates (Canadian Centre for Occupational Health and Safety, 1987). Most would agree that alcohol is the drug representing the number-one safety problem in industrialized society, because of its high usage and the profound effects it has on psychomotor coordination (Schottenfeld, 1989, Addiction Research Foundation, 1990). Too few studies have been conducted on the relationship between impairment from other drugs and work accidents for reliable and accurate conclusions to be reached regarding risk levels.

[1] For the purposes of this paper, impairment is defined as a deterioration in general performance. In some countries legal definitions of impairment exist in relation to alcohol consumption.

Few studies have examined *the relationship between drug use off the job* and job-related problems, such as poor performance or industrial accidents (Henriksson, 1991). In a longitudinal study of 4,396 employees, job applicants who tested positive for alcohol, cannabis, barbiturates, cocaine and nicotine were more likely to have high rates of absenteeism than those testing negative (Normand et al., 1990). Results from a study of 1,740 employed adults indicated that drug users were 1.7 times more likely to be involved in accidents on the job (Hingson et al., 1985). Evidence to date suggests that alcoholics and problem drinkers are two to three times more likely to be involved in industrial accidents than non-problem drinkers (Hingson et al., 1985; Observer and Maxwell, 1959; Pell and D'Alonzo, 1970).

In some studies, comparisons are drawn between the absenteeism and turnover rates of groups who had tested positive and groups who had tested negative prior to employment (Blank and Fenton, 1989; Normand and Salyards, 1989; Sheridan and Winkler, 1989). Studies were conducted in settings where pre-employment test results had no bearing on subsequent hiring decisions. The study by Normand and Salyard (1989) of applicants to the United States Postal Service found that voluntary separation (staff turnover) and job absence rates were higher among the groups that tested positive for drugs. The Blank and Fenton (1989) study of United States Navy recruits revealed that marijuana users were more likely than any other recruits to be discharged from the Navy for behavioural or performance problems (including the use of marijuana). Sheridan and Winkler (1989) also reported higher rates of absenteeism among positive test groups. Another study by Crouch et al. (1989), indicated that employees testing positive for marijuana, cocaine, and other drugs were five times more likely to have a reportable vehicle accident than a non-drug-using sample, matched by age, sex, occupation, years of service and geographic location. McDaniel (1989) found that self-reported drug use was associated with discharge from the army for unsuitability. Zwerling et al. (1990) reported that accident rates, injuries, and the use of sick leave were between 55 and 145 per cent higher among those testing positive for marijuana and cocaine compared with those testing negative.

This material provides a brief overview of the major types of drugs for which screening is typically conducted and of their reported effects on occupational performance and/or accidents. Other factors are also important. The amount consumed of a drug, the nature of the drug, the frequency of usage and the degree of addiction are all critical factors in assessing accident and performance risk. These factors have rarely been investigated. Moreover, whereas workers' performance may not deteriorate while using certain drugs, physical withdrawal from using drugs such as cocaine or nicotine can contribute to performance deficits (Addiction Research Foundation, 1991). The drugs discussed above do not include the large variety of over-the-counter and prescription drugs that also might affect performance and safety on the job (see Klein, 1972).

The methodology and accuracy of conclusions drawn from many of the aforementioned studies have been vigorously challenged. One problem is that users of different types of drugs are often treated in the analysis as a homogeneous group and compared with non-users, making it difficult to arrive at conclusions regarding the relative risk of a particular drug. Another shortcoming of most studies is their failure to distinguish between moderate and heavy users. The heaviest users show higher accident rates and more productivity problems. These may therefore be attributed to a minority of heavy users. Furthermore, the studies do not provide conclusive evidence that drug use is causally related to performance problems. Since drug users differ from non-users in many respects, it is difficult to conclude that drug use or some other confounding characteristics are causing performance problems. For example, drug users may be more likely than non-users to take risks, which could explain the higher rate of job-related problems (Macdonald and Dooley, 1991; Newcomb, 1988). Studies examining self-reported drug use suffer from an additional weakness in that many users are unlikely to admit to the use of illegal substances.

Due to these limitations and to the paucity of studies, the empirical evidence of a relationship between drug usage and industrial accidents or performance problems is inconclusive. Nevertheless, although empirical evidence is lacking, this does not mean employers should not run programmes to curtail alcohol and drug use in the workplace. However, without such empirical evidence, employers should carefully weigh up the issues related to screening, such as the costs, laboratory and procedural issues involved, their likely impact and effectiveness, the possible adverse effects of intervention, and the various legal implications.

III. Issues arising from drug screening

Laboratory testing procedures

Breathalysers and blood tests *for alcohol* are the only drug tests that correlate very closely with actual levels of impairment (Hawkes and Chiang, 1986). The concentration of alcohol measured in a breathalyser test is a very good indication of its actual concentration in the brain. Furthermore, evidence has shown that a high correlation exists between blood alcohol concentration levels and accident and performance data (Cornish, 1988). By contrast, urine and blood tests for substances other than alcohol have a limited value, in that they can only be used to determine whether or not drug metabolites are present. In other words, they cannot measure impairment (i.e. deteriorated performance), habituation or addiction (McCunney, 1989). Blood tests for these other substances generally correlate better with impairment levels than do urine tests. However, as yet, no valid correlations have been found between the concentration of drugs in urine or blood and

impairment (Cornish, 1988). Some drugs, such as marijuana, can be detected by urinalysis for up to three weeks after use, while other drugs, such as cocaine, can only be detected for a few days (see Smith and Wesson, 1984, for a chart of approximate times during which drugs and their metabolites remain detectable in urine). The successful detection of drugs using urine tests depends on several factors, such as the amount consumed, the time since ingestion, individual metabolic rates, the type of drug and the amount of water consumed before collecting the urine specimen (Manno, 1986).

Although many types of testing instruments are available, they vary considerably as to their validity and reliability (Rothstein, 1985-86). False positive screens have been documented, where tests erroneously indicate the presence of a drug (Walsh and Gust, 1986; Knight et al., 1990). Sometimes false positives are attributable to ingested substances such as medication to counter asthma or allergy (The Privacy Commission of Canada, 1990). Some authors have suggested that employees subjected to drug screening refrain from using popular over-the-counter medicines, such as Alka-Seltzer Plus and Sudafed, because they are known to have caused false positives (Potter and Orgali, 1990). Some natural substances such as herbal teas and poppy seeds can also give positive responses to screens. These may be true positives but should be distinguished from those due to illegal drug use. In other instances, false positives have resulted from mistakes or from sabotage of the chain of custody for urine samples.

"False negatives" (tests that fail to detect the actual use of drugs) can also occur. Employees sometimes attempt to increase the likelihood of false negatives to avoid detection of drug use (Hoffman, 1987; Potter and Orfali, 1990). Flushing one's system with large quantities of water, use of diuretics, use of clean urine in condoms or bladder bags, or adulteration of urine with salt or ammonia are examples of some methods described for beating the tests. Employers should ensure that company procedures are sufficiently rigorous that employees cannot interfere with the paperwork involved in running a screen, or know when upcoming tests are scheduled, if random screening is initiated.

Rigorous laboratory controls are often instituted to guard against erroneous results, i.e. both false positives and negatives. Clearly it is best to guard against the occurrence of false positives, even at the expense of increased proportions of false negatives, since an incorrect positive test can have a profound adverse effect on an individual and could lead directly to litigation and negative publicity for the employer. Very stringent procedures are required to avoid liability associated with discharging or failing to hire an individual due to a faulty laboratory report. In late 1990 and early 1991, three out of 63 laboratories certified by the National Institute on Drug Abuse in the United States were suspended for documented cases of false positives (Cornell/Smithers, 1992). Employees have been reinstated after proof of improper procedures, such as failure to secure the initials of employees on tamper-proof jars. Use of an accredited laboratory is advised, to guard

against employers being challenged in court. Gas chromatography in combination with mass spectrometry is the only government-authorized method in the United States for confirming the presence of cocaine, marijuana, opiates, amphetamines and phencyclidine; this approach is considered nearly perfect. Guidelines for drug screening laboratories have now been established in the United States (Zurer, 1987).

Screening can take place either on company premises or at an outside laboratory; the use of an outside laboratory is preferable, since both initial and confirmatory tests can be conducted in the same laboratory by professional staff, and problems associated with confidentiality and sample mishandling can be minimized (Willette, 1986; Manno, 1986). Outside laboratories should be licensed and should follow strict procedures to guard against tampering or mistakes due to poor chain-of-custody arrangements or laboratory error. Personnel should be appropriately trained and be capable of testifying in court. Employers should seek legal counsel before implementing programmes and should specify clearly in writing to employees any prohibited conduct, spelling out the circumstances in which testing will be conducted and describing the consequences of positive tests (Bitter, 1990). For more detailed information about setting up screening programmes, please refer to Addiction Research Foundation (1987).

Summing up, several important points have been described in this section. Firstly, except for breathalysers that measure blood alcohol concentration (BAC) and correlate closely with impairment, no drug test can assess whether an individual is under the influence of a drug at the time of the test. Secondly, although the best methods are close to being perfect, both false positives and false negatives can still occur. Thirdly, stringent laboratory conditions must exist to ensure tests are valid and reliable and elaborate testing procedures must be carried out by specialized personnel. In fact, these three aspects of the laboratory testing techniques are less than ideal for any widespread implementation of drug screening programmes. If tests cannot determine whether a person is under the influence of a drug when tested, then they cannot be relied upon to assess whether someone is at increased risk of experiencing work problems. In short, drug tests do not measure what they should be measuring in order to be fair and, possibly, useful. Furthermore, although remote, there is a possibility that non-users may be incorrectly labelled as users.

Legal and ethical issues

The *legal issues* arising from drug screening are very complicated. To a large extent they vary according to the constitution of the country concerned, legislation on human rights, or variations in provincial or state laws within countries, and on the regulations governing the workplace. The legality of screening is also likely to depend on the type of screening instituted and the procedures adopted once tests prove positive. Examples of

legal issues arising from drug screening include rights to privacy, defamation, self-incrimination, due process, discrimination and wrongful dismissal. Many of the legal issues involved have yet to be resolved in the courts (Fritze, 1990; Hodkin, 1991):

Ethical issues have also been raised in relation to such tests. For all of the ethical arguments against screening outlined below, proponents of testing would argue that they are outweighed by the need to protect employees and possibly innocent bystanders from physical harm and to reduce the overall work performance problems of employees. Some have charged that screening programmes are not morally justifiable, especially if they are used as a weapon in the war on drugs. In most countries it is illegal to pick people at random off the street or out of their homes and subject them to drug screening tests. Since screening simply bypasses procedural safeguards to protect citizens' rights to privacy and due process, many feel that the workplace should not be the site for attempts at social control.

Many would agree, however, that drug screening tests are ethically acceptable if they can be used in a fair manner in order to save lives. Most people consider that laws prohibiting drinking and driving and those ensuring the means by which impairment is assessed are ethically sound. These laws are accepted because there is strong empirical evidence indicating that a person whose BAC (blood alcohol concentration) is of 0.80 mg% is twice as likely to be involved in traffic collisions as persons who are sober. The relative risk of traffic collisions increases exponentially as the BAC rises above this point (Council on Scientific Affairs, 1986). Furthermore, the technical means needed to measure these levels directly and accurately are readily available. By contrast, a causal relationship between impairment due to many other drugs (especially cocaine and amphetamines) and accidents has not been convincingly established. As previously pointed out, no technical means exist to measure the degree of impairment (at the time of testing) which has been caused by drugs other than alcohol. Since these conditions are not satisfied, human rights activists claim that drug screening is not justifiable on the grounds of increasing safety in the workplace (Kaplan and Williams, 1988).

A third ethical problem is that employers are placed in a position of considerable power – and a potential conflict of interests. They could obtain other sorts of information from the test results of prospective employees or current employees, for example on pregnancy status or the presence of diseases (Canadian Human Rights Commission, 1988). Proponents of screening argue, however, that procedural safeguards can be implemented to ensure that such abuses do not occur.

Fourthly, many people feel that the testing procedures themselves are degrading and amount to a violation of personal rights because they are intrusive. They are most intrusive if procedures involve direct observation of urination. However, procedures without direct observation are liable to tampering and are therefore less accurate (Smith and Wesson, 1984).

Fifthly, since most tests detect and measure earlier use and not impairment at the time of testing, many feel that drug screening invades the right to privacy during leisure hours and violates principles of autonomy (Gold, 1987; Schottenfeld, 1989). Finally, the workers who account for any high risk of accidents are likely to be heavy or chronic users; yet drug tests cannot distinguish between heavy users and casual or infrequent users.

Impact and cost-effectiveness

The actual impact of drug screening is practically unknown because so few studies have been conducted in this area. Studies have been severely criticized for attributing reductions in accident rates or improvements in productivity to drug screening, without accounting for the influence of other developments (Eichler et al., 1988; Jones, 1990; Sheridan and Winkler, 1989). For example, a study conducted at the Southern Pacific Railway reported that the number of personal injuries occurring on the railway dropped from 2,234 to 322, and the number of train accidents due to human failure dropped from 911 to 54, in the five-year period following the institution of random drug screening (Taggart, 1989). However, massive engineering improvements in the tracking system, the implementation of measures to reduce crew risk, the expansion of training programmes, and other improvements to safety took place simultaneously with the drug screening programme (Jones, 1990). These measures may have accounted for most if not all of the reported reductions in accidents and injuries. Too few studies have examined the impact of screening programmes on industrial accidents and those that do exist lack scientific rigour.

Some companies have noted reductions in the percentage of employees or job applicants who test positive over subsequent years of screening (Needleman and Romber, 1989; Willette, 1986). This outcome could mean that fewer employees are using drugs or that employees have simply adopted better methods for beating the tests. Some authors have even suggested that casual users of drugs may be more likely to test positive than the heavier users who have learned how to beat the tests (Weiss and Millman, 1989). One possible explanation for the reduction in the percentage of job applicants who test positive may be that drug users seeking employment are less likely to apply for work to employers known to use screening.

Information about the impact and effectiveness of drug screening is limited because adequate control groups are rarely available, which makes the interpretation of evaluations problematic. Typically, companies are obliged to evaluate their programmes by comparing critical indicators before and after programme implementation. As explained above, a major problem with this approach to assessment is that changes may be attributable to other events or developments. Companies should therefore carefully log all developments in other related programmes they (or others) institute and

major factors (such as the overall economic climate) that occurred during or after implementation of the drug screening. They should also attempt to account for the probable influence of such developments on changes in the critical outcome indicators. Policy-makers cannot make rational decisions about the effectiveness of drug screening programmes without methodologically sound evidence.

Concern has been expressed by some researchers that drug screening may have a negative impact on the workplace. They state, for instance, that such programmes can lead to a reduction in employee morale (International Labour Office, 1991; Maltby, 1987; O'Keefe, 1987; Rothstein, 1989; Weeks, 1987). Another area rarely considered is the impact of drug screening on society as a whole. Some have suggested that widespread mandatory screening may encourage covert behaviour and possibly escalate crime rates (Ellis, 1988; International Labour Office, 1991). Drug users may increase their drug intake as a result of being fired, which may cause them to engage in criminal activity to pay for drugs (Ellis, 1988). Drug screening may also undermine labour-management relations, impede employee recruitment and promote litigation (Rothstein, 1991, as cited in Cornell/Smithers, 1992). If mass screening is implemented, some companies operating in localities of high drug use may have difficulty finding qualified "drug-free" applicants, especially at times when the labour market pool is diminishing (Cornell/Smithers, 1992). One recent study suggested that companies implementing drug screening are less likely to attract job applicants than companies not doing so (Crant and Bateman, 1990). However, little scientific evidence exists to substantiate or refute any of these claims. This is because, as yet, few companies have evaluated their drug-screening programmes.

Recently, researchers and employers have attempted to determine the cost-effectiveness of screening. While the term effectiveness refers to the extent to which the objectives of screening are met, cost-effectiveness refers to the extent to which the monetary benefits of screening outweigh its monetary costs. For many companies effectiveness and cost-effectiveness are synonymous. Costs of programmes may vary considerably from one country to another. Tests are likely to be least expensive in the United States where testing laboratories are numerous. A recent estimate in the United States was that *each drug test* costs about $20 (Walsh, 1989). In countries or industries where drug usage is lower, *costs per positive drug test* (i.e. overall costs divided by the number of positive test results) will be higher. A United States congressional committee report on screening in 38 federal agencies estimated the costs associated with each positive test to be approximately $77,000 and an electronic manufacturer arrived at a cost of $20,000 for each positive test (Cornell/Smithers, 1992). This is not surprising since the positive ratio is relatively low compared to the number of tests carried out. Most employers in the United States have found that between 0.5 and 1 per cent of all employees have tested positive (Cornell/Smithers, 1992), and about 90 per

cent of those who test positive are found to have consumed cannabis (Morgan, 1988, as cited in Horgan, 1990). If employees with positive tests are dismissed, then employers incur the additional costs of hiring and training new employees.

Since the amount of money saved in terms of improved performance due to screening is not easily measured, it is difficult to estimate the cost-effectiveness of drug screening. In safety-sensitive industries, such as aviation or shipping, the financial costs of an accident like that of the oil tanker Exxon Valdez that occurred in Alaska in 1989 can be astronomical. If drug screening can prevent such a loss, the costs saved by preventing accidents may exceed the costs of a programme.

Alternatives to screening

Other approaches may prove more effective at ensuring that employees perform their jobs in a safe and efficient manner. Alternative measures can be taken that do not involve the complex ethical dilemmas associated with drug screening. One such approach involves training supervisors to detect performance problems that may affect safety (Rothman, 1988). A second approach involves the use of behavioural tests using, for example, computer software packages or mechanical aptitude tests, which measure performance directly (Jex, 1987). These approaches may not detect drug use, but could be useful for detecting performance problems. Although these performance tests may have merit in theory, little empirical evidence exists to show they are effective. Widespread implementation of these tests cannot therefore be recommended at this point.

Employee assistance and health promotion programmes, which are sometimes used in conjunction with drug screening programmes, can also be considered viable alternatives to drug screening. They have already proved instrumental in reducing drug-related problems in the workplace (Jerrel and Rightmyer, 1982). Educational programmes aimed at preventing and reducing drug usage offer another approach; those which convey scientifically accurate information in a non-judgemental manner are generally thought to be most effective (Ogborne, 1988). Such alternative approaches may be instrumental in eliminating or limiting the conditions that favour substance abuse.

IV. Conclusions

This article has touched upon a wide variety of issues related to drug screening in the workplace, of which the most significant are as follows:

- The most common reasons for implementing drug screening are to lower the rate of accidents, increase productivity in the workplace and reduce the overall use of illicit drugs in society.

- Knowledge about the prevalence of drug and alcohol problems in the workplace and the impact of drug use on job performance is limited because research in these areas is sparse and lacking in scientific rigour.
- Alcohol is the drug associated with the greatest safety problems in the workplace because of the high usage made of it and the profound effects it has on psychomotor coordination.
- With the exception of breathalysers for alcohol, drug tests can only measure prior use of drugs, not impairment at the time of testing.
- The most reliable drug screening tests are gas chromatography, in combination with mass spectrometry.
- The legal aspects of screening are very complicated and depend on the constitutional fabric and human rights legislation in a given country; they are largely unresolved.
- Use of drug screening raises a variety of moral and ethical issues.
- Little is known about the impact and effectiveness of drug screening programmes, largely because few scientific studies have been conducted.
- A number of viable alternatives to drug screening exist, including the use of employee assistance and health promotion programmes.

Some have treated drug screening as the panacea for drug problems in industrial society. In reality, experience shows there is no single remedy to eliminate drug use. Screening, however, raises many complex issues, most of which render it undesirable as a drug reduction strategy. The tests themselves are severely limited, in that they do not measure impairment of work performance. Furthermore, laboratory testing procedures are elaborate and costly. Screening has not been proved effective in reducing drug problems at work, and may indeed create negative consequences for employers. The legal aspects of screening are highly complex, largely unresolved, and the possibility of litigation is increased by the use of such programmes. Several moral and ethical problems arise because tests are considered degrading and an intrusion of privacy, as well as ineffective. Use of screening as a general deterrent against drug use in society may have some utility; however, this goal goes beyond the responsibility of most employers. In short, the strengths of screening programmes are far outweighed by their weaknesses and possible negative consequences. Alternative approaches to drug screening that do not involve ethical and legal dilemmas and that are less intrusive should be considered. Given the many limitations and possible negative impact of drug screening programmes described in this paper, utilization of screening to reduce illicit drug use in general and to minimize work performance problems (other than work accidents) is *not* advisable.

The question whether to screen for drug use among employees in potentially hazardous jobs poses a dilemma to employers. In the United

States, this dilemma is less acute because there are legislative requirements for employers to test. In other countries, employers must weigh the degree of possible harm resulting from the wrongful assessment of an employee against the numerous drawbacks of testing.

Another important consideration is whether an employee's work is generally unsupervised so that impairment through drugs or alcohol would not normally be observed (Addiction Research Foundation, 1991). Drug screening might be appropriate for such jobs (e.g. ship's captain or airline pilot). If screening is used, however, it should not be viewed as a substitute for other drug reduction strategies described in this paper. In addition, such workers who test positive should be referred to an employment assistance programme for assessment, and counselling and rehabilitation should be provided if needed (Addiction Research Foundation, 1991).

The use of breathalysers for detecting impairment through alcohol is the most justifiable type of screening in the workplace because there is considerable empirical evidence that alcohol use is associated with work accidents; moreover, breathalyser results correlate closely with impairment levels, proof of such correlation being the desired goal of drug tests. Many of the ethical and legal problems that occur with tests for other types of drug do not arise with breath tests for alcohol. In short, breathalysers are most justifiable in cases where employees occupy safety-sensitive positions, where they could do physical harm to themselves, to others or to the environment, and where evidence of impairment would not normally be observed (Addiction Research Foundation, 1991).

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