WORKING PAPER

ON

TYPES OF DRUG TESTING PROGRAMMES
IN THE WORKPLACE

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PREFACE

This paper on types of drug testing programmes in the workplace has been prepared for discussion at the "International Tripartite Experts Meeting on Drug and Alcohol Testing in the Workplace" (Oslo, Norway; 10-14 May, 1993). The goals of the meeting include: (1) reviewing the need, rationale, and current experience with workplace alcohol and drug testing; (2) developing principles, guidelines, and preconditions to be followed if testing programmes are initiated; (3) suggesting specific rules and regulations to ensure the integrity of testing procedures; and (4) drafting a consensus statement on alcohol and drug testing in the workplace.

The following papers have also been prepared for more in-depth examination of various aspects of drug and alcohol testing in the workplace:

- "Overview and Perspectives on Drug and Alcohol Testing in the workplace" by Meredith Hanson;
- "Drug and Alcohol Testing in the Workplace: Moral, Ethical and Legal Issues", by Carl Raskin;
- "Drug Testing Methods and Clinical Interpretations of Test Results" by Bhushan Kapur;
- "Current Practice and Experience on Drug and Alcohol Testing in the Workplace" by Craig Zwerling.

This paper's purpose is to review the variety of testing programmes and to serve as a catalyst for discussion and debate among the experts. It tries to highlight issues specific to each category of testing which are important when such programmes are under consideration.
1. INTRODUCTION

This paper will describe basic elements of programmes for the detection of a limited number of drugs and their metabolites or alcohol in biological samples.

The use of drugs and alcohol can lead to changes in the composition of the body fluids. Such changes have, in particular, been reported after chronic use of alcohol (1). Similar changes can, however, occur unrelated to the use of alcohol, and hence no alcohol-related biological marker or indicator can be taken as an unequivocal evidence of alcohol intake, heavy alcohol consumption, alcohol misuse or alcoholism. Accordingly such tests will not be dealt with in this paper. Since alcohol usually will remain detectable in biological samples for less than 24 hours after the last intake, and since it has no easily detectable metabolite, in contrast to most other drugs, alcohol would more easily escape detection based upon the principles discussed in this paper.

2. GENERAL FEATURES OF TESTING PROGRAMMES

All drug and alcohol testing programmes described have a series of different features in common. Among these are the various regulations, procedures and methods surrounding the collection of a suitable biological specimen, the subsequent handling and analysis of the specimen and the production of an interpreted report. Important points in this regard are the underlying legal background, the agreements between the parties involved, the individual’s informed consent, the correct selection of the biological medium to be analyzed, the collection of information from the sample donor e.g. with respect to drug use; the specimen collection procedures, the selection of sample containers, the shipment of the sample, the chain of custody procedures during sample collection, transport and handling in the analyzing laboratory; the selection of drugs to be analyzed, the process and methods for drugs analysis, the reporting of results, the interpretation of analytical results, the reporting of results, the interpretation of the report in relation to the individual in question (the Medical Review Officer (MRO) function); and the quality assurance and control of all the above points.

It is generally agreed that all precautions possible should be taken to guarantee and secure the best quality throughout this process. Accordingly, confirmatory drug analysis has become a required standard in almost any testing programme (2,3,4). The reason for such demands is obviously the seriousness and consequences of the results of drug testing, making false positive results unacceptable.

It is important to underline that the establishment and implementation of any testing programme requires some kind of corporate drug and alcohol policy and the development of written statements concerning goals, and procedures to reach these goals. This process, which should involve both the employer and the workforce, is considered to be of great importance in its own right (5).
A first step is to decide which drugs should be included in testing programmes. Drugs of interest can roughly be divided into two groups 1) illegal drugs and 2) legal, both prescribed and over-the-counter drugs that are either psychoactive, that have abuse potential, or both. This second group of legal drugs can either be misused or used as prescribed. Problems in the workplace will usually be related to only the former of these two types of use, although the latter cannot always be considered fully uncomplicated. In addition comes alcohol. Alcohol escapes detection much more rapidly than most other drugs, but should nevertheless be kept in mind. Thus, testing programmes should aim at three different targets: alcohol, illegal drugs and other drugs. As will be seen, few testing programmes have taken this comprehensive approach.

Another issue is to what extent can a worker be required to give information about use of prescribed drugs. In a medical setting with no possibilities of negative sanctions as a consequence of a positive result, this question is hardly relevant. A different situation arises, however, when the result of e.g. urine analysis can lead to formal sanctions. As long as legal drugs are not included in the testing programme, few problems will arise, provided highly specific testing methods are used. In some cases, however, the consumption of legal drugs such as codeine and ethylmorphine can lead to the formation of the same metabolite (morphine) as the intake of heroin. In programmes which include testing for prescribed drugs with abuse potential such as barbiturates and benzodiazepines, information about the possible legal prescription of such drugs will have important implications for the final interpretation of the test results. In such cases, information about drug use by the individual is essential. Every testing programme of this type must therefore contain measures to obtain this type of information, while guarding the privacy and confidentiality of such information. Many testing programmes do not state clearly how such problems are handled, making their evaluation difficult. A Medical Review Officer (MRO) will, in most cases, be the right person to address such problems. Complicated situations may also arise which require close collaboration between the MRO and the laboratory to solve the case.

It is stated in various guidelines that the reporting of a positive drug finding in a biological specimen should be based upon both a positive result by screening analysis as well as by confirmatory analysis (2,3,4). Somewhat surprisingly similar requirements do not seem to apply for the demonstration of the presence of alcohol by breath testing. This is interesting since it has been demonstrated that substances other than alcohol might yield false positive results for alcohol in various instruments used for breath testing (6,7,8). Since alcohol should, in principle, be regarded in the same way as other drugs in the workplace, it is difficult to find any rationale for this more lax attitude concerning confirmatory analysis in the case of alcohol.

In some test programmes the level of blood and breath alcohol is of critical importance as to whether action should be taken against the employee involved. In general, there will be possible repercussions only if the concentration is above a certain level. Compared to blood alcohol measurement, breath alcohol determination shows much larger individual variation and is influenced by several factors including breathing technique (8,9) and body temperature (10). It has been shown that people with equal blood alcohol concentrations can have large variation with regard to their breath ethanol concentrations (11,12). Thus, the question remains as to which concentration, obtained by which type of instrument and analytical principle should be regarded as the correct alcohol concentration?
It has been stated that the detection of a drug or its metabolites in urine only constitutes proof that the drug had been used once during a period preceding the test (3). The result gives very limited information about when the intake took place and what dose was taken. It does not give information about the frequency or pattern of drug use, and cannot discern infrequent recreational use from drug abuse. Finally, a positive or negative drug finding in an urine sample does not give any reliable information with regard to the influence of the drug at the time of sampling. All these uncertainties which are highly relevant, have been pointed out repeatedly and should not be ignored. They have been mentioned to indicate shortcomings in urine testing programmes, especially with regard to how testing can demonstrate drug influence and how its introduction could enhance workplace safety (13).

On the other hand, there exists a growing body of evidence that the demonstration of drug levels in blood (and/or levels of active metabolites) give far more reliable information with regard to when the drug was used, and to what extent the person was influenced at the time of sampling (14,15). With regard to influence or intoxication it has been claimed that such correlation between blood concentration and effect is only found for alcohol (13). There are, however, very few studies which have directly compared alcohol with other drugs in this respect with regard to the same measures of influence. Studies which have performed such comparison, have not found profound differences between alcohol and other drugs with regard to the relationship between blood concentrations and the degree of influence (15,16). It must, at the present stage, be concluded that blood level determinations for alcohol and drugs are much more useful than urine determinations as an indication of both influence, and when the substance was last taken. The same would apply to breath alcohol analysis, to the extent that such analysis reflects blood alcohol levels.

Other tests, e.g. measurement of psychomotor performance, have been recommended as alternatives to substance detection. Such tests have been claimed to be better for the evaluation of performance at a certain point of time (13). Performance tests are however not without problems either. Large inter-individual differences in many tests would require the establishment of individual baselines. Besides this, non-drug induced day to day variations have to be calculated for various individuals to be tested. In addition, possible learning effects have to be taken into account. Finally, it is also difficult to establish how relevant various psychomotor tests would be to evaluate safety risk under workplace conditions.

3. TYPES OF TESTING PROGRAMMES

At least eight different types of testing programmes are discussed in this paper. These are:

- Pre-employment;
- Probable cause;
- Reasonable suspicion;
- Periodic;
- Random;
- On return from treatment;
- Transfer/promotion; and
- Voluntary.
A clear distinction exists between pre-employment testing and other programmes. The use of these programmes have mostly been restricted to the United States and have been conducted according to guidelines by the National Institute on Drug Abuse (NIDA) (2). These guidelines mainly include the testing, by urine analysis, of a selection of illegal drugs commonly used in the U.S. The guidelines, however, provide an option for testing prescription drugs as well. It should nevertheless be emphasized that the main experiences reported are based on programmes which are testing mainly for illegal drugs, and not for abuse of alcohol or legal drugs.

3.1 Pre-employment testing

Pre-employment programmes where job applicants are tested, are the most popular type of drug testing programmes, with the least liability to the employer (3). Pre-employment testing is probably the most common and widely accepted type of screening. Between 60 and 70 per cent of small businesses in one eastern U.S. city, and 80 per cent of the Fortune 500 companies which test for drugs, are reported to include pre-employment screening in their programme. A survey of federally regulated Canadian transportation companies with 100 or more employees revealed that approximately 15 per cent of the organizations performed pre-employment testing (17). Pre-employment testing is mandatory for commercial vessel personnel according to the rules of the U.S. Department of Transportation/U.S. Coast Guard (18). These rules have been adopted by parts of the international maritime industry.

Data from various laboratories engaged in providing services to industry demonstrate an overall positive ratio of around 12 per cent in pre-employment testing (3). An equal percentage was reported in a study on urine samples obtained during the pre-employment physical examination of hired employees at a large U.S. teaching hospital (19). In this study the results of the test had no consequences for the outcome of job application. This was also the case in another study, performed on approximately 5000 applicants for positions in the U.S. Postal Service’s Boston Management Sectional Centre (20). In this study, approximately 7.5 per cent of the samples were positive for cannabinoids, 2 per cent for cocaine and 2.5 per cent for other drugs. In yet another study of similar design 10 per cent of all eligible job applicants tested positive for drugs at the time of their medical examination (21).

Pre-employment testing has usually been performed with respect to illegal drugs. The efforts have been focused on cannabinoids, cocaine, amphetamines, opiates and phencyclidine. In some cases, other drugs like propoxyphene, barbiturates and benzodiazepines have been included in the screening procedure. Alcohol has very seldom, if at all, been included. Urine has been the biological medium used.

It has been discussed whether pre-employment testing should encompass all job applicants. Usually this appears to be the rule. In some cases, however, pre-employment testing has been reserved for applicants for certain jobs within a company. The International Transport Worker’s Federation (ITF) has stated that pre-employment testing should only be applied to employees in safety-sensitive positions (22).

According to NIDA’s Comprehensive procedures for drug testing in the workplace, (23) the requirement of applicant testing should be indicated in vacancy announcements. Furthermore, the applicants should be informed with respect to when and where testing is to take place, and of confidentiality
protections. The applicant should be notified that appointment to the position will be contingent upon a negative test result. An applicant with a positive test result may be declined a final offer of employment (23), but the procedures may allow the applicant to reapply after a period of time (e.g. six months). The applicant should be informed if a job is not offered on the basis of a positive test result. The general impression is that the usual consequence of a positive urine test is refusal of employment. It is open to discussion whether information to the applicant, about when and where pre-employment testing will be performed, should be given in advance. Many will argue that if this is done, drug abusing applicants might adjust their drug intake and show up at a test with drug-free urine. The counter argument is that if a person is able to do such an adjustment, the degree of drug abuse is light and should not lead to refusal of a job offer. ITF states that job applicants should be clearly warned in advance if pre-employment testing is to be carried out (22). It is somewhat surprising that in spite of advance notice of pre-employment testing, many applicants still present with a drug positive urine. The reason for this might be severe drug dependence or lack of knowledge with regard to the duration of positive test results after the last drug intake.

Management has to decide at which stage in the hiring process should pre-employment testing be introduced. It can be used relatively early to screen out applicants before an interview takes place. It can be applied only to those who are the best ranked applicants after the interviewing process and other pre-employment measures. Finally, pre-employment testing can be introduced as a last step before an offer is to be given.

In many cases the pre-employment drug test will take place during the pre-employment physical examination. While this is practical, it nevertheless, requires that the urine sample is taken according to the regulations, procedures and methods which should govern this process. Usually a urine test for other purposes during physical examinations will not require similar precautions. Therefore it might be useful to consider other occasions at which the pre-employment urine sample can be taken.

The chain of custody procedures, sample analysis, reporting results and the MRO reviewing process should be similar for pre-employment testing as well as for testing of those individuals already hired.

What is known about the impact of pre-employment testing programmes? To what extent are they able to achieve the general goals of any testing programme in the workplace? In general, it is assumed that over a period of years, pre-employment drug testing will lead to a lower prevalence of drug use in the working population as drug users are screened out before being hired (3).

Some studies have applied a more experimental approach to the problem. In these studies the result of pre-employment urine drug testing were unknown to the applicant and the employer, and accordingly test results had no bearing on employment. Subsequently, various measures related to job performance were monitored for a certain period after employment.

Studies from one group (20,24) of approximately 2500 postal employees showed that those who tested positive for cannabinoids on the original test had: increased relative risk for turnover (1.56 times those who tested negative); accidents (1.55); injuries (1.85); disciplinary actions (1.55) and absenteeism (1.56) during the first year of work. These relative risks were still elevated at evaluation after two years. A trend towards somewhat reduced
risk at the later point of time compared with the former, was noticed. For those with positive cocaine tests the relative risks after the first year of evaluation were: turnover (1.15); accidents (1.59); injuries (1.85); disciplinary actions (1.40); and absenteeism (2.37). These figures showed no falling tendency when the material was evaluated after two years (24).

In a similar blind nationwide longitudinal study on approximately 5500 job applicants for the U.S. Postal Service, the relationships between the test results for illicit drugs and absenteeism, turnover, injuries and accidents on the job were evaluated (21). After an average 1.3 years of employment, employees who had tested positive for illicit drugs had an elevated rate of absenteeism (1.59) and involuntary turnover (1.47). No significant associations were detected between drug-test results and measures of injury and accident occurrence (21).

A third similar study has been performed on a much smaller sample (n=180) on employees hired at a large teaching hospital (19). After a year of employment, comparison of job performance, job retention, supervisory evaluations, and reasons for termination showed no difference between drug use and job performance. This study was small, and showed no statistically significant tendencies in the same direction as the findings in the other studies (20,21,24).

Taken together, these studies give no clear answer as to the value of pre-employment testing for the goals of this testing programme. They do give, however, clear indications that a positive drug test during pre-employment screening is correlated to problems at work during subsequent years. The generalization of the results is hampered by some difficulties and shortcomings.

First of all, only illicit drugs have been screened for. A substantial body of literature suggests that alcohol abuse correlates with the abuse of other substances (25). Alcoholics have poor employment outcome. It is uncertain whether pre-employment tests on alcohol would have yielded different results with regard to job performance during the subsequent years.

Secondly, the present studies were performed on population groups that were aware of the study design, and more importantly, knew that positive results would not have any bearing on recruitment. At the same time, ordinary pre-employment test programmes, requiring drug free urines before a job was offered, were operating elsewhere in the U.S. This could indicate that the job applicants in question constituted a selected population.

Thirdly, these studies gave no advance warning to applicants that drug testing was going to take place. This could lead to a higher rate of positive samples than would have been found in a pre-employment programme with advance announcement of testing.

3.2 Probable cause testing

There are at least two categories of such testing: one includes testing after accidents, near-misses and unsafe acts; the other includes testing when evidence of intoxication, impairment or other behavioural signs of problem drug or alcohol use is witnessed. Some also include poor job performance under this type of testing, while others would refer that situation as well as all testing of the second category to a "Reasonable suspicion testing" (23).
Considering the first main category, post accident etc., some would require that testing can only be performed providing there is good faith reason to suspect impairment as a result of drug or alcohol abuse. A growing number of companies, however, require testing after all industrial accidents (26). With this type of screening, no evidence is needed to indicate that the employees involved in the accident were impaired and subjective evaluation of each case is omitted. A possible outcome of this approach is that employees might be reluctant to report minor accidents and injuries for fear of being tested (27). Some employers have attempted to address this problem by confining testing to cases where accidents involve carelessness (26). Automatic post-accident testing might be acceptable to many employees as this might prevent rumours following an accident with regard to intoxication as possible cause.

According to NIDA (23) the intention of a programme for accident or unsafe practice testing is to provide a safe and secure work environment, by having the option to test any employee who is involved in an on-the-job accident, or who engage in unsafe on-duty job related activities. NIDA also states that it is important to specify conditions for accident and unsafe practice testing. Thus any employee involved in an on-the-job accident should be notified that testing will be initiated. It is also considered important to specify criteria for accident or unsafe practice testing. Thus testing may include, but is not limited to, death or personal injury requiring hospitalization, or damage to property in excess of a pre-designated amount. In some countries serious industrial accidents will more or less automatically be investigated by the police, who might order testing to reveal alcohol or drug impairment. Such actions instituted by parties outside the workplace are, however, considered to be principally different from the test programmes described here, and will not be dealt with further in this paper.

The other category of this programme involves testing employees who show behavioural signs. A problem with this is that supervisors or others who are authorized to order the test must focus on behavioural symptoms rather than work problems. Supervisors are usually not qualified to diagnose such symptoms, and this could lead to singling out and labelling individuals, who may or may not be users (28). Another criticism is that supervisors could abuse their discretion and harass certain employees (22). The latter point can be circumvented by the procedure recommended by Canadian authorities (29) stating that: "The grounds for testing will differ from case to case, but will generally pertain to an individual's behaviour or performance at the time. At least two people, one of whom is the supervisor, will need to conclude that there is sufficient reason to test".

Supervisors and employees can be instructed to recognize the signs of drug intoxication. This is not an easy task and there will always be the possibility of the supervisor making wrong decisions. It has been argued that this type of testing will meet limited criticism due to the fact that individuals are not tested unless sufficient evidence indicates that they are impaired by drugs or alcohol at work (26,30). It is stated that the written documentation of witnessed behaviour that corroborates test results is extremely important in such programmes. Osterloh and Becker (3) recommended that a worker's supervisor document his or her observations and accompany the person who is under suspicion of drug use to the test site. It seems clear that the more objective the criteria for selection to a test can be, the more acceptable the testing process will appear to all parties involved. One possibility could be the use of performance tests (13) as a test criterion.
Probable cause testing of both categories described above are mandatory after serious marine incidents (18). This is also the case for safety-sensitive positions in Canadian transportation. Between 5 and 10 per cent of federally-regulated Canadian transportation companies with more than 100 employees performed post-accident testing (17). One would assume that probable cause testing is being performed to an increasing extent although firm evidence for this is lacking.

Some studies have addressed the results obtained from post-accident testing. Roman and Trice (31) concluded in a review article in 1972 that alcohol and alcoholism were of minor importance in workplace accidents compared to other accidents. Similar results have been reported from Denmark (32). A French study demonstrated the presence of benzodiazepines in serum samples of 6 per cent of work accident victims (33). There are, however, much more studies on drivers fatally injured in road accidents. Alcohol has been detected in 20 to 60 per cent, and drugs in 7 to 30 per cent of such cases (34).

It is usually not stated explicitly which drugs are looked for in probable cause testing programmes. Since most experience originates from the U.S., it is most likely that the drugs specified by NIDA (illegal drugs) are tested for, with possible addition of benzodiazepines and barbiturates. In several cases it is also mentioned that alcohol is looked for. Urine is the usual medium for drug testing, while breath and/or blood samples have been taken for alcohol analysis. Most programmes in probable cause testing do not stress that the test should be performed as early as possible after the accident or other events leading to the test. The reason for this might be that usually only urine tests are carried out. As indicated earlier, a positive result of a urine test only records that the drug was present in the urine. Urine drug concentrations do not necessarily correspond to pharmacological effects or drug impairment and give no information on the duration and severity of possible continual abuse. Blood drug (and alcohol) concentrations on the other hand give information about possible impairment, especially when evaluated together with results from an objective observation of the subject. In many countries, combined evaluation of a clinical test (performance test) and blood drug concentrations constitute the bases for expert witness statements in cases of e.g. suspected drugged driving (35). It is, however, seldom raised to have a similar practice in cases of probable cause testing.

In principle, all employees should be subject to probable cause testing as such programmes should reflect a workplace policy of not tolerating drug or alcohol impairment while on duty. Some companies, however, have restricted such testing to persons in safety-sensitive positions. Post-accident testing will also restrict probable cause testing to those who are in positions which are apt to be involved in accidents. This could represent some unfairness. It is obvious that impairment of people in positions responsible for strategic decisions, production secrets etc, might also put the company's future, and thereby its employees, at risk. It seems wise, therefore, for a company to survey possible impairment of all its employees.

The policy underlying probable cause testing programmes should be explained and made clear to all employees. The company should also practice procedures that are fair for situations which are selected for testing. The policy of the company should also include a description of actions to be taken when an employee refuses to submit to testing after a probable cause is documented. This should be a part of the informed consent given by the employee when the testing practice was agreed upon.
There exists a spectrum of reactions to a positive result of probable cause testing, as for other testing programmes. These might include a change of position within the company, a leave of absence, intensified performance evaluation, resignation and termination (3). With all of the above alternatives, counseling and treatment should be provided through a practitioner with experience in drug abuse and rehabilitation (3). The comprehensive procedures by NIDA (23) state that an employee who tests positive should be referred to the EAP (Employee Assistance Programme). If the employee occupies a sensitive position, he or she may be removed from the position, and at the discretion of the employer, may be returned to duty in that position if it is determined that such a return would not endanger the safety and security of others. Further, it is stated that the employer may or may not take disciplinary action which could include removal/termination, and that the severity of the action taken should depend on the circumstances of each case.

Probable cause testing contains, in contrast to other workplace testing programmes, a special problem of what actions should be taken during the period after the sample for drug or alcohol testing has been taken and before the test result becomes available? Practice appears to vary from a leave of absence or change of position to no action.

There appear to be few if any studies which have particularly addressed the question with regard to the effects of probable cause testing programmes.

3.3 Reasonable suspicion testing

This type of testing includes testing of employees who exhibit lateness or a high degree of absenteeism or other suspect behaviour. The distinction between this type of testing and probable cause testing is not sharp. It might be said that the grounds for testing on the basis of reasonable suspicion are less rigorous than for probable cause. According to NIDA (23) other situations are also referred to under the heading of reasonable suspicion testing. These are: drug-related investigations, arrest or conviction of an employee, employee drug test tampering, and information from reliable sources about drug abuse. In such cases it is recommended that all information about the case is gathered, as well as facts and circumstances leading to and supporting the suspicion. Furthermore, a written report should be prepared in such cases detailing the basis for the suspicion. After this the employee should be notified and a test be performed.

If lateness or absenteeism should constitute the background for reasonable suspicion testing, there appears to be little published on how this should be implemented. One could, of course, suggest that lateness or absenteeism of a certain magnitude, should lead to a test. If so, this has to be described in a drug policy statement or in other written guidelines. Even when handled this way, some might feel it insulting, when for example, illness should lead to drug testing. Complications could also arise if the illness has to be treated with drugs that are metabolized to morphine, giving rise to positive drug tests. If, on the other hand, the decision to test is on a case to case basis, the possibilities of e.g. supervisors' harassment may arise.

Information on the extent to which reasonable suspicion testing programmes are used appears generally to be lacking. The same is the case with regard to frequency of positive results when such testing is performed.
In principle, all types of drug and alcohol abuse should be considered as possible causes for lateness and absenteeism (22,36). This would indicate that testing of this type should encompass both illegal and legal drugs as well as alcohol. As discussed earlier, such testing would, however, be of limited value in detecting these problems, since it would have to be performed when the subject in question was back at work, more likely in a "quiet phase" of an abuse problem. This type of testing might therefore be of rather limited value.

It may be argued that this type of testing would be particularly useful for persons in safety-sensitive positions. If reasonable suspicion testing is to be undertaken at the workplace, it is important to have a clear policy, accepted by the employees, which emphasizes the opportunity for rehabilitation which such testing might provide. This would also indicate that this is part of a caring approach and that the consequences of a positive test result should go more in the direction of counseling, treatment and rehabilitation rather than towards disciplinary action. Consequently, it may be more pragmatic to consider such programmes in conjunction with medical check-ups.

3.4 Periodic testing

Periodic testing is usually found in programmes where employees are tested for drugs or alcohol according to a predetermined timetable, usually at an annual medical check-up. Such programmes could also include testing upon return from a layoff or lengthy illness. Under all these circumstances, the employees would usually be given advance notice of when tests would take place (22). Testing of this type should most likely withstand most legal challenges. As with pre-employment testing, periodic testing enables drug users to avoid detection by abstaining from drugs for an appropriate duration before the tests are administered (26). However, those who are more severely drug-dependent will be less likely to abstain even with the knowledge that they will be tested. Periodic testing is included in the guidelines by the U.S. Coast Guard (18), in many programmes that operate within the international maritime transport industry (22), and in the strategy paper of Transport Canada (29). Periodic testing programmes are used by 10 per cent of federally regulated Canadian transport companies with more than 100 employees (17). In most periodic testing programmes illegal drugs have been looked for.

An important aspect of these testing programmes is their connection to medical examinations. When applying for a license or renewal of a license to the U.S. Coast Guard, the applicant is required to provide the results of a chemical test as part of a physical examination (18). Transport Canada (29) states that periodic testing will be added to the medical examinations required for many employees in safety-sensitive positions with physicians designated to perform the exams making use of the employer's testing procedure and facilities. In this way, usage which might not be discovered in routine examination procedures would be identified. This is in sharp contrast to statements by one of the larger oil companies which is of the opinion that periodic testing has been shown to be of little value in detecting alcohol or drug abuse as it both enables abusers to beat the system and also has other negative consequences. If associated with periodic medical examinations it may compromise the role of the company's medical adviser, jeopardize the value of the medical examination and lead to less effective medical service.
The latter, ethical aspect, is debatable depending on the consequences of a positive test result. If these consequences are mostly of the counseling, treatment and rehabilitation type, it appears appropriate to link such testing programmes to the physical examination. How effective such screening is, however, is another question, to which there does not appear to be clear answers in the literature.

3.5 Random testing

Random testing involves testing employees without cause and notice. The employees are unaware of when testing will take place until the day of the test. Random testing includes either all or a certain number of employees. It has been emphasized that the randomization process should be real, so all persons included in the test programme should have an equal chance of being tested. It is also important that all persons within a programme are tested within a certain period of time (18). Computer programmes or other objective techniques have been recommended for the randomization process. The means of selection should remain confidential (23). Among the various types of testing programmes, random testing has generated the most resistance and controversy (26,30). Negative factors mentioned are infringing upon privacy (22), discrimination, humiliation and promotion of insecurity, oppression and anxiety in employees, which in turn could reduce productivity. Random screening programmes have also been criticised for being inefficient and costly (3). To identify most of the drug users in a population using random testing, urine specimens must be collected relatively frequently compared with the period of time that drugs may be present in the urine (3). A positive factor which has been mentioned is the reduced possibility of an employee cheating the system compared to other programmes. The strong deterrent effect of random testing is often discussed (29). Also from the point of view of the employer random screening can be defended as not singling out individuals for suspicious behavior or sub-standard performance in the workplace, as does the probable cause approach (28). Since each employee has an equal chance of being tested, individuals who are selected for a drug test are not at risk for being labelled by supervisors or fellow employees as being possible drug users (22). The Comprehensive Procedures for drug testing by NIDA (23) therefore state that the supervisor shall explain to the employee that she or he is under no particular suspicion and that her/his name was selected randomly. This notification of selected individuals should be given with minimal advance notice (two hours are recommended). Random testing is recommended by the U.S. Coast Guard (18), is used in the international maritime industry, is recommended by Transport Canada, and is used by a small percentage of Canadian federal transport companies (17).

The percentage of samples with positive test results in random testing programmes will vary depending on the type of workplace, and drugs looked for. It is generally considered to be low, probably less than 1 per cent, depending on the group examined.

Usually illegal drugs have been the main focus of random testing programmes. In some cases alcohol as well as other drugs have been included. U.S. Coast Guard regulations (18) state that only those crew members who are in safety-sensitive positions shall be subject to random testing. This is also mentioned in guidelines for programmes conducted in other workplaces. One oil company mentions that random testing can only be justified in the case of safety- and environmentally-sensitive positions, and for designated management
positions. Thus the group of people is somewhat expanded in this case compared to those in strict safety-sensitive positions. It is important that persons in positions designated for testing receive ample notice of being subject to random selection (23).

Random testing should be based on a clear drug policy in the company. It contains many aspects of fairness which should be reinforced by not exempting management from testing. It is somewhat difficult to see how this type of program could be more offending than other testing programs - rather the contrary. Obviously the way the underlying drug and alcohol policy is defined, as well as the way the program is explained to employees is critical for the acceptance of the program. Programmes should have guidelines for consequences of refusing testing by those who have previously given their informed consent.

The consequences of a positive test result in a random test program should also be given by the document underlying the informed consent. The range of consequences are similar to those discussed under 3.2 - probable cause testing.

Random testing is not recommended in combination with medical examinations as this might confuse and jeopardize the integrity of the medical health related service in the workplace.

The effect of random testing alone does not appear to have been tested to any extent in a controlled study.

3.6 On return from treatment testing

Testing after treatment and rehabilitation is discussed in the program described by NIDA (23). The goal of such testing programs is to ensure that relapse has not occurred by employees either during or after treatment. These guidelines recommend that the conditions of such programs should include unannounced testing for a period of one year following the completion of a counseling, treatment or rehabilitation program. Testing approximately once a month is suggested as a suitable frequency. The high relapse frequency among drug and alcohol dependent people appears to constitute the rationale behind these type of programs.

Such testing programs are reported to be used rather seldom by Canadian federal transport companies (17).

Usually the emphasis is on the detection of illegal drugs in such programs, but in principle other drugs and alcohol as well could be included.

The point in this type of program appears to be that the persons involved are selected because of information about their past. Therefore, this background has to be known for those operating the program.

The information available about such programs is limited, and there appear to be uncertainties with regard to several points. Information should be given to employees that they will be subject to unannounced testing (23), but what will happen if they refuse to take part in such testing? Is informed consent a prerequisite to get a job (back)? What will the consequences of a positive test result be in such programs? In principle, both medical and/or
disciplinary action might be taken, and the reactions should be stated in guidelines backed by the drug and alcohol policy of the workplace. In many respects this type of programme can be considered to represent a category of random testing programmes which is conducted among a group of people with a special past, considered to represent a risk factor.

3.7 Testing related to transfer/promotion

This type of programme may be considered similar to pre-employment testing. The basis for such testing should be included in the company's drug and alcohol policy. The reason could be the transfer of an employee to a safety- or environmentally-sensitive position. Otherwise considerations and discussions concerning this type of programme are similar to those for 3.1 - pre-employment testing.

The only difference appears to be the fact that under 3.7 the person is already an employee. What are the consequences for failing the test? Is the new position lost for ever? What are the consequences with regard to the present position?

According to a Canadian survey (17), only a few companies practice such testing.

3.8 Voluntary testing

Voluntary testing is when an employee submits to testing although it is not a requirement of work. This testing should provide employees with an opportunity to demonstrate their commitment to the goal of a drug-free workplace in their work setting and to set an example for other employees (23). This can be arranged in such a way that an employee, not in a position designed for random testing, may volunteer to be included in the random testing component. Otherwise voluntary testing can help to eliminate suspicion of drug or alcohol abuse in certain situations (22).

Voluntary testing could include any drug or alcohol, depending on the circumstances underlying this testing. The medium (urine, blood, breath) used would also depend on the conditions surrounding the voluntary testing programme. It should be possible to withdraw from a random testing pool at any time, except when an immediate test has been announced. The consequences of a positive test should be the same as if this test had been positive in that type of programme for which the person volunteered.

The circumstances under which the biological sample is given is critical in voluntary testing. If the negative test result is to remain valid, it must be a consequence of a sampling situation and a chain of custody procedure which can not be criticized.
4. IMPLICATIONS AND CONSEQUENCES OF TESTING PROGRAMMES

Consequences for employees who test positive are varied and are summarized below.

The employee can be offered counseling, treatment and rehabilitation. This can be organized inside the workplace or outside. The activities might be organized in Employee Assistance Programmes (EAPs). Disciplinary action might also follow a positive test. These include: change of position within the company, a leave of absence, close surveillance in the present position, resignation and termination. How these various measures are used, alone or in combination might vary considerably between workplaces.

More long-term consequences for the employee will be dependent on the drug and alcohol policy of the company and how drug testing is incorporated into other broad programmes. This will be dealt with in more detail in the next section.

In this chapter we will discuss how drug testing programmes have contributed to goals for the employee, the employer as well as the government and society at large.

Five different types of goals are often discussed. These are: (1) employees' health; (2) employees' safety at work; (3) job quality; (4) productivity; and (5) reduction of drug and alcohol use/misuse in society.

All these are of importance to the society at large, with the first four goals being the main interest of the employer and the last two goals being most central to the employee and the unions.

The extent to which a testing programme can contribute to the achievement of these goals will depend on a series of different factors. The consequences of positive test results for the employee, how well and how often drug testing is performed, which drugs (and alcohol) are included in the programme, the drug and alcohol policy and the general climate in the workplace are among these factors. It might appear quite reasonable that any drug testing programme could contribute to the achievement of the goals.

Employee health might be influenced by the use of drugs and alcohol. It has been claimed that testing programmes might act to prevent this. For those already using drugs and alcohol in a way which threatens their health, testing programmes can be used to identify drug using employees in order to facilitate their recovery.

Safety may be jeopardized on many different levels. The environment might be endangered as a result of accidents in the workplace. For example, the safety of the public is related to the safety by which the transportation companies execute their tasks. The safety of other employees as well as that of the employer causing the accident is at stake when industrial accidents happen. Some empirical studies have concluded that drug users are at an elevated risk of causing industrial accidents. A study by Crouch et al (37) using self-reported data on drug use, indicated that those who reported drug use 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
Results from another study of employed adults indicated that drug users were nearly twice as likely to be involved in accidents on the job (38). Similar results have also been reported elsewhere (39,40). Other evidence may suggest that problem drinkers are approximately 2 to 3 times more likely to be involved in industrial accidents than non-problem drinkers (36,38,41). The claim is that drug and alcohol testing programmes will reduce or eliminate the chance that employers will appear influenced by substances in the workplace. Thus the effects of these drugs on employees' motor coordination, perceptual abilities, cognition and risk-taking behaviour will be absent in the work setting, and subsequently the incidence of accidents will be reduced.

In competing industries and services the integrity of the products may be of great importance to all depending on that workplace. The quality of the work performed would in many cases depend on the same factors that were related to job safety. The quality of the product in the broad sense could depend critically on the employer's motor coordination, perceptual activities, cognition and responsibility. All these factors could be affected by the influence of drugs and alcohol. Testing programmes that reduced the incidence of such influences could therefore enhance the quality of the products.

Low productivity caused by absenteeism, tardiness and high turnover rates is a major problem in several workplaces. Some research has shown that the use of alcohol, cannabis, barbiturates and cocaine is related to indices of poor performance in the workplace (21). A 15 fold increase in sick leave by drug users has been reported (42). A study by Pell and D’Alonzo (36) showed that problem drinkers were found to have approximately twice the rate of sickness absences compared to controls. Again the implementation of testing programmes in the workplace could be considered to reduce the use of drugs and alcohol, thereby increasing productivity.

Most countries have expressed a clear policy on the elimination or reduction of illegal drug use, as well as on the reduction of alcohol consumption. Studies have shown that 70 per cent of all drug users are employed (22). An even larger percentage of people who are problem drinkers or heavy consumers are probably working. It is argued that workplace testing programmes provide a means to reduce drug use in society through both specific and general deterrence. Specific deterrence would in this case refer to identification of the individual user, followed by some type of interception leading to a situation where the apprehended user would be less likely to continue using drugs. General deterrence refers in this respect to the process where users who have not been identified are deterred by the threat of being so.

Few studies have actually evaluated the consequences with regard to these goals of the various testing programmes and very few, if any, have looked for various types separately. The latter task is difficult since many programmes have often been operating more or less simultaneously within a workplace or a community. Some studies have therefore described the effects of drug testing more generally. It should be emphasized that most experience has been gained in the U.S. with screening programmes focusing on five illegal drugs. This, together with the prevalence of drug use in the U.S. should be borne in mind, when considering the results of other populations.

Some companies have noted reductions in the percentages of employees or job applicants who test positive over subsequent years of screening (43,44). It is not known whether this reduction is directly linked to a decline in drug use. This outcome could also be interpreted to mean that employees had found ways of beating the test, or that drug users seeking employment are less likely to apply to employers who have a screening programme (22).
A reduction in the prevalence of drug-positive urine tests among U.S. Navy sailors from 47 per cent in 1981 to 3 per cent in 1989 might indicate, although not prove, a reduction of drug abuse in this population as a consequence of drug testing programmes (3).

In one company, the Southern Pacific Railway, personal injuries declined after a drug screening programme was introduced (45). These reductions were likely due to improvements in the travel system and other safety measures (27).

Although results from several studies provide tentative support to the fact that drug users are at high risk for performance problems, these conclusions have been challenged due to flaws in the design and interpretation of the studies (46).

A recent working paper by the ILO (22) states that there might appear to be several reasons or objectives for employers to establish testing programmes, but that empirical evidence from scientific studies is largely inconclusive as to whether these objectives are likely to be achieved.

Another recent paper by the ILO (5) concludes that the same uncertainties are also present when the effect of assistance and prevention programmes including testing programmes are evaluated: "Unfortunately, much of the evaluation that has been completed of workplace programming has been anecdotal and non-experimental, allowing for little confidence in the results".

Thus the present state appears to be that valid scientific documentation of the beneficial effects of any testing programme with regard to the goals for such programmes is generally lacking. There are, however, some indications that such programmes might be useful with respect to the employees, the employer and the society at large. The need for controlled studies is obvious, since the present situation is open to loosely-founded speculation and guessing.

5. WAYS TESTING CAN BE INTEGRATED INTO BROAD PROGRAMMES

As already briefly discussed in this paper, testing programmes and broader programmes might be integrated.

It is generally agreed that testing should constitute only a part of an integrated and comprehensive programme. It is accordingly not surprising to notice that within the maritime industry both the workers' organisation and the employers' organisation stress that programmes shall contain assistance programmes for individuals (22). Positive reporting of results of drug or alcohol testing that are followed by disciplinary measures only, should therefore not constitute the rule. The essential main components of any comprehensive workplace alcohol and drug prevention and assistance programme seem to be: 1) a written, well communicated formal policy on drugs and alcohol, 2) training of supervisors, 3) employee education, 4) employee assistance programmes and 5) drug and alcohol testing. Results from strict evaluations demonstrating the beneficial effects of such integrated, broad programmes, are generally lacking. The process evaluation of the implementation of integrated programmes is often reported as positive.

The integration of testing programmes and individual assistance within a workplace occur along somewhat different lines. They can roughly be placed in two categories, referred to here as (a) medical testing ("health" testing) and (b) employer organized testing ("control" testing). In the following an extract of what appears to be the essential points of each are given:
(a) **Medical testing** ("health" testing) stresses the link between testing and the medical examination. The information from the testing goes to the physician who combines this information with other clinical and laboratory information to reach his conclusions with regard to the employee's suitability for a certain position. The doctor would also have the responsibility for referring the employee to treatment if needed.

The client's overall mental and physical health would be the focus of integrating testing and individual assistance. Of the testing programmes discussed earlier, periodic testing and on return from treatment testing, would often fall into this category. In some instances this would also be the case for pre-employment testing and reasonable suspicion testing as well.

(b) **Employer organized testing** ("control" testing). In this context the enterprise determines the type(s) of testing programmes as a part of its alcohol and drug prevention and assistance programme. In case of a positive finding after a test, this will be reported back to the company through the MRO. The consequence of this report will be primary administrative usually followed by counseling, treatment and rehabilitation. This mixture of medical and administrative action seems to be included in most EAPs. As a part of this strategy, intensified testing can be used. Deterrent factors of such programmes appear to be personal degradation, resignation or termination.

The employer's need to control the workplace would be the basis of this type of integrated testing. Most testing appears to be linked to this type of employer determined programme. This applies in particular to probable cause testing, reasonable suspicion testing, random testing, on transfer/promotion testing and voluntary testing.

6. **INFRASTRUCTURE REQUIRED FOR A TESTING PROGRAMME**

6.1 **Skill level and related matters**

The operation of a testing programme as described in the literature requires different skills at the different stages.

The necessary communication between employer and employees to discuss and explain why a drug and alcohol policy should be part of the company's policy requires many pedagogic skills. Effective communication of the rationale behind a testing programme can be quite difficult. The same applies to the establishment of the testing routines.

Skills of various types and levels are required to make up appropriate testing premises within a workplace. This is usually concerned with the collection of samples. It will require people with various medical skills depending on how the programme is carried out. If urine is the medium of choice, the test station personnel should be able to handle and secure samples in a proper way. They should perform simple on-the-spot tests, measuring temperature, PH, specific gravity etc. with correct instruments, in a correct way. They should provide precise information to the sample donors, and ask the right questions about the use of legal drugs. They should ensure that the employees sign the right documents, and agree that the urine samples have been handled and secured correctly. They should sign chain of custody documents and ship the samples to the laboratory in charge in a proper way.
The skills required can also be more demanding in case the test station personnel take blood samples. Additional skills will be required if they should also operate testing equipment like a breath alcohol apparatus.

The skill level demanded by the laboratory performing drug (and alcohol) analysis in the U.S. is specified by the Mandatory Guidelines for Federal Workplace Drug Testing Programmes (NIDA guidelines) (2). These guidelines comprise skill levels by laboratory management, laboratory supervisors and workers, and set standards for instrumentation, analytical work, reporting, quality assurance and quality control. Similar guidelines exist for other laboratories performing similar work in the U.S. and other countries. It should be noted that the skills required by the NIDA guidelines formally are linked to the analysis of five illegal drugs in urine, and that additional skills will be required when other drugs and other biological media are included.

The MRO-function demands certain skills. Besides being a physician with knowledge about drug and alcohol abuse, the MRO should be knowledgeable with regard to pharmacology, drug metabolism and pharmacokinetics. The MRO should have some experience in laboratory work in order to communicate well with the analysing laboratory. The MRO should also be able to communicate with the employer in a way that gives unequivocal reports with regard to the employee's test result.

In summary, the highest skill levels will be required among 1) the medical personnel collecting the information and the sample, 2) the analytical laboratory and 3) the medical review officer (MRO) interpreting the results for the employer. At these three stages; sample collection, sample analysis and interpretation of results, serious mistakes can be made if the personnel lack competence or lack access to the instrumentation needed. Such mistakes can easily lead to wrong results and punish an innocent employee.

It is, therefore, very difficult to accept standards that are not at the level set by the NIDA guidelines. The possible consequences of erroneous reports are too serious to allow deviations from the guidelines. This has implications for the costs, which are discussed in the next section. It might also have a bearing to the situation in developing and newly industrialized countries. If such countries decide to implement testing programmes, the skill levels at the three critical stages discussed above will be very important to the quality of the final programme. Obviously in most developing and newly industrialized countries the needed expertise will be present, but often not in the same abundance as in industrialized countries. Since it is difficult to accept lowering of the standards discussed above, this means that developing countries in some way have to concentrate the analytical and the MRO functions to one or a few units. This is possible if medical information on drug use is collected together with the sample and is shipped in confidentiality with the sample.

6.2 Costs

In general, the cost of running the testing component of a programme can be estimated quite accurately. The costs will, of course, differ from country to country depending on price level and salary levels.

The operation of a sample collection site will include costs of hiring the premises as well as investments in necessary equipment and instrumentation, containers, forms etc. The salary paid to the medical personnel operating the sample collection unit will depend on their qualifications, which again can
depend on which type of biological media they are to collect. The working hours lost by the employees delivering samples should also be taken into consideration. In one study the total costs of sample collection was estimated close to US$ 20 per sample (47).

The mailing costs, and more importantly the analytical costs, will usually be calculated as a certain sum per sample. This can differ very much from one country to another. In the U.S., analytical costs of US$ 20 to 30 per sample have been reported, covering screening for 5 illegal drugs as well as necessary confirmation analyses. If the screening programme is extended to include other drugs, the costs will increase, in particular if drugs are included that cannot be screened by immunological techniques.

The MRO is usually paid on an hourly basis and will depend on the amount of positive samples, the repertoire of drugs looked for as well as the qualifications of the MRO.

Most of the test results are negative. A U.S. congressional committee looking at screening in 38 Federal agencies estimated the costs associated with each positive test of existing employees to be approximately US$ 77,000, and an electronic manufacturer arrived at a cost of US$ 20,000 for each positive test. In countries or industries where drug use is lower than in the U.S., cost per positive drug test will be higher (22).

From the pharmacokinetics of most drugs of abuse and the sensitivities of most drug analyses, it can be calculated that every employee has to be tested at least twice a week and for ten or more drugs to ensure abstinence from the usual drugs of abuse. To ensure abstinence from alcohol abuse, daily testing might be necessary. A test programme of these latter types would cost probably at least 100 times as much as those running today where testing is often performed once a year. In the present programmes between 0.5 per cent and 1 per cent are reported to test positive (22). The costs per positive test in a more intensified programme are hard to foresee, but they will probably be higher.

It is important to ask what conclusion should be drawn from the high costs per positive test. Is it good, or is it bad? Does it show us that the drug testing programmes deter people from using drugs and therefore most of the samples are negative? Or does it tell us that despite high costs invested in testing, only 0.5 to 1 per cent of approximately 10 to 15 per cent of drug users are discovered? As long as the critical figures as well as critical knowledge are missing, the costs per positive sample do not tell us much.

The question of cost benefit has been addressed in one recent paper by Zwerling, Ryan and Orav (47). They based their calculations on applicants to the U.S. postal service, who were subject to pre-employment screening, but where the results of the screening were not used in making employment decisions. The costs of additional absenteeism, accidents, injuries and turnover in those who tested positive were calculated, and they also considered the benefits gained if these people had not been hired. The cost of the screening process plus the costs of recruiting and hiring an employee to replace one screened out, constituted the cost. The study showed that preemployment screening would have saved US$ 162 per applicant hired. The model contained, however, several assumptions. One was that the prevalence of drug use in the population screened was 12 per cent. Had it been one per cent, the programme would lose money. Another assumption was that the total costs for screening and recruitment of replacements was US$ 49 per applicant hired. Finally the average cost per accident was found to be rather low, US$ 169,
which of course could be much higher in many other industries. Thus the conclusions reached are, as also stated by the authors, difficult to extrapolate outside the U.S. Postal Service. The results indicate, however, that pre-employment screening in certain settings, in certain geographical regions, screening for a certain group of drugs, might give more benefits than costs.

7. CONCLUSIONS

There is general agreement to reduce drug abuse and the use of alcohol in society. It has been hoped that testing programmes in the workplace could contribute to the achievement of that goal. So far there are no scientific studies which have demonstrated that this is the case.

Some studies have addressed the important question of determining what levels and patterns of drug and alcohol use are threatening with regard to health, safety, job quality and productivity? Heavy use as well as use during working hours has been indicated as dangerous in this respect. The facts underlying this statement are however not overwhelming. No studies appear to have shown that the infrequent use of alcohol and drugs is risky with regard to workplace performance and productivity. Positive test results from most screening studies cannot distinguish between frequent and infrequent use.

What are the positive effects of testing programmes? The programmes are directed towards the workplace with the final goals of improving workers' health, increasing safety, improving job quality and increasing productivity. However, there are almost no scientific data demonstrating that testing programmes have actually documented any of these effects.

With this background there is an obvious demand for studies that can demonstrate or not demonstrate effects of separate or combined testing programmes. This appears to be one of the most urgent tasks in the near future, the results of which should have the largest impact on ongoing and planned testing programmes. Recent papers by the ILO have given advice on how this research can be designed (5,22). The results of such research will probably depend, among other factors, on which drugs (and alcohol) to look for, which testing intensity to use and what consequences should flow from positive results. When such studies are done, it should be remembered that it also might become difficult to generalize with other prevalences of alcohol and drug use in other countries.

Another important point to remember is that most experience with drug testing programmes has been gained in the U.S. In that country, there has been a broad national policy in support of testing. The implementation of programmes in other countries not having this policy might represent quite a different scene. In many European countries the national policy will be much more in support of other measures against alcohol use and abuse. This will inevitably influence the climate of drug testing in the workplace.

Taken together, this indicates that we know rather little with respect to the programmes described in this paper. It will take time before we acquire the knowledge and it might be hard to generalize it because of the diversity of workplaces.
This calls, nevertheless, for some immediate action. Three main directions can be chosen: 1) One could initiate action to suspend all testing until such time as firm evidence of its usefulness is available; (2) One could try to stop implementation of new programmes; (3) One could support some test programmes which are demonstrating positive results, and perhaps simultaneously introduce some modifications into these programmes.

The author of this chapter will not try to recommend which of these directions should be taken, but rather give some examples of the third alternative based on the preceding discussions in this paper.

A prerequisite for all future testing should first and foremost be a comprehensive drug and alcohol policy. It should make provisions for best procedures for sample collection, sample handling and shipping, chain of custody, drug and alcohol analysis, reporting, MRO functioning and the most careful consideration of the final result by the company. Much harm can be caused by wrong conclusions and lack of attention to these issues and steps.

Testing programmes could be divided into "health" and "control" testing as outlined in section 5.

In a "health" test programme, the physician should act as the company's, medical adviser, knowing the workplace and qualifications required for different jobs. In this context alcohol and drug testing would be a part of an almost ordinary patient/client - doctor relationship. This relationship should be built upon open-mindedness from both sides. The doctor would receive information, which may be checked by some kind of drug testing. The doctor would then inform the client about this and if agreed, could perform the testing. Drug and alcohol problems are often denied for a long period and a positive test result can be the first step for a client to admit the problem. Information about drug use which might be given to the doctor as part of this process, would be kept confidential. The report from the laboratory performing the analysis of a specimen would go to the doctor. In this way the employer would not be directly involved in the testing process. The responsibility for ensuring proper testing procedures would be left up to medical personnel. Together with information, interviewing of the client and physical examination, the physician should be able to obtain a general picture of the client's health and suitability for the job in question. The doctor's role in this connection would be that of helper and guide to the client based on knowledge about the client's physical and mental state. Such guidance could, in some instances, lead to temporary (or permanent) exclusion from certain positions in a company. The doctor's advice could, of course, change over time if the health of the client improves.

In this approach testing would only constitute a part of the total health status that would form the basis for the doctor's decision. The doctor should also try to initiate and survey improvement of the client's health by instituting an appropriate counseling and treatment programme followed by regular check-ups. Such initiatives could, if appropriate, include alcohol and drug testing.

"Health" test programmes would, according to this suggestion, include 1) pre-employment testing, 2) upon transfer/promotion, 3) reasonable suspicion, 4) periodic, and 5) upon return from treatment and rehabilitation.

In a "control" test programme the employer would initiate the testing and should obtain the interpreted test result. The employee would be confronted with this result. In many respects this situation will resemble an interview...
when an employee is observed impaired or intoxicated on duty. On this basis, a physician or another medical staff person might become involved to diagnose, classify and evaluate the employee's possible drug or alcohol problem. The role of the doctor in this case would be more concentrated on the alcohol or drug part of the problem. The doctor should be responsible for initiating appropriate counseling, treatment and rehabilitation. The company would be responsible for possible administrative action such as close surveillance in the present position, change of position within the company or a leave of absence. The consequences of this would be clearly visible to all other employees.

In the future, "control" test programmes would, according to this suggestion, only include 1) probable cause testing, which possibly could be renamed "safety testing". This type of testing could be performed after all accidents of a certain magnitude, when obvious behavioural symptoms were observed, but could also be extended to include other situations, e.g. in connection with certain safety-sensitive jobs. Such jobs should be determined beforehand and it should be discussed how such testing could be randomized. In this way, one would focus on safety risks due to impairment which are the most important issues. Until more is known about the effect of testing on other aspects, impairment during work could constitute a primary focus. By analogy, it is well known that impairment by drugs and alcohol is an important risk factor in road traffic.

The test medium used should preferentially be blood, (with breath testing as a screening test if alcohol only was in question). Results from this medium are of greater interest than urine data with regard to the evaluation of impairment and time point of drug and alcohol intake. The collection of the sample could be accompanied by the formulation of a written report on behavioural symptoms signed by the supervisor and a neutral medical officer (not the employee's physician nor the company doctor). If possible, a performance test should also be conducted by the neutral medical officer. The test results and laboratory results should go through a MRO experienced in handling such cases.

The final conclusion is therefore that we need more studies to determine the impact of ongoing programmes. In the meantime, discussion could focus on the introduction of modifications into existing programmes.
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