



UNIVERSITY  
OF WOLLONGONG  
AUSTRALIA

University of Wollongong  
Research Online

---

Faculty of Social Sciences - Papers

Faculty of Social Sciences

---

2003

# A literature review on the international state of knowledge of drug testing at work, with particular reference to the U.S

Peter Francis  
*Northumbria University*

Natalia K. Hanley  
*University of Wollongong, [nhanley@uow.edu.au](mailto:nhanley@uow.edu.au)*

David Wray  
*Northumbria University*

---

## Publication Details

Francis, P., Hanley, N. & Wray, D. (2003). A literature review on the international state of knowledge of drug testing at work, with particular reference to the U.S. University of Northumbria.

Research Online is the open access institutional repository for the University of Wollongong. For further information contact the UOW Library:  
[research-pubs@uow.edu.au](mailto:research-pubs@uow.edu.au)

---

# A literature review on the international state of knowledge of drug testing at work, with particular reference to the U.S

## **Abstract**

Over the last forty years there has been a substantial growth in workforce drug testing. Most notably, this proliferation has occurred across U.S. industry and federal organisations. Developments in the U.S. have become the catalyst for an international debate on the issue of substance use in the workplace and ways of responding to it.

## **Keywords**

testing, drug, knowledge, state, international, review, particular, reference, work, u, literature

## **Disciplines**

Education | Social and Behavioral Sciences

## **Publication Details**

Francis, P., Hanley, N. & Wray, D. (2003). A literature review on the international state of knowledge of drug testing at work, with particular reference to the U.S. University of Northumbria.

**A LITERATURE REVIEW ON THE INTERNATIONAL STATE  
OF KNOWLEDGE OF DRUG TESTING AT WORK, WITH  
PARTICULAR REFERENCE TO THE U.S.**

---

Commissioned for an  
**Independent Inquiry into Drug Testing at Work**

Funded by  
**Joseph Rowntree Foundation** and **NEF**  
and facilitated by **DrugScope**

**Peter Francis, Natalia Hanley, David Wray**  
Sociology and Criminology Subject Division, Northumbria University

## **CONTENTS**

---

<b>Executive Summary</b>	<b>3</b>
<b>1. Background</b>	<b>8</b>
<b>1.1 Introduction</b>	<b>8</b>
<b>1.2 Research approaches</b>	<b>10</b>
<b>1.3 The present study</b>	<b>11</b>
<b>1.4 Methodology</b>	<b>11</b>
<b>1.5 ‘Workforce’ drug ‘testing’ – a note on usage</b>	<b>13</b>
<b>2. The Extent and Development of Workforce Drug Testing</b>	<b>15</b>
<b>2.1 Overview</b>	<b>15</b>
<b>2.2 Findings</b>	<b>16</b>
<b>3. Rationale For and Methods of Workforce Drug Testing</b>	<b>31</b>
<b>3.1 Overview</b>	<b>31</b>
<b>3.2 Findings</b>	<b>31</b>
<b>4. Employee Alcohol and Illicit Drug Use and Workplace Occupational Accidents and Injury</b>	<b>37</b>
<b>4.1 Overview</b>	<b>37</b>
<b>4.2 Findings</b>	<b>37</b>
<b>5. Alcohol and Drug Use and Employee Productivity and Performance</b>	<b>44</b>
<b>5.1 Overview</b>	<b>44</b>
<b>5.2 Findings</b>	<b>46</b>
<b>6. The Effectiveness of Workforce Drug Testing</b>	<b>51</b>
<b>6.1 Overview</b>	<b>51</b>
<b>6.2 Findings</b>	<b>52</b>
<b>7. Employment Issues and Workforce Drug Testing</b>	<b>60</b>
<b>7.1 Overview</b>	<b>60</b>
<b>7.2 Findings</b>	<b>60</b>
<b>8. Workforce Drug Testing, Surveillance and Social Control</b>	<b>68</b>
<b>8.1 Overview</b>	<b>68</b>
<b>8.2 Findings</b>	<b>68</b>
<b>9. The Extent and Nature of Societal Alcohol and Illicit Drug Use and Workforce Alcohol and Illicit Drug Use</b>	<b>73</b>
<b>9.1 Overview</b>	<b>73</b>
<b>9.2 Findings</b>	<b>74</b>
<b>References</b>	<b>81</b>

## **EXECUTIVE SUMMARY**

---

Over the last forty years there has been a substantial growth in workforce drug testing. Most notably, this proliferation has occurred across U.S. industry and federal organisations. Developments in the U.S. have become the catalyst for an international debate on the issue of substance use in the workplace and ways of responding to it.

Beyond the U.S., much less is known about workforce drug testing (Verstraete and Pierce 2001). Little research has been conducted on the nature, size and role of the drug testing industry, on the numbers of employees who are exposed to it, and on the number of companies who test employees. What is known is that workforce drug testing is delivered usually, but not exclusively, in many 'safety and security critical' industries and professions, including transportation and the armed forces.

Recently, there has been a movement towards aligning workforce drug testing with more rehabilitative and educational responses to workplace substance use. Nevertheless, punitive measures in response to those identified as alcohol and drug users in the workplace continue to be proposed by many as useful in reducing both workplace use and wider societal drug use.

Research carried out on alcohol, drugs, the workplace and drug testing programmes can be divided between laboratory based studies and empirical studies carried out in the workplace. Across laboratory and empirical field studies, there are a variety of specific ways in which research into workforce drug testing has been carried out. While each research approach offers benefits in terms of outcome, they also suffer various methodological and conceptual limitations. In addition, researchers have carried out secondary documentary analysis and literature searches and reviews on workplace drug testing. Most of the literature is North American based, and focuses upon the U.S.

### **The Extent and Development of Workforce Drug Testing**

- There is little reliable data on the numbers of U.S. companies that test, and on the nature and size of the drug testing industry. At best, the extent of workforce testing, and the numbers of employees tested, can only be guesstimated.
- In 1995, 95% of Fortune 500 companies tested employees for alcohol and / or drug use. For all U.S. companies, it is estimated that in 1996 81% of companies tested for drugs, a figure that fell to 70% in 1999. The number of employees tested for alcohol and drug use annually across the U.S. has been estimated to be between four and thirty million.
- Workforce drug testing is a multi-billion \$U.S. industry, involving a workforce delivering drug testing and a service and consultancy sector that supports and promotes it. Research indicates that workforce drug testing in the U.S. differs across industry type and characteristic, employee group and size, and is informed by Federal and State laws. Larger employee organisations are more likely to test.

- A proportion of smaller organisations in the U.S. have abandoned workforce drug testing due to the financial cost involved and the limited extent of substance misuse among particular employee groups.
- A high prevalence of drug misuse amongst U.S. soldiers returning from the Vietnam conflict and substance use amongst middle class college students attending high school and university in the U.S. during the 1960s and 1970s provided the impetus for the emergence of workforce drug testing policies.
- The first mass drug testing programme was introduced by the U.S. Department of Defense during the late 1970s / early 1980s. At the same time several U.S. law enforcement agencies introduced drug testing as a method of identifying and controlling substance misuse and criminal activity.
- Perceived widespread drug misuse during the 1980s and early 1990s in the U.S. and the resultant Republican governments 'war on drugs', led to the implementation of workforce drug testing across many organisations and industries facilitated by Executive Order 12564 (1986), The Drug Free Workplace Act (1988) and the Omnibus Transportation Employee Testing Act (1991). These have been revised during the last twelve years.
- As a consequence of a number of safety critical accidents during the 1980s and 1990s, the justification for workforce drug testing in the U.S. expanded beyond increased employee performance and productivity to include workplace health and safety issues.
- Employee Assistance Programmes (EAPs) have developed, especially in the U.S. and Canada. EAPs offer remedial and supportive, rather than punitive, responses to employee welfare issues, including drug and alcohol use.
- There is little research evidence on the nature, extent and size of workforce drug testing beyond the U.S.. In Canada, UK and European countries, workforce drug testing policies have been targeted towards security and safety sensitive industries and organisations rather than across all industrial groups, justified on performance related grounds.

### **Rationale For and Methods of Workforce Drug Testing**

- Employer justifications for workforce drug testing centre upon the potential for increased risks in the workplace environment resultant from employee alcohol and drug misuse. These 'increased risks' can be identified as:
  - employee risk - relating to workforce occupational injury (fatal and non fatal).
  - employer risk - relating to costs of workforce drug use, usually in terms of decreased productivity and performance.
  - customer risk - referring to the impact workforce alcohol and drug use may have on the delivery of a service or product to the general population.
- Workforce alcohol and drug testing is seen as an effective tool to reduce such risks. An associated justification for workforce drug testing is that it will help reduce workforce substance misuse and therefore societal use more generally.
- Across U.S., Canada and western European countries there is legislation specifying the remit of workforce alcohol and drug testing policies.
- There are many and varied ways in which alcohol and drug use can be identified. These include hair, blood, breath and urine. Additionally psychometric tests can be used.

- There are several different ways of delivering workforce drug testing. Workforce drug testing varies as to the stage of employment at which it is implemented, and the ways in which employees are selected for testing.
- There are a number of possible outcomes of workforce drug testing. Usually applicants will not be offered employment following a positive pre-employment drug test. Consequences of other workforce drug testing mechanisms include dismissal, welfare, support and treatment. In some cases no further action will be taken against the employee concerned.

### **Employee Alcohol and Illicit Drug Use and Workplace Occupational Accidents and Injury**

- There is a relatively large body of research that seeks to demonstrate the association between employee substance misuse patterns and the frequency of fatal and non-fatal occupational injury.
- Research evidence suggests that there is insufficient evidence to conclude that illicit drugs play any substantial causal role in fatal and non-fatal occupational injury. A number of studies do provide evidence of a link between illicit drug use and occupational accident and injury. Others, however, do not make the link.
- There is some research evidence in relation to the causal role played by employee alcohol use in occupational accident and injury.
- A number of research studies identify the causal role of non-substance misuse factors in explaining workplace fatal and non-fatal occupational injury. Non-substance misuse factors include dangerous working conditions; noise and dirt; conflict among the workforce and employee fatigue exacerbated by sleeping problems and shift work.

### **Alcohol and Drug Use and Employee Productivity and Performance**

- There is a large body of research that seeks to demonstrate the association between employee substance misuse patterns and a reduction in employee productivity.
- A number of research studies indicate evidence that alcohol use, and particularly alcohol abuse, is associated with high employee absenteeism rates. Some studies identify an association between illicit drug use and absenteeism.
- There is conflicting evidence as to the relationship between, and the effects of, alcohol and drug taking and job performance.
- As in the case of job performance, evidence of a relationship between alcohol and drug use and turnover is unclear.
- Overall, there is evidence that alcohol use, and particularly alcohol abuse, is associated with decreased productivity. With regard to illicit drugs, research evidence appears to be inconclusive, although a small number of studies do provide cursory evidence of an association between illicit drug misuse and lowered employee productivity and performance.
- Studies have also indicated other negative outcomes of employee alcohol and drug use including tardiness and aggression.

### **The Effectiveness of Workforce Drug Testing**

- Particular research studies have indicated that the frequency of occupational injury has reduced, and employee performance and productivity has increased following the implementation of workforce alcohol and drug testing. Other research studies have indicated that workforce drug testing has reduced workforce alcohol and drug use.
- However, too few empirical studies on the effectiveness of workforce alcohol and drug testing exist to conclude that it reduces employee health and safety problems and increases employee productivity and performance.
- The majority of research studies fail to take account of the possible and actual effect of non-drug testing factors (such as increased employee training, superior capital equipment and better management and supervisory arrangements) in reducing employee and employer risk.

### **Employment Issues and Workforce Drug Testing**

- While there is a growing trend among employers to introduce workforce drug testing, especially in the U.S., some employers are choosing not to test.
- The reactions of employees to testing are mitigated by perceptions of fairness. These perceptions of fairness are formed by the type of testing programme they are exposed to, their individual drug taking histories, and more general social values and norms
- Pre-employment testing in particular, may be deterring some quality candidates from applying for jobs. As a response, some employers in times of low unemployment, are foregoing this type of testing.
- Drug and alcohol use and abuse can significantly impact on employment status, occupational attainment and wage levels.

### **Workforce Drug Testing, Surveillance and Social Control**

- For a number of researchers, the emergence and development of workforce drug testing has led to a blurring of boundaries between the personal and professional lives of employees
- Workforce drug testing may discriminate against certain groups of employees, and the testing process is not immune to error
- Workforce drug testing does not establish impairment and may cause tension in employee and employer relations
- Information produced as a result of workforce drug testing may be used inappropriately, or not in accordance with stated aims and objectives

### **The Extent and Nature of Societal Alcohol and Illicit Drug Use and Workforce Alcohol and Illicit Drug Use**

- In the U.S. and UK alcohol, rather than illicit drug use, is reported to be the most used substance amongst the population. Reported alcohol use does not appear to decrease with age. Individuals aged 18-21 years old consume the highest levels of alcohol.

- In the U.S. and UK illicit drug use is generally thought to be increasing, although rates vary across drug type, country, race, gender and age. Marijuana is the most commonly reported illicit drug used. Individuals aged 18-25 years old, particularly men, are reported as the most prolific illicit drug users.
- Estimates on workplace alcohol and drug use vary across type of employees, research study, country and substance reported. Alcohol is reported as being the most used substance within the workplace while marijuana is reported as being the most commonly used illicit drug within the workplace.
- It is broadly accepted that unemployed individuals are more likely to use alcohol and illicit drugs than those in employment.

## **1. BACKGROUND**

---

### **1.1 Introduction**

Over the last forty years there has been an almost exponential growth in workforce drug testing. This proliferation has occurred most notably across U.S. industry. Accurate information on the number of workers tested for alcohol and illicit drugs is limited (Martin et al 1994). The research literature also indicates that there is little reliable data on the numbers of U.S. companies that test, and on the nature and size of the drug testing industry. At best, the extent of workforce testing, and the numbers of employees tested, can only be guesstimated.

Ambrose (2000) reports that drug testing in U.S. organisations increased 277% between 1982 and 1995. She suggests that in 1982 less than 5% of Fortune 500 companies conducted drug tests, while for 1995 she reports the number had increased to 95%. Beck (2001) reports evidence from the American Management Association (AMA) for 1996 indicating that 81% of all U.S. companies tested for drugs, a figure that fell to 70% for 1999. According to Lloyd (1998) 44% of all U.S. workers were subject to drug testing in 1998, with various estimates indicating that the number of employees tested for alcohol and drug use annually across the U.S. is between four and thirty million (Martin et al 1994; Smith 1996; Williams 1998). Research indicates that workforce drug testing in the U.S. differs across industry type and characteristic, employee group and size, and is informed by Federal and State laws. What is not disputed within the literature is that in the U.S. today, drug testing has become a multi-billion \$U.S. a year industry. Ozminkowski et al (2001) estimate that the volume of current workplace drug testing in the U.S. is nearly 40 million tests annually, with approximately 95% yielding negative results.

The research literature indicates that it was escalating societal use of illicit drugs, especially amongst U.S. university and college students, together with the discovery of widespread drug use in the U.S. military during the 1960s and 1970s that provided the impetus for the introduction of workforce drug testing (Konovsky and Cropanzano 1993). Drug testing across the U.S. military commenced in the early 1980s. The growth in drug testing across U.S. industry was driven during this time by employers concerned about the impact of employee alcohol and drug use. Their concerns centred upon lowered employee productivity and performance (Macdonald and Wells 1994). Such concerns were intensified by heightened publicity surrounding the use of alcohol and drugs by certain groups of workers, especially those involved in 'safety and security critical' industries. Several major accidents, including the grounding of Exxon Valdez in 1989, highlighted the health and safety implications of employee alcohol and drug use to the Federal government (Zwerling 1993). The emergence and development of drug testing in the U.S. was further driven, during the 1980s and onwards, by the Federal governments 'war on drugs' campaign aimed at eliminating the illicit drugs market, and by legislative enactment. The research literature has also indicated the role of the media in the construction of a moral panic over societal and workforce illicit drug use which has intensified calls for increased workplace regulation, promulgated by a drug testing industry actively seeking diversification and expansion across industry and commerce.

Such developments have become the catalyst for an international debate on the issue of alcohol and illicit drug use in the workplace and of ways of controlling it. Yet outside the U.S., much less is known about workforce drug testing (Verstraete and Pierce 2001). Little research has been conducted on the nature, size and role of the drug testing industry, on the numbers of employees who are exposed to it, and on the number of companies who test employees. What is known is that workforce drug testing is delivered in a number of Western European countries and further afield, usually but not exclusively in many 'safety and security critical' industries and professions, including transportation and the armed forces. It is also known that there are various developments taking place seeking to further expand drug testing across industry and commerce outside of the U.S. (Verstraete and Pierce 2001). For example, in the UK the Forensic Science Service (FSS), an executive 'trading' arm of the Home Office has expanded its role to one of delivering drug testing services to assist employers in identifying job applicants and employees who may have used alcohol and illicit drugs. Beyond the U.S., the official justification for drug testing is to reduce the likelihood of occupational injury rather than the more generic one of reducing productivity and performance problems.

Researchers and social commentators often propose or oppose workforce drug testing based upon their own political viewpoints and the research evidence they wish to call upon to substantiate their claims. A number are engaged in the industry itself, others as consultants to it. Many again are employed within academic and research institutions and organisations. The majority of them are North American. To its proponents, the aims of workforce drug testing are three fold. First, to reduce safety concerns across industry and commerce. Second, to address issues of cost resultant from lowered employee productivity and performance. Third to reduce general workforce drug and alcohol use, and potentially, wider societal use. Loup (1994: 19), writing in *Employee Counselling Today* states, 'Having drug and alcohol abusers on the payroll is expensive and dangerous. The exact toll is difficult to calculate because so many factors are involved. Diminished productivity, increased accidents, management difficulties, and security problems all contribute to the costs. One estimate puts the costs to industry of drug and alcohol misuse at a billion pounds a year; another puts the social costs of alcohol misuse at two billion'.

To its detractors, workforce drug testing is one aspect of a wider movement to surveil and regulate employees, and their activities both in the workplace and beyond. As Heckler and Kaplan (1989: 701) have argued, 'One's own bodily fluids can tell tales, not about one's being impaired on the job, but about one's activities last Saturday night, or perhaps a week ago, or about other personal characteristics or medical conditions unrelated to work or to illegal drug use'. Moreover, detractors of workforce drug testing argue that its justification is based on misinformation rather than robust research evidence. For Jardine-Tweedie and Wright (1998: 538), 'Few scientific studies have been conducted to determine whether or not testing programmes reduce possible work difficulties resulting from alcohol and drug use. Furthermore, the available data do not produce sufficient evidence to show that alcohol and drug testing programmes improve productivity and safety in the workplace'.

## **1.2 Research approaches**

Most research has been conducted in North America and most studies are U.S. based, although there are a number of Canadian focused research studies. Very little academic and scholarly empirical research has been carried out in the UK and Western European Countries and beyond. Research carried out into the relationship between alcohol and illicit drug use and the workplace can be divided between empirical studies carried out within the workplace, and laboratory based studies (see Macdonald 1997; Coombs and McAndrews 1994). In addition, there are numerous reviews of the research based primarily or solely on secondary documentary analysis.

There are numerous ways in which empirical research - field studies - have been conducted. Research indicates that approaches vary greatly across employee, employer, industry and country. The means of measuring workplace alcohol and drug use, and its impact, include specific alcohol and illicit drug surveys conducted on the general population, surveys conducted on particular employee groups, extrapolations from other surveys (for example driving and drugs or crime surveys), the collation and analysis of particular company surveys of staff drug misuse; perceptions of supervisors or employers, studies of employer and trade union perceptions of alcohol and illicit drug use amongst employee populations, results from specific employee testing programmes and pre-employment screening programmes; post accident investigations (for example autopsies), evidence taken from drug screening studies which compare drug positive and drug negative employees, records of notifiable addicts receiving treatment at clinics who report their employment status; research literature and documentary collection and analysis, as well as information detailed in the media and anecdotal evidence based upon hearsay or observation (Newcomb 1994; Beswick 2002). Field based studies, are open to numerous criticisms (Macdonald and Wells 1994: 129). One point worth noting is that it is important to consider the local context of the research, given the cultural differences in what is acceptable and unacceptable regarding drug and alcohol use.

Laboratory based research frequently involves subjects performing psychomotor tasks under drug and non-drug conditions. These experimental studies usually identify that an individual's motor coordination and perceptual abilities decrease considerably with the ingestion of alcohol and some drugs. Workplace effects are then inferred from these findings (Coombs and McAndrews 1994). For example, high correlations have been reported for blood and breath tests for alcohol and impairment (with the potential to cause accidents and impact upon performance) (Jardine-Tweedie and Wright 1998: 537). For some, this provides evidential support for workplace alcohol testing. Regarding illicit drugs, experimental studies show that some drugs produce large performance deficits, while other drugs produce minor changes in performance (Jardine-Tweedie and Wright 1998). As Osterloh and Becker (1990: 507) detailed over a decade ago, experts continue to disagree on the consequences for the human function resultant from the use of drugs (Jardine-Tweedie and Wright 1998: 537). As Coombs and McAndrews (1994: 96), argue, there remains much still to know on laboratory testing and alcohol and drug use. 'The gaps that remain in our understanding of the effects of drugs ... need to be addressed. Without such knowledge, it is difficult or impossible to establish whether an employee is actually impaired by a particular drug' (1994: 96). A further criticism directed at laboratory studies (Macdonald and Wells 1994), is the extent to which performance deficits

observed in the laboratory are replicated in the workplace (Coombs and McAndrews 1994: 94). That is, to what extent can laboratory studies be generalized to the workplace environment?

### **1.3 The present study**

Workforce drug testing is both controversial and complex. Ethical, legal, social, political, economic and methodological issues arise in any discussion of it. The purpose of this review is to offer a sober yet critical assessment and review of the academic and scholarly research literature relating to drug testing in the workplace. The broad aim of this study, as commissioned by the Independent Inquiry into Drug Testing at Work, is to present ‘the international state of knowledge of drug testing at work, with particular reference to the United States of America’ (personal correspondence from Yolande Burgin, Director of the Inquiry 12/08/02). The study comprises an extensive review of the published English language academic and scholarly research literature. Mostly, the review draws upon research literature deriving from the U.S., given that it is the one country that has embraced the desire to test, and has a sizable research literature on various aspects of it. Beyond the U.S., the paucity of academic debate and discussion surrounding workplace drug testing programmes is noticeable (Francis and Wynarczyk 1998).

### **1.4 Methodology**

In commencing this review we drew upon the work of Hart (1998), Robinson et al (1998), Robinson and Keithley (2000) and Harris et al (1992). Hart (2002) offers excellent advice on conducting a literature search and review in the social sciences, while Robinson et al (1998) and Robinson and Keithley (2002) provide excellent illustration and exemplification of a literature review (especially in relation to structuring content, given its focus was into the impact of crime on health and health services). Harris and Heft (1992) provide an early, but interesting, literature review on the issues, controversies and directions for future research on alcohol and drug use in the workplace. These sources helped frame our own approach to carrying out the literature search, as well presenting the research evidence and in writing the review.

Various search services were consulted and utilised. The Internet provided access to recent and relevant online journal articles. It also proved invaluable in identifying and locating other recent and relevant articles, books and newspaper sources many of which could not be accessed electronically. The Internet also proved useful in exploring various aspects of the drug testing industry, as well as the ‘home testing’ phenomenon and the ‘beat the testing’ cottage industry. In addition we searched newspaper archives, mainly through LexisNexis and the BBC website. Government websites were consulted, primarily in the UK and the U.S., although Canada, Australia and a number in Western Europe were also searched. Websites and Directories of related organisations including the Trades Unions Congress, the Institute for Personnel Development, the European Monitoring Centre for Drugs and Drug Addiction, Income Data Services and the Drug and Alcohol Testing Industry Association amongst others provided information.

Keyword searches were carried out on relevant search engines, social sciences based search facilities and computerised databases including: Google, Ingenta, Elsevier,

Scirus, BIDS, Sociological Abstracts, ASSIANet, Sociological Research Online, Emerald, Science Direct, PsychINFO, INSPEC, ProQuest Nursing Journals, Social Sciences Citation Index, OPAC97, ESRC Data Archive and SOSIG. Specific Journals were searched where abstracts, full text or contents pages could be viewed electronically; the British Journal of Criminology and British Journal of Sociology are two examples. Databases at Northumbria, Newcastle, Durham, Teesside and Sunderland Universities were all searched in addition to COPAC and the British Library, both at London and the Document Supply Centre, at Wetherby. Keyword searches, limited to English language, were performed. These involved combining 'drugs' and 'alcohol' with a variety of related keywords and phrases to produce 'history of drug and alcohol use', 'alcohol use', 'drug use', 'societal alcohol use', 'societal drug use', 'workforce alcohol use', 'workforce drug use', 'prevalence of alcohol and drug use', 'drug testing' 'workplace drug testing' 'war on drugs', 'Employee Assistance Programmes', 'drug treatment', 'harm reduction', 'surveillance' 'employment testing' 'drug testing industry', 'drugs and occupational injury', 'drugs and productivity and performance', 'drug testing techniques', 'surveillance technology' 'labour force participation', 'employment' and 'social control'.

The British Library was visited on several occasions (London: 28/08/02 and Document Supply Centre, Wetherby: 05/09/01-06/09/02; 23/12/02). These visits allowed for various sources of information to be obtained and for further searches to be conducted as some facilities allowed onsite access only, with only limited time in which to obtain resources via the traditional method of inter library loan. DrugScope library was also visited on several occasions during the course of the study (27/08/02; 29/08/02; 09/09/02-11/09/02; 24/09/02-26/09/02; 14/10/02). The DrugScope library contains one of the largest single collections of information on drug use and related themes in the UK and as such it proved invaluable through the course of the review, although it must be noted that there was limited access to a number of more recent sources of information.

The literature review generated a substantial number of references to journal articles, periodicals, monographs, edited collections, newspaper articles and stories, and practitioner and industry reports and magazines, and in addition we have consulted various abstracts and official publications. In order to handle this material, and in order to ensure that the review corresponded with the original request from DrugScope for an international review of the literature with particular reference to the United States of America, the review was undertaken using the following main categories:

- Extent and nature of societal drug use and employee drug use
- Extent and development of workforce drug testing
- Rationale for and methods of workforce drug testing
- Alcohol and illicit drug use and occupational injury
- Alcohol and illicit drug use and productivity and performance
- Effectiveness of workforce drug testing
- Employment issues and workforce drug testing
- Debates on justice, surveillance and social control

These categories proved useful in mapping out the field and providing some structure to the search and review. In a number of instances there is some overlap between them. Four key points must be noted in relation to the literature review and the use of these categories. First, there is a relatively large body of academic and scholarly research literature on workforce drug testing available on North America, notably the U.S. but also Canada, yet there is much less English language research literature that addresses these themes and categories with regards to the countries of Western Europe and beyond. We have utilised that which is available to present a picture of what is known about workforce drug testing in North America and beyond. As a result, there are several gaps in the research literature, particularly with reference to the UK and the countries of Western Europe. Second, during the course of the review, we found an abundance of information on the technical ‘components’ associated with workforce drug testing, such as testing types, methods and techniques. Given our need to maintain the focus of the review in line with the Inquiry’s written request, it was decided that all but the seminal research literature in relation to these categories was beyond the scope of this review. This was also the case with regards the use of drug testing in the criminal justice system, and to a lesser extent the emergence of the ‘home testing’ phenomenon and the growth of the ‘beat the testers’ counter-enterprises. Third, workforce drug testing and the associated research literature in North America have gathered apace over the last four decades. Given the need for clarity and conciseness, this review does not list, either in the text nor in the bibliography, every reference uncovered and identified by the literature search. Often, older, and therefore more outdated literature was eliminated from the review, with the exception of what appeared to be seminal research studies. The review notes, discusses and presents key references that appear to offer important, relevant, recent, innovative and interesting research evidence and information on workforce drug testing. The aim is to provide an overview of the research literature, highlighting the key themes and issues relating to the international state of knowledge of drug testing at work. Finally, there are a number of academic and scholarly reviews examining various aspects of the research on workplace drug testing. We acknowledge and draw upon a number of these reviews, as well as their reportage and commentary. In doing so, we combine discussion of these reviews with discussion and comment arising from our own reading and examination of original research papers and scholarly monographs.

This review is an ongoing project. As and when new books and articles are published, and when other relevant sources of information are made available to the research team, the review will be amended, added to, updated and refined over the course of the Inquiry. We would hope to present a further version of this report to the Inquiry during the course of the next six months. We would encourage comments on this version.

### **1.5 ‘Workforce’ drug ‘testing’ – a note on usage**

Throughout this review we refer to ‘workforce’ drug testing. This is because the focus of testing is the workforce rather than the workplace. Second, by ‘testing’ we include both screening and testing. Screening sometimes refers to the process of drug testing individuals pre-employment, whereas testing is usually taken to refer to the process of delivering drug testing during employment. For the purposes of this review, both are

subsumed under the one word of testing, although as and when appropriate we do differentiate in the text.

## **2. THE EXTENT AND DEVELOPMENT OF WORKFORCE DRUG TESTING**

---

### **2.1 Overview**

The research literature provides detail of, and explanation for, the emergence, development and prevalence of workforce drug testing over the last four decades (see for example Gilliom 1994; Husbands 1993). Most of this research literature is North American (for example Macdonald and Roman 1994; Butler 1993), reflecting the enormous growth in workplace drug testing across the U.S. and Canada.

Since the 1960s there has been an almost exponential growth in drug testing across industry and commerce in the U.S.. From the mid to late 1980s onwards the number of organisations drug testing employees intensified. Workforce drug testing in the U.S. has become a multi-billion dollar industry (Zwerling 1993), with a reported 95% of Fortune 500 companies carrying out some form of drug testing in 1995, and a reported 30 million employees tested annually for drug use (Smith 1996). Testing is more likely to focus upon employee illicit drug use rather than alcohol use. There is limited research indicating that in recent years there has been some decline in the number of companies drug testing employees, particularly smaller sized companies.

Reasons cited for the emergence and expansion of workforce drug testing in the U.S. include concern, especially during the 1960s, regarding the extent and nature of drug use amongst students and military personnel, and more recently amongst the general population. For some researchers, a moral panic has emerged over the nature and extent of societal drug use, the consequence being that workplace drug testing developed as one aspect of the Federal governments 'war on drugs response'. Research indicates that workforce drug testing in the U.S. was driven primarily by the Federal government's concern about the relationship between drugs and organised crime, and the perceived association between drug use and performance and productivity problems. It was only towards the mid to late 1980s that the potential health and safety implications of alcohol and illicit drug use amongst employees were acknowledged, highlighted by a number of critical accidents. Finally, it has been suggested that U.S. workforce drug testing has proliferated as a result of the development of an industry capable of delivering testing and eager to promote its services across business and commerce.

Beyond the U.S., there is limited research literature examining the nature of, and explanations for, the emergence, development and prevalence of workforce drug testing (Husbands 1993). This is partly a consequence of the limited nature of workforce drug testing in Canada and Western European countries, and partly a failure of the research community to engage with the topic area. What is known about workforce drug testing beyond the U.S., for example in Canada, and Western European countries, is that it has been promoted on the grounds of health and safety, and is delivered in mostly safety and security critical industries and businesses. More generally, it can be suggested that there has been a greater welfare and education orientated approach to alcohol and illicit drug use in the workplace setting. Canada, in particular, is an example of a country that has embraced the welfare approach.

The remainder of this section provides a review and summary of the research literature examining: (a) the emergence and development of workforce drug testing in the U.S.; (b) the extent and prevalence of workforce drug testing in the U.S.; (c) explanations and reasons forwarded to understand this growth in workforce drug testing; and (d) workforce drug testing developments in Canada and parts of Western Europe and beyond.

## **2.2 Findings**

Most of the research literature explores the emergence and development of workforce drug testing. Often there is similarity and consistency in narrative, content and explanation within the literature. Konovsky and Cropanzano (1993: 171-4) detail that U.S. workforce drug testing first emerged in the changing social, political and economic climate of the mid to late 1960s, and in particular as a consequence of a perceived increase in drugs consumption amongst upper middle class university and college students and reportedly high levels of drug use amongst U.S. military service personnel returning from the Vietnam war (see also Husbands 1993, Macdonald and Wells 1994; Macdonald 1995; Ackerman in Coombs and West 1991; Willette and Radehjian in Autry and Friedman 1992; Jacobs and Zimmer 1991). The reported prevalence of drug use amongst students and military personnel led, Konovsky and Cropanzano (1993) go on to report, to a heightened concern over the effect of drug use on both academic and military performance, resulting in a move – especially within the U.S. military – towards drug testing to correct ‘behavioural problems of its personnel’ (Macdonald and Wells 1994: 122). Macdonald and Wells (1994) identify that the first use of drug testing was by the U.S. Department of Defense, which implemented a testing policy for heroin use among its service personnel. This programme was extended during the late 1970s, according to Husbands (1993), to include testing soldiers reporting for active duty. By the late 1970s, Gilliom (1994) acknowledges the expansion of drug testing across a number of security industries, detailing that many law enforcement agencies in the U.S. began to employ drug testing measures, particularly in prisons, as a method of identifying and controlling substance abuse and criminal activity (Ackerman in Coombs and West 1991). According to Burt (1981), in 1980 the U.S. Department of Defense published a report indicating that 26% of military personnel used drugs. More damaging, Husbands (1993) reports, was evidence that the figure was 47% among young enlisted men aged 18-25 years old in the Navy and Marine Corps (see also Willette and Radehjian in Autry and Friedman 1992). As a consequence, the first large scale-testing programme was implemented by the U.S. military in the early 1980s (Burt 1981).

Much of the research literature links the subsequent development and growth of workforce drug testing during the 1980s to the U.S. Federal government. Macdonald and Wells (1994) detail that the early to mid 1980s heralded anti-drug campaigns in the U.S., and Gilliom (1994) suggests that it was at this time that the Federal government began to advocate urine testing in the workplace. Gilliom (1994) reports, for example, that the President’s Commission on Organised Crime identified a link between organised crime and drug use and called on the Federal Government to, ‘Provide an example of the unacceptability of drug use’. It went on to suggest that ‘The President should direct heads of all Federal agencies to formulate immediately clear policy statements with implementing guidelines, including suitable drug testing, expressing the utter unacceptability of drug use by Federal employees’ (President’s

Commission on Organised Crime 1986 cited in Gilliom 1994; see also Autry and Friedeman 1992: 2; Husbands 1993: 12). Executive Order 12564 (1986) was passed on September 15<sup>th</sup> 1986 in response to President Reagan's call for a 'drug-free workplace'. Autry and Friedeman (1992: 2) detail that Executive Order 12564 (1986) states that, 'The Federal Government, as the largest employer in the nation, can and should show the way towards achieving drug-free workplaces through a program designed to offer drug users a helping hand' (Executive Order 12564 1986 cited in Autry and Friedeman 1992: 2).

A number of articles indicate that Executive Order 12564 (1986) directed each federal agency to construct a comprehensive drug and alcohol policy and also recommended similar action for private employers, although the latter was not enforceable in law. The review by Husbands (1993) notes that drug testing was encouraged across the private sector, 'Drug testing of employees by private companies who wanted to contract with the Department of Defense became a condition of doing business through the adoption of an interim contractor regulation in 1988, which was made final in 1991' (Husbands 1993: 12). Husbands (1993: 12), details how Executive Order 12564 (1986) required the head of each federal agency to establish a programme to test employees in sensitive positions for illicit drug use, 'sensitive' being defined as including those serving as presidential appointees; as law enforcement officers; in positions of national security; in positions responsible for the protection of life and property; in jobs of public health and safety; and in jobs requiring a high degree of trust and confidence. In establishing Executive Order 12564 (1986), President Reagan also asserted that 'the profits from illegal drugs provide the single greatest source of income for organised crime, fuel for violent street crime and otherwise contributes to the breakdown of our society' (Reagan cited in Husbands: 1993:12). Reagan stated 'that federal employees who used illegal drugs were less productive, less reliable and more likely to be absent from work, thus causing the federal government billions of dollars in lost productivity on an annual basis' (Reagan cited in Zwerling 1993: 3). Gilliom (1994: 35) reports that Reagan's attorney Edwin Meese further stated that 'Since most American's work, the workforce can be the chokepoint for halting drug abuse'.

Macdonald and Wells (1994) and Schwenk and Rhodes (1999) detail that in 1988 the Drug Free Workplace Act required public and private companies that held Federal contracts worth U.S.\$25,000 or more to have a comprehensive drug policy in accordance with Executive Order 12564 (1986). Federal regulations for workforce drug testing were revised in the mid 1990s (Ozminkowski et al 2001: 59) and again in 2001. According to Ozminkowski et al (2001), these regulations require a two-step laboratory process involving immunoassay screening and confirmatory testing by gas chromatography/mass spectrometry. All testing results must be channelled through a medical review process before being reported to the employer. 'The regulations require that federally mandated tests (i.e. for federal agency workers such as those regulated by the Department of Transportation and the Nuclear Regulatory Commission) must be conducted in laboratories certified by the U.S. Department of Health and Human Services (DHHS)' (Ozminkowski et al 2001: 59). These authors go on to state that whilst most private sector drug tests are not subject to federal regulations, the majority of workplace testing in the U.S. is conducted in laboratories following the federal guidelines (Ozminkowski et al 2001: 59). New Health and Human Services Mandatory Guidelines, as reported by Hitchens (2001), which will

apply to the 20% of workplaces that mandate regulatory testing, such as the Department of Transportation, civilians in the Nuclear regulatory area, will change the types of specimens used, the types of laboratories that can process them and the type of information that can be determined. Following the implementation of the Drug Free Workplace Act 1988, Fine and Reeves (1996) detail that Federal agencies issued a variety of policies mandating the random testing of contract workers in positions related to public safety or national security. Fine and Reeves (1996) also acknowledge that state and local governments, although not required by the Drug Free Workplace Act 1988, also promulgated regulations and policies establishing not only drug awareness programmes but also substance abuse testing of employees, including random testing. The link between drug testing and treatment was established in the 1960s when testing was given a key role in treatment programmes (Jacobs and Zimmer 1991). The eventual combination of treatment and testing helped to silence those critical of testing programmes.

During this period of legislative development and enactment, the literature acknowledges the limited emphasis placed upon safety concerns. Indeed, the underpinning justification of workforce drug testing from the outset was to combat organised crime and to promote a drug free workplace and society (Husbands 1993). It was only from the late 1980s onwards that the justification for workplace drug testing expanded somewhat from an aspect of the Federal government's 'war on drugs', motivated by a concern for lost productivity and performance, towards a more health and safety orientated strategy and programme. Safety concerns, according to Macdonald (1995) only received legislative support, with the passing of the Omnibus Transportation Employee Testing Act of 1991 which legislated existing U.S. Department of Transport guidelines requiring drug testing of transport workers in safety critical roles (Husbands 1993: 13). During this period, Zwerling (1993) suggests that employee organisations and Trade Unions were concerned about the potential impact and effect of workforce drug testing, with many arguing that employers should only be concerned with the employee's ability to perform their job, rather than concerning themselves with off duty activities. Indeed, the research literature highlights that during this relatively short period, there were a number of judicial challenges to drug testing in the workplace. Zwerling (1993), for example, acknowledges that between 1987 and 1991, the U.S. Department of Justice spent approximately U.S.\$725,000 defending drug testing legislation, with two cases reaching the Supreme Court (National Treasurers Employee Union challenged U.S. Customs Service, and railway organisations sued to enjoin regulations promulgated by the Federal Railroad Administration). In both cases the Supreme Court upheld the legality of the Federal government's drug screening programme. Willette and Radehjian (cited in Autry and Friedman 1992) report that the courts have ruled that employees accept some loss of privacy when they enter the workplace. There continues to be resistance to workplace drug testing, promoted principally by some civil liberties groups and worker organisations and trade unions.

Research has indicated that workforce drug testing has expanded considerably across U.S. industry and commerce since the 1990s. This has been established through examination of worker experiences and attitudes, by analysis of the prevalence of testing across U.S. industry and by exploration of the costs of the drug testing industry. There is little research on the size of the testing industry.

With regard to the prevalence of drug testing, the research literature indicates that up until fairly recently the U.S. has experienced an exponential growth in the implementation of workforce drug testing (Brunet 2002). Testing for substance abuse in the workplace is becoming increasingly popular with employers, with estimates of 88% of U.S. employers either testing now, or with plans to test in the near future (Business Wire 2001). Konovsky and Cropanzano (1993) report that in 1986 approximately 25% of all Fortune 500 companies had some drug screening programme in operation, with Sujak et al (1995) indicating the figure rose to 50% in 1988. Kaestner and Grossman (1995: 55) cite evidence that in 1990, 46% of all firms with 250 or more employees had some form of drug testing programme, while Axel (1991) sites evidence for 1990 that approximately half of all U.S. companies with over 1000 employees tested applicants and / or current employees. In a review by Konovsky and Cropanzano (1993) it is indicated that the average number of *all* companies undertaking some form of drug testing was around 40% in the early 1990s. Macdonald (1995: 703) reports evidence for 1993 that approximately 85% of major firms had some form of drug testing programme in place. Ambrose (2000) reports that drug testing in U.S. organisations has increased 277% between 1982 and 1995. She reports that in 1982 less than 5% of the Fortune 500 companies conducted drug tests. In 1995 the figure was 95%.

Some of the research literature indicates that the direction of change has not been solely one way, since, as Macdonald and Wells (1994: 123) report, 'a proportion of companies in the United States have abandoned their programs'. This reduction is usually, but not always, a result of the discontinuation of testing amongst smaller size companies, combined with a questioning of the size of use amongst particular employee groups (Macdonald and Wells 1994). Similarly, Beck (2001), suggests that the rapid growth in drug testing in the U.S. may be slowly reversing. Citing evidence from the American Management Association (AMA), she suggests that after reaching a high of 81% in 1996, the percentage of U.S. companies utilising drug testing fell to 70% in 1999. Brunet (2002) reports that the 1996 figure reflected a threefold increase in the number of companies testing employees from 1987.

With regard to employees reportage of their attitudes towards and experiences of being tested, Fendrich and Sookim (2002), in analysis of 102 questions drawn from 20 different surveys administered between the mid 1980s and the late 1990s report that 'these data suggest that workplace drug testing programs have been on the rise in the 1990s' (2002: 85), from approximately 44% in 1994 to 49% in 1997. This growth, they argue, corresponds with increasing rates of support for workforce drug testing across the general population. While they acknowledge that the data presented does not necessarily equate directly with the number of employers operating drug testing programmes, they argue that their findings are in accordance with an employer based survey carried out by Hartwell et al (1996, cited in Fendrich and Sookim 2002: 92), which estimated that approximately 40% of all U.S. businesses tested applicants and or current employees for drug use.

Research carried out in 1988 by the U.S. Bureau of Labour Statistics found that the most important determinant of the incidence of drug testing was the size of the organisation measured by the number of employees. The more employees employed by an organisation, the more likely it is to test. For example, in organisations with more than one thousand employees, 43% tested for drugs and alcohol. In

organisations of less than thirty employees, only 2% tested for drugs. The U.S. Bureau of Labour Statistics estimated that since smaller establishments made up most of the workforce, approximately 3% of all establishments had testing programmes at the end of the 1980s. A 1990 follow up study reported very little difference (Francis and Wyncarczyk 1998).

Research also identifies that rates of testing differ by industry. Bader and O'Hara (1991) provide evidence that drug testing is more common in manufacturing industries, and not very common in financial and service sector businesses. Zwerling (1993) suggests that high rates of drug testing can be found in mining, communication, public utilities and transportation industries, low rates are usually found in the retail and service sectors and in construction industries. Indeed, with regard to the construction industry, research carried out by Gerber and Yacoubian (2001) indicate that it ranks near the bottom of companies that test. In comparison to an average national estimate of 38.6% of all workers tested in the workplace in 1997, Gerber and Yacoubian (2001) indicate that the figure for the construction industry was 25.8%. Additionally, they note that only 55.6% of construction workers indicated that their workplace had a written alcohol and / or drug policy (the national average was 70.3%). With regards geographical variation, the research literature offers limited information; and little evidence is forthcoming about the extent and nature of testing across private industry, although Brunet (2002) suggests that during the period of the late 1980s and early 1990s, private sector employers rapidly implemented drug detection procedures and policies, including testing.

A number of researchers have acknowledged that in estimating the prevalence of workforce drug testing, account must also be taken of the fact that Federal and State law can differ, producing a situation where national companies will be required to test in one state, but not in another (Brunet 2002: 193). Moreover, following President Reagan's call for workforce drug testing in 1986 (Executive Order 12564 1986), 17% of the federal workforce had to submit to random drug testing. Brunet (2002: 193) reports that many state and local government agencies quickly followed suit, and by 1990 'More than half of all state police departments and one quarter of all sheriff and municipal police departments required job applicants to submit to mandatory drug tests' (Brunet 2002: 193). Mieczkowski and Lersch (2002) detail that out of 50 states in the U.S., law enforcement agencies in 42 states use drug screening for new applicants or new officer recruits. They go on to suggest that examination of local law enforcement agencies (cities, counties and townships) reveal that in excess of 80% of local law enforcement agencies also screen applicants.

Whilst it remains the case that drug testing varies between industry type and characteristic, as well as employee group (Macdonald and Wells, 1994: 122), Konovsky and Cropanzano maintain 'that a large proportion of the American workforce will be tested for drug use at least some time in their careers' (1993: 171). At the end of the 1980s, Murphy and Thornton (1990), estimated that the number of employees tested could be upwards of 4 million workers per annum, with this figure including only those 'organizations regulated by the federal government' (Konovsky and Cropanzano, 1993: 171). Smith (1996) has estimated that the number of employees tested for drugs amounted to approximately 30 Million U.S. workers in 1996. Williams (1998: 15) in a more recent, but speculative journalistic review suggests that the U.S. figure is 15 million people tested for illicit drug misuse. Similar

estimates can be found in the work of Macdonald and Wells (1994), Macdonald (1995), and DuPont et al (1995). Ozminkowski et al (2001: 60), estimate that the volume of current workplace drug testing in the U.S. is nearly 40 million tests annually, with approximately 95% yielding negative results.

Within the research literature, much less evidence is available with regards the size and cost of the drug testing industry. In terms of financial cost, Hoffman and Silvers (1987 cited in Beswick 2002) and Williams (1998) both suggest that drug testing has become a multi-billion dollar a year industry in North America today. In 1993 Zwerling (1993) estimated that the drug testing industry was worth U.S.\$300 million in terms of the manufacture of the equipment and chemicals. Such figures remain estimates, and vary. For example, Rockmore et al (1997) estimated the industry was worth U.S.\$230 million. With it has emerged a workforce involved in testing for alcohol and illicit employee drug use and a service sector that supports and promotes it; for example by providing training, verification, substance misuse clinics, the analysis of tests, the selling of testing products, Employee Assistance Programmes and 'beat the testing' services (see for example Moore and Haggerty 2001). The analysis of urine, blood, saliva, perspiration, eye or hair requires skill and expertise that are not available in the general workplace. It was therefore inevitable that laboratories possessing those skills would sell their services to industry. Additionally, a consultancy culture comprising of management 'experts' has emerged offering advice and support on what works in testing methods and practices (see for example Fay 2000; Frankenfield and Kleiner, 2000). Research indicates that there in operation various drug and alcohol testing associations and related organisations, including the European Workplace Drug Testing Society (EWDTTS) and the Drug and Alcohol Testing Industry Association (DATIA). Furthermore, the research literature has indicated that testing has become integrated into a welfare orientated approach (EAP) to substance abuse, especially given that employees have realised that it has also become necessary to implement some kind of post testing programme (Butler 1993).

The research literature indicates that the origins of EAPs can be traced to the late nineteenth century, a period when the first attempts to "...eliminate the long-accepted use of alcohol in the workplace" were made (Denenberg and Denenberg 1983: 35). EAPs were originally called Occupational Assistance Programmes (OAPs). The research literature suggests that the history of these welfare support programmes in the U.S. is complex. Spicer (1987) argues that the development of EAPs is similar to the growth of the public health sector generally. A review of the research indicates that the growth of EAPs can be linked to three factors that came to the fore in the 1930s. First, the rapid emergence of alcoholics anonymous. Second, a sudden and enlarged need for productive workers during the second world war. Third, as a result of a growing concern amongst industrial physicians. Additionally, U.S. society was emerging from a period of distrust of addiction treatment policies and of health care professionals. Consequently problems previously regarded as 'invisible' began to be seen as resolvable with measurable benefits to be gained by employers willing to tackle such problems. EAPs expanded in the 1940s and 1950s and by the 1960s, employers, trade unions, worker representatives, and other organisations became involved in them. This movement provided assistance for employees with problems (such as mental health, family and emotional issues). Support for these initiatives came from state and local government, as well as health care providers. Since the 1970's the number and scope of EAP programmes has increased dramatically. As

employers became more interested in EAPs, the emphasis of the programmes shifted away from emotional or psychological problems to concentrate on the deterioration of work performance and productivity. This development paralleled the emergence and development of workforce drug testing. As the use of workforce drug testing policies has expanded during the 1980s onwards, they have often been integrated into EAPs rather than regarded as an entirely separate entity. Consequently, an increasing number of organisations have introduced testing located within an EAP framework.

The 'employee welfare' industry is now extensive, particularly in the United States and Canada, as external contractors are involved in consultation, training and service delivery of EAPs. Local associations and national professional associations such as the Association of Labour Management Administrators and Consultants on Alcoholism (ALMACA) emerged as a response to the emerging body of EAP practitioners. Research indicates that two types of EAP are in operation today - generally distinguished by use of the terms 'internal' \ 'external'. 'Internal' programmes are located within organisations with EAP professionals working for and with the organisations own employees. 'External' programmes are those in which organisations bring in external EAP professionals to set up and run their programmes.

Banta and Tennant (1989) identify several advantages of EAPs. From an employer's perspective, the EAP can potentially reduce healthcare costs, improve attendance, productivity and safety by identifying problem workers. From an employee's perspective, they can promote feelings of goodwill, appreciation and loyalty. They can also provide an employee with the opportunity to seek help for substance abuse problems. By identifying substance abusers the EAP will encourage employees to confront any personal problems in an open manner, thus improving the quality of their lives and, by association, the workplace. Reducing the negative effects of substance abuse on the reputation of the organisation can improve community relations, as can the negative consequences of dismissal. The provision of welfare in this way has the potential to improve relations between employers, unions and employees.

Banta and Tennant (1989) also identify a number of potential disadvantages of EAPs. The cost can be high, especially for smaller sized employer organisations, where savings are at best speculative; the number of employees successfully rehabilitated is often small, as a large percentage either drop out of rehabilitation or resume abuse at a later time. Banta and Tennant (1989) also acknowledge that it is difficult to measure the effectiveness of EAPs in terms of costs and welfare, as data is restricted for confidentiality reasons. Indeed, the value of rehabilitating an existing employee cannot easily be measured (in monetary terms alone) or compared against the cost of a replacement worker. A National Council of Alcoholism and Drug Dependence survey in the U.S. (cited in Campbell and Langford 1995) attempting to assess the effectiveness of EAPs, and suggested that for every dollar invested, employers generally save between \$5 and \$16. It is estimated that the average annual cost per employee for an EAP programme is between \$12 and \$20. Where research studies have attempted to estimate the cost effectiveness of EAPs the precise figures vary, but most companies report a saving. Additionally, employers may be vulnerable to legal claims if an employee is dissatisfied with the provision of treatment or counselling.

MacDonald and Dooley (1991) point to a degree of sectoral prevalence of EAPs, concluding that government health and education services are more likely to have

EAPs than construction and retail sectors (see also Gerber and Yacoubian 2001). It is difficult to assess the accuracy of information regarding the numbers of employees entering treatment programmes for drug or alcohol abuse. While MacDonald and Wells (1994) estimate that drug and alcohol abuse constitute around 10% of primary diagnoses in the workplace, a much larger proportion of employees are referred for other reasons including marital or financial problems which have had a causal effect on drug or alcohol abuse. Although this research is dated, MacDonald and Wells (1994) indicate that around 73% of employers permit family members to use the EAP programmes in their organisations.

By the end of the 1990s, research indicates that workplaces with drug testing programmes could be found in all employment sectors, with the transportation, communication and utilities sectors most likely to have testing programmes (Macdonald and Wells 1994). Of the employers operating testing policies in a Canadian study conducted by Macdonald and Wells (1994), two thirds indicated that they tested all employees, the remainder tested only those employees considered to be in safety critical roles. The most common drugs tested for were alcohol, cocaine/crack and marijuana, with few employers reporting tests for heroin, amphetamines and prescription drugs. The consequences of positive test results were dependent upon the nature of testing programmes, with over two thirds of those operating pre-employment screening indicating that they would not employ individuals testing positive for drugs. The most common responses to positive tests for other types of testing mechanisms were referral for either in-house or external treatment programmes, with individual cases dealt with according to individual circumstances. Health Promotion Programmes (HPP) were found to be increasing in the workplace, with a significant relationship between the size of the organisation and the existence of a HPP. The construction industry, the sector least likely to have an EAP, experienced the highest accident rate. This could indicate a relationship between the existence of an EAP and a reduction of accidents, though the authors admit that little evidence exists to support this supposition.

In addition to mapping out the emergence and development of workforce drug testing in the U.S., and the emergence and development of related EAPs, the research literature has also offered explanation for the growth in workforce testing. The first factor, according to Francis and Wynarczyk (1998: 173) relates to the perceived growing 'epidemic' of drug use and the associated high levels of violence and property crime across urban areas of the U.S. from the 1960s onwards, and particularly during the 1970s and 1980s. Arthur and Doverspike (2001: 77) suggest that 'in recent years, the pervasiveness of drug and alcohol abuse in the United States has become a growing concern'. Banta and Tennant (1989) identify that such perceptions have been compounded by; the extensive publicity given by the national media to drug abuse problems; the national crusade against illicit drug use initiated by the Reagan administration and continued by the Bush administration; and an increase in the amount of readily available and inexpensive illicit drugs. Indeed, research indicates that it was during the 1980s that drug use was increasing in the U.S. in terms of prevalence, and further; the age of individuals experiencing drugs for the first time was at an all time low. Given this, the research literature suggests that the workplace was seen as one site with the potential to deter and detect drug taking, both at work and in society more generally (Quale 1983 cited in Gilliom 1994).

A second factor identified within the research literature as responsible for the implementation and expansion of workforce drug testing is the U.S. Federal governments 'war on drugs' discourse and practice aimed at eliminating the drugs market. The perceived association between drugs and crime, especially organised crime, also increased society's general intolerance of illicit drug use and led government and the media to locate the drug user as the 'scourge of society'. For Gilliom (1994: 17), 'the controversy over employee drug testing is inseparable from the broader intensification of the society's focus on illegal drugs in the mid 1980s'. Potter and Orfali (1990) identify that the Reagan administration offered a five-pronged attack on the 'war on drugs'. This included law enforcement and education, and was heavily federally financed. As Potter and Orfali (1990) detail, spending increased dramatically during the mid 1980s, reaching U.S.\$1.2 billion in 1985. Moreover, 'Federal spending on radar, tracking aircraft and other measures to detect airborne smugglers increased dramatically, to nearly U.S.\$205 million in 1989 fiscal year from about U.S.\$18 million in 1982, the year Reagan declared 'war on drugs''. Blackwell (1994) has argued that the public perception of the 'drug problem' was constructed through such developments, allowing for increased public spending on police, customs, armaments, surveillance, technology and prison construction. As she argues, 'Drug war discourse has generated strong public support for a supply side 'tough guy' approach to drug policy'. As Gilliom (1994: 34) points out, the conservative law and order philosophy that prevailed in the 1980s eschewed strategies [those dealing with poverty and inequality] as ineffective and turned instead to heightened surveillance and tougher punishments. Testing was a central tool in the arsenal'.

A third factor identified by the research literature concerns the promotion of evidence that several critical accidents involved alcohol and drug use (Zwerling 1993; Husbands, 1993; Gilliam 1994; Macdonald and Roman 1994). The research literature certainly indicates that these have played a role in the development of testing in security and critical sensitive industries. Four critical accidents dominate in the literature. In May 1981 a Marine Corps aircraft crashed aboard the aircraft carrier Nimitz. Nine of the fourteen people who received fatal injuries showed evidence of cannabinoids in the autopsy test results. The pilot was also identified as having taken prescribed antihistamine, and the publicity surrounding this crash accelerated the Navy's decision to implement across the board drug testing (Zwerling 1993). By 1982, all branches of the U.S. military operated a drug-testing programme (MacDonald and Wells 1994). In January 1987 the Conrail rail crash in Maryland (Amtrak incident Gust and Walsh 1989 cited in Parrot Undated) killed 16 passengers and injured one hundred and seventy four people. The engineer and breakman tested positive for marijuana. As a consequence, on 21 January 1987, the U.S. Department of Transportation proposed rigorous drug testing programmes for railroad workers, airline pilots, air traffic controllers and others in safety related positions. A third accident involved the grounding of the Exxon Valdez oil tanker in 1989 causing billions of dollars of property damage. This incident was linked to alcohol abuse. The fourth major accident occurred in 1991, when a speeding subway train in New York City derailed, killing five people. Authorities indicated that the driver had been using alcohol. During this period, as detailed earlier, workforce drug testing was opposed by worker organisations and trade unions on the basis that it was unnecessary to invade the individual privacy of employees. These accidents significantly weakened trade union and other libertarian arguments forwarded by employee representatives and led

to a resurgence of public support for workplace drug and alcohol testing programmes as a means of promoting health and safety in the workplace (Jacobs and Zimmer 1991). Indeed a 1991 survey of 1493 human resource managers indicated that over two thirds of the sample agreed 'strongly' with the notion that employers have the right to drug test their employees. However, these findings should be seen in context; only 45% of those surveyed worked in an organisation that operated a drug testing policy (Zwerling 1993). In the same year, the Omnibus Transportation Employee Testing Act of 1991 was implemented and legislated existing U.S. Department of Transport guidelines requiring drug testing of transport workers in safety critical roles including, mass transit, aviation, commercial motor vehicle operation, railroads and the marine and pipeline industries. For the first time, intrastate truck drivers were included within the legislation and the Act authorised alcohol testing alongside illicit drug testing.

A fourth factor acknowledged within the research literature is the role of the media in the construction of a moral panic over illicit drug use (Kravitz and Brock 1997; Blackwell 1994). Research has highlighted how drug users have been charged with an increase in crime rates, the spread of disease and increasing levels of unemployment. The latter situation has been compounded by evidence that almost fifty percent of job applicants have abused drugs and have consequently been refused employment. For Kravitz and Brock (1997) 'concerns about employee drug use constitute a 'moral panic' that is fuelled by those who will profit from the panic (e.g. drug testing laboratories) and by politicians who use the drug 'problem' to avoid dealing with more important and controversial issues'. However, as Banta and Tennant (1989) also argue, the publicity and panic that surrounds drug taking is not limited to the media. They point out that the medical profession has demonstrated that drug use can lead to negative psychological and physiological after-effects. Educationalists have voiced concerns over the number of students taking illicit drugs and the impact of such use on their education and welfare. Truancy, high dropout rates and crime on, or against, school property have all allegedly been exacerbated by increased drug abuse among students. In the home, parents have begun to associate rebelliousness and poor grades with drug abuse and the industries involved in drug testing have used these fears to promote home testing kits (Moore and Haggerty 2001), selling the idea that children are at risk of death or addiction as a result of the drug 'epidemic' in society. Indeed, the publicity given to the problem of drugs has raised the consciousness of the American public. A national survey found that the percentage of people concerned with alcohol and drug misuse increased in the 1980s and is now listed as one of the biggest concerns of Americans today (Banta and Tennant: 1989).

A fifth factor detailed in the research literature for concretising workforce drug testing policies across U.S. industry and commerce, especially from the late 1980s onwards, is the development of a reliable technology for testing and the birth of an industry capable of delivering it (Zimmer and Jacobs 1990). Such developments have allowed for relatively quick and cheap programme delivery (Zwerling 1993). For Zwerling (1993) during the 1960s and 1970s thin layer chromatography (TLC) became the screening method of choice. It was easy to use; yet needed trained analysts but was inappropriate for mass screening. During the mid to late 1970s, radio-immunoassays (RIA) and enzyme-multiplied immunoassays (EMIT) began to appear. These allowed for a quicker testing process and in consequence more tests to be carried out. For

example, Zwerling (1993) suggests that by 1993 between 4000 and 7000 urine samples per hour could be delivered using this method.

Blackwell (1994) identifies three further factors as explanation for the growth of workforce drug testing. 'The convergence of supply and demand side interventions at a national level; development of citizen groups which redefined the drug problem to include all drug users, not simply those causing harm, thus making zero tolerance the norm; and the need to maintain labour discipline in the promotion of business interest' (Francis and Wynarczyk 1998: 173-174).

In comparison with the literature on drug testing programmes in the U.S., research examining the extent and development of drug testing programmes in Canada and Europe is sparse (Macdonald and Wells 1994; Butler 1993; Verstraete and Pierce 2001). Verstraete and Pierce (2001) suggest that 'In some parts of Europe, e.g. in the United Kingdom and some Scandinavian countries, WDT (workplace drug testing) is increasing in importance, but it is not as widespread as in USA'. This is partly a consequence of the limited nature of workforce drug testing in Canada (Butler 1993) and Western Europe (Verstraete and Pierce 2001), and in part a failure of the research community in Canada and Europe to engage with the topic area. Seijts (2002: 136) indicate, that in today's global economy, while many organisations manage workforces in more than one country, 'little research, however, has examined the relative perceived fairness and acceptance of drug and alcohol testing programs across borders'. Certainly, little comparative and international research into workforce drug testing more generally has been carried out. As Francis and Wynarczyk (1998) point out in relation to the UK research, '...we would argue, there has been a neglect, especially within the British social science literature of any exploration: of whether there is a growing problem surrounding illicit drug use and the workplace; of the consequences of such workplace use; of the effectiveness and efficacy of workplace drug testing programmes/mechanisms; of the consequences of such programmes and mechanisms for workers rights and employee/employer relations, as well as broader theoretical debates surrounding workplace testing, employment, discipline and the surveillance society'. Francis and Wynarczyk (1998) suggest a number of points can be made regarding developments in workforce drug testing beyond the U.S.. The first point is that what developments have taken place within these countries have followed those implemented within the U.S.; either because of the exchange of ideas and practices and or because of the global expansion of American owned companies across Canada and Europe.

Second, Francis and Wynarczyk (1998) note that in Canada and Europe workforce drug testing is a relatively recent phenomenon, much more so than in the U.S. (see also Verstraete and Pierce 2001: 5-7). Third, they suggest that this is in part a result of there being little in the way of legislation promoting drug testing programmes (Verstraete and Pierce 2001; Macdonald and Wells, 1994: 123), and that which has been enacted is fairly recent. Forth, knowledge of the extent of workforce drug testing is highly variable outside of the U.S.. What is known is that the extent and level of testing is much less than that detailed for North America (Macdonald and Wells 1994). The evidence that exists is usually speculative or localized. For Macdonald (1997: 252) those organisations operating within a safety critical sector are leading the way in terms of workforce drug testing across Canada and Western Europe, largely due to the legislative requirements imposed by governments. 'Although the United

States has embraced drug testing and has argued that it should be globally implemented, other industrialised countries around the world have been much more cautious. The U.S. goal to promote a drug free workplace does not appear to be reasonable to other countries given the invasiveness of the approach. Rather the only acceptable reason for drug testing in other countries is to reduce the likelihood of industrial accidents. Policy statements from various countries, such as Canada, Australia, France, Sweden and the Netherlands, reveal either implicitly or explicitly that safety is the only reasonable justification for workplace drug testing programs'. While the issue of drug and alcohol use in the workplace is unavoidable for these organisations, it is not uncommon for other larger organisations to have some form of policy on drug or alcohol use, although this may not be linked to a drug testing programme.

Husbands (1993), in a research review of developments beyond the U.S. suggests that it is difficult to explain the discrepancy between the way in which the U.S. has embraced testing in comparison to the rest of the world. Two potential reasons, he suggests, may be that drug and alcohol use is not as urgent a problem as in the U.S. and / or that there may be a reluctance to place additional strain on the traditionally difficult relationship between labour and management. Nevertheless, either as a consequence of legislation and / or individual employer practice, workforce drug testing has been implemented outside of the U.S.. Husbands (1993) provides a useful review of developments beyond the U.S.; particularly in France, Canada, Germany, Netherlands, Norway, Sweden and the UK. Verstraete and Pierce (2001) offer a review (in places brief) of workplace drug testing in Europe, Belgium, Netherlands, Spain and Portugal, France, Finland, Sweden, Luxembourg, Germany, Italy and Austria, Greece, Switzerland, Denmark, Ireland, United Kingdom, while Seijts et al (2002) offer some useful comparative analysis between Canada and U.S.. However, it is clear that there is a need for further comparative and international research into this area.

Within Canada, some research literature suggests that drug use is relatively small in comparison to the U.S. (Husbands 1993). However, Butler (1993) suggests that among employers, employees and other stakeholders a divergence of opinion exists over the nature and extent of substance misuse in Canada. Seijts et al (2002: 136) suggest that in comparison with the U.S., there is much less public awareness about the problems associated with drug use and fairness and acceptability of workforce drug testing, and, as a result, Canadians have yet to put drugs as high on the political agenda as have Americans. Nevertheless, Husbands (1993) suggests that while debates over mandatory testing programmes for the Canadian workforce remain unresolved, there is widespread support for preventative measures on substance use in society. This has developed in line with a stronger social democratic and trade union movement than exists in the U.S. (Seijts et al 2002). The Canadian model focuses upon the employers right to test only in very specific employment situations, with the employer having to demonstrate that sufficient grounds exist for suspicion of employee alcohol and illicit drug use. The Canadian Labour Congress (CLC) note that workers in safety sensitive positions such as transportation are subject to drug testing. Such tests are performed as part of medical examinations and following an accident. At both Federal and provincial levels, the emphasis is on EAPs, alongside education, early identification of problems and awareness campaigns (Butler 1993). Butler (1993) highlights the Canadian focus upon EAPs and strategies to avoid testing. For

example, in Canada, Employee and Family Assistance Programmes (EFAP) provide a service to all employees including those that are retired, disabled, in ill health, as well as their spouses and dependents. EFAP also aims to address a whole spectrum of personal problems (ILO 1991). Seijts et al (2002) report that approximately 15% of Canadian corporations are conducting some form of workforce drug and alcohol testing (see also Butler 1997), while, Macdonald and Wells (1994: 123) suggest that in 1990 just under 20% of companies employing more than one hundred employees had some form of drug screening programme (see also the discussion by Butler 1993); located within particular companies especially concerned with health and safety matters.

The general consensus within the CLC is that workforce drug testing is a 'labour-management issue largely imported from the U.S.' (Husbands 1993: 23). In 1988, drug-testing legislation in the U.S. encouraged American multi-national enterprises to impose mandatory drug testing on Canadian subsidiaries. The CLC has remained critical of proposals to introduce mandatory drug testing, even in safety critical industries, stating that 'the law would be aimed at use rather than abuse, and as such supposes the employer's (or government's) right to exercise control over an individual's lifestyle and to invade the most private areas of their life' (Husbands 1993: 23). The Public Service Alliance of Canada (PSAC) also opposes alcohol and drug testing in the workplace stating that 'The PSAC opposes all forms of workplace drug and alcohol testing for any reason whatsoever...there is no conclusive evidence of a link between drug and alcohol abuse and workplace safety...[T]esting is an invasion of privacy, and threat to worker's dignity... the solution to drug and alcohol use, abuse and misuse can be achieved through prevention, education, rehabilitation, union counselling and joint employee assistance programs'. (Husbands 1993: 23-24).

Moving on to the UK, the research by Verstraete and Pierce (2001) indicates that workforce drug testing appears to be more widespread than in other European countries. Within the UK, the Transport and Works Act 1992 provides for the mandatory testing of railway workers, tramway workers and other safety critical employees if there is reasonable cause to believe that they are unfit to carry out their job because of alcohol or drug impairment (Husbands 1993: 17). In addition, Husbands (1993) suggest that workforce drug testing is carried out in other critical and security sensitive industries including the energy sector such as oil companies, and the nuclear industry. Other industries involved in promoting pre-employment, post accident and or reasonable cause testing include some police forces and transport companies. Research evidence regarding the numbers of employers testing across the UK is unavailable or estimates only. Campbell (1997: 6) for example has suggested that the percentage number of UK firms who test employees for illicit drug misuse is at present approximately 10% but rising (see also Sullum 2000), while Williams (1998: 15) details that firms that tend to have health and safety concerns including London Underground and Virgin Atlantic Airways. Verstraete and Pierce (2001), estimate that between 220,000 and 330,000 tests are carried out each year, with 40% in the military, 35% in prisons and 25% in companies. They also indicate that there are two major laboratories and three smaller ones operating across the UK.

The focus of concern in France is very much alcohol orientated, as opposed to illicit drug use, which is considered a minor problem. Verstraete and Pierce (2001), indicate that twenty laboratories perform drug testing, clients are mainly from the automobile

industry and airlines. No evidence is provided as to the size of the industry, the numbers of companies testing or the number of employees tested. With regard to legislative measures, there are provisions in the Labour Code that prohibit employees entering, or remaining, in the workplace while intoxicated. Judicial decisions have placed restrictions upon testing policies for libertarian reasons, and while workplace drug testing is allowed, it is only in very specific employment sectors and roles, for example the transport sector. In France, trade unions have traditionally resisted the introduction of drug or alcohol testing, unless performed within a medical assessment by a physician; only those in safety critical positions should be targeted (Husbands 1993).

Research indicates that workforce testing for either drugs or alcohol is limited in Germany, although accident prevention legislation does allow drug testing in specific circumstances, such as in the chemical industry (Verstraete and Pierce 2001). There are no specific laws that tackle the issue of substance abuse and while there is provision for testing, this is only on the basis of reasonable suspicion, such as observation of slurred speech or aggressive behaviour. Verstraete and Pierce (2001) indicate that the Netherlands does have legislative guidelines for alcohol testing for those employed in transport and navigation, but all testing has to be performed by the police authorities. Verstraete and Pierce (2001) suggest that one laboratory carries out nearly all workforce drug testing in the Netherlands (approximately 20,000 tests per year). The consensus in the Netherlands appears to be that few organisations support workforce testing and few companies test for drugs and alcohol. The impact of alcohol on workplace performance has been acknowledged, however, resulting in a move to eliminate alcohol use from the workplace. In the Netherlands, testing is limited to those in safety critical positions although employer's organisations do not find that testing constitutes an invasion of privacy, nor do they consider the low prevalence rates of substance abuse a reason for not testing. Conversely, employees organisations view testing as undesirable, and do not accept that it has any bearing on impairment. Workers organisations suggest that testing within multi-national companies is linked to reducing insurance claims rather than health and safety. Verstraete and Pierce (2001) indicate that Norway does have legislation prohibiting certain categories of workers (military personnel; transport workers) from being under the influence of drugs or alcohol while at work. Workforce testing is relatively rare. Moves to introduce testing policies have been unpopular, but some sectors such as shipping, have found that testing policies must be in operation in order to compete for international business.

Similarly, in Sweden, there is existing legislation authorising drug and alcohol testing for those in the transport sector, and testing can be performed either on a routine basis or following reasonable suspicion. Brannstrom and Hopstadius (1994: 4) report that in Sweden 'approximately 40 companies are testing drugs. The use of tests occurs within shipping, transport services, engineering industry'. It has been estimated that between 10% and 20% of all private sector employees work in an organisation that has a testing policy; policies are usually framed within health and safety guidelines. According to Verstraete and Pierce (2001) in 1998, 24000 tests were performed. The emphasis is largely upon the eradication of illicit drugs rather than alcohol, and some of the testing guidelines have been written to comply with U.S. Federal guidelines. The Swedish Trade Union Confederation has developed guidelines stating that 'Tests may not be introduced without prior negotiations; the persons integrity and

information regarding him or her must be protected, even at the pre-employment stage; ...testing of staff may only take place in relation to work in which safety considerations are important; a totally reliable means of testing must be used...the employer must take responsibility for rehabilitation [and] negotiations on replacement should only take place after negotiations concerning rehabilitation have been completed; [and] voluntary testing is a way of working towards prevention' (Husbands 1993: 25).

Verstraete and Pierce (2001) also provide research evidence on Belgium, where workforce drug testing is well established in the automobile industry and by the state police. In Spain and Portugal workforce drug testing is performed in the military (for example the Portuguese Navy) as well as transport and communication industries. In Finland, drug testing is recommended for maintaining the employment relationship ('e.g. in order to protect the employer, the customers or the other workers' (Verstraete and Pierce 2001: 4); Luxembourg has no specific legislation, although some private companies perform on site testing; Italy, Denmark and Austria, Verstraete and Pierce (2001) report no data is available; in Greece, testing is performed in the security services and professional drivers when a licence is revoked for drug abuse. In Switzerland workforce drug testing is only performed in the area of public transportation, military, private schools and few private companies, including the automobile and pharmaceutical industries; Ireland they report carries out approximately 20,000 workplace drug tests annually, with testing mostly on white collar workers (information technology, pharmaceutical, call centres).

### **3. RATIONALE FOR AND METHODS OF WORKFORCE DRUG TESTING**

---

#### **3.1 Overview**

Much of the research on the appropriateness or otherwise of workforce drug testing has focused upon the rationale for testing which, from an organisational viewpoint, has mostly been packaged, in one of two key arguments. Like much of the literature on workforce drug testing, the majority of it is North America.

The first frequently cited rationale is that workforce drug testing promotes workplace safety by reducing the number of injuries and accidents resultant from employee illicit drug and alcohol use or inappropriate licit drug use whilst at work or impairment from recent use whilst away from work. The second reason commonly cited in the literature is that workforce drug testing is justified as illicit drug or alcohol use is detrimental to an employees' performance and productivity.

In addition to these key arguments, there are a number of further justifications including the notion that workforce drug testing will reduce general workforce use and wider societal drug use. It is also suggested that workforce drug testing may have a positive effect on an organisation's image and reputation. It is argued that employers have the right to discover which employees use substances, and remove them from the workplace, either through disciplinary action or treatment programmes and services.

Workforce drug testing techniques vary. Research identifies that most organisations utilise urine testing. Types of workplace drug testing programmes also vary. There are varying degrees of criticism levelled at the different types of testing programmes. Research indicates that pre-employment and post accident testing have enjoyed the most support and are particularly common across business and industry.

The remainder of this section provides a review and summary of the research literature examining: (a) arguments forwarded for workforce drug testing; (b) arguments forwarded against workforce drug testing; and (c) testing techniques; and (d) types of workforce drug testing programme.

#### **3.2 Findings**

*Arguments for Workforce drug testing* Francis and Wynarczyk (1998: 176-178) offer a useful overview of the arguments within the literature forwarded by supporters of workforce drug testing. First, drug taking is a major societal problem, and therefore it is a problem that has major consequences for the workplace environment. Second, that the use of alcohol and drugs poses major risks within the workplace environment, no matter what the work entails. Hecker and Kaplan (1989: 693) detail such consequences in terms of the possible risks drug use poses to an individuals 'own health and safety, risks to the safety of fellow employees and / or the public from drug induced impairment, and risks to the production process'. Third, drug testing is seen as effective in reducing employee and employer risks. Effectiveness is measured by the extent to which programme objectives are achieved. Usually these are in terms of reducing occupational injury, increasing employee productivity and performance and

reducing workforce alcohol and drug use. Francis and Wynarczyk (1998) also suggest a more general criterion is that testing may contribute to the reduction of societal levels of use. 'With the threat of being caught at work, so this deterrent argument goes, individuals usage of drugs outside work decreases. As a result, societal levels of drug misuse are supposed to decline also' (Francis and Wynarczyk 1998: 178).

In addition, researchers have identified a series of further arguments in favour of workforce drug testing (Macdonald and Wells 1994; Macdonald and Roman 1994; Banta and Tennant 1989). It has been argued, for example, that workforce drug testing promotes public confidence in an organisation and determines medical fitness for work in addition to reducing the cost of medical plans. Within the workplace context, drug testing has also been seen as a mechanism to reduce and / or prevent workplace theft (Lehrer 1987 in Parrot Undated). Research also suggests that it may promote enhanced employee morale, particularly in light of evidence that 69% of organisations surveyed by the Incomes Data Services (Income Data Services 1998 cited in Jackson 1999) identified that an employees alcohol use had resulted in deteriorating working relationships with co-workers (the corresponding number for drug use resulting in deteriorating relationships was 57%). An article in the Financial Times (02/03/98) cited the Institute of Management, and detailed that approximately 17% of employees are impaired at work as a result of drug use, and that the same number again are affected by other employees drug use. Furthermore, the research literature identifies that in order to provide rehabilitative, welfare and educational services it is first necessary to establish which individuals have substance abuse problems, and testing can, therefore be justified in terms of employee welfare. The research literature also identifies that an associated benefit of workforce drug and alcohol testing may be that illegal or socially unacceptable behaviour by employees is discouraged. Research has suggested that alongside the 'dark figure' surrounding the extent of illicit drug taking at work, it is even more difficult to establish the number of employees that supply other employees with illicit substances. Research carried out by May (1999) estimates that up to 44% of employees could be supplying co-workers with illicit substances.

Gerber and Yacoubian (2001) conducted research in the U.S. that focused upon the extent of drug testing in the construction industry. A survey circulated to company officials, which asked them to rank the reasons for the implementation of drug testing in order of importance indicated that the most important justification identified was to promote the safety of employees and those that use company products and services. The second most important reason was to promote the company's image in a positive manner and the third highest-ranking reason was that drug testing acted as an effective deterrent for employee drug use.

***Workforce drug testing – arguments against*** The research literature also identifies a number of arguments forwarded that reject workplace drug testing (Macdonald and Wells 1994; Macdonald and Roman 1994; Banta and Tennant 1989; Francis and Wynarczyk 1998). Drug testing, it is argued, may contravene employee rights to privacy and may, for some, constitute a humiliating and intrusive procedure, which also provides the possibility of legal action if testing is not carried out in adherence to strict guidelines and legislation. False positive results can lead to the further embarrassment and complication of incorrectly labelling an employee as a drug or alcohol user. These difficulties can cause tensions in labour/management relations. Additionally, the research literature has suggested that the effectiveness, efficacy and

cost effectiveness of such programmes have not been empirically supported to date. In the meantime, a number of researchers maintain that drug testing programmes remain an expensive way of responding to potential drug and alcohol misuse. Critics contend that a more appropriate method of controlling substance misuse in the workplace is to improve reference checking, the interview process, and the training of supervisors and to establish EAPs (Butler 1993; Campbell and Langford 1995; Banta and Tennant 1989).

***Workforce drug testing techniques*** The research literature identifies that there are many and varied drug testing techniques. These include breath/saliva, blood, urine, hair, perspiration and eye testing (Bean 2002). Research identifies that breath tests are one measure of alcohol intoxication<sup>1</sup>. Breath tests have been accepted in some courts, as evidence of workplace alcohol abuse (in the U.S. for example). While Cohen (1984) concedes that testing for alcohol can indicate a level of impairment it is still a complex issue as individuals have different tolerance levels. Moreover, some employment cultures require alcohol consumption as a social requirement of the job. Breath alcohol analysis is used to determine the levels of alcohol in the blood but cannot detect drug use, and is therefore, of limited use to an employer with a comprehensive drug and alcohol policy. It is usual that positive breath tests are followed by a confirmatory technique, usually a blood test. Blood tests are the most accurate measure of concentration of alcohol in the bloodstream but are the most invasive and require laboratory analysis.

Research identifies that the most commonly used testing technique is the urine test, although this test can take several forms. Urine tests are usually performed 'based on the principle that what is ingested, injected or inhaled into the body must eventually be excreted' (Husbands 1993: 18)<sup>2</sup>. Testing urine involves techniques based on biological (immunological) assays due to their suitability for mass screening. The most common of these is Thin-Layer Chromatography (TLC) (Schur and Broder 1990). It is one of the oldest forms of urinalysis, and is relatively inexpensive<sup>3</sup>. Radio-immunoassay (RIA) provides a different form of test, while extremely sensitive, RIA is expensive in terms of time and level of expertise necessary to interpret the results. The Enzyme Immunoassay (EIA) test has a long history of application in drug testing and the Enzyme-Multiplied Immunoassay Technique (EMIT) is one of the most commonly used techniques in drug testing laboratories. EMIT is considered a highly accurate test, (NYPD 1990; Ozminkowski et al 2001 ).

Gas Chromatography (GC), or Gas Liquid Chromatography (GLC) is often, but not exclusively, used as a confirmatory technique as it can detect up to three-dozen types

---

<sup>1</sup> This technique is based on the principle that after alcohol enters the blood stream; vapours diffuse from the blood to the lungs. As the amount of alcohol entering the lungs from the blood supply corresponds to the amount of alcohol the blood is delivering to the brain, expelled breath provides an accurate indicator of the extent to which an individual is currently impaired by alcohol.

<sup>2</sup> The original drug can be excreted unchanged, but usually drugs are broken down by the body's metabolism, and those parts or metabolites can be detected in urine. In some instances metabolites appear in urine for some time after either drug use or its mental and physical effects have taken place, although this is drug type specific.

<sup>3</sup> The technique itself involves the use of an absorbent material, usually silica, which is placed on glass. Drops of the sample are then placed on the silica, and it is possible to identify different components of the sample by the different absorption rates.

of drugs (Husbands 1993)<sup>4</sup>. Gas Chromatography with Mass Spectrometry (GC/MS) can be considered as the state of the art drug testing technique, as it is extremely sensitive and specific. Disadvantages of employing this method include the length of time required to provide a result and that it is also a relatively expensive technique. This test also has an increased potential for false positive results.

Hair testing cannot measure impairment or time of ingestion. Perhaps the key benefit of hair testing is that it is non-intrusive in comparison to other methods such as blood and urine testing. It is however, expensive. It has been suggested that while the average number of positive tests identified through urinalysis range from 3-5%, the corresponding figure for hair testing is 18% and it is therefore significantly more accurate (Nadell 2001). Moreover, drugs may be detected in hair for a significantly long period of time after the drug has been ingested. Perspiration testing is a relatively recent technique and is often used to test for cocaine, codeine, and metabolites. Samples are subject to Gas Chromatography/Mass Spectrometry (GC/MS). It is a less invasive procedure than blood or urine testing and is also thought to provide a more convenient sample collection process (Huestis et al 1999). Bean (2002) also indicates that perspiration provides a longer time scale in which drugs can be identified and measured in comparison with urine samples. Eye testing is another relatively new technique and involves measuring the intake of drugs through eye movements (Bean 2002).

Drug testing, with the exception of alcohol testing, is problematic in that it cannot deduce impairment “there is no way of extrapolating how intoxicated a person is from doing a drug test” (Naylor 2001:86). This may result, Naylor suggests, in an increased likelihood of uncovering ‘soft drug’ users i.e. cannabis users as cannabis is identifiable in the body for a longer period of time (up to 28 days). As Naylor goes on to state: “...recreational drug use doesn’t affect your ability to work, any more than emotional problems, bad management or lack of motivation. Unfortunately you can only test for drugs” (Naylor 2001:90). Cohen (1984) however, points to evidence that suggests that cannabis use does impair performance and research has shown that limited use can cause impairment for up to ten hours.

**Workforce drug testing types** The research literature identifies that there are several different types of workforce drug testing both in terms of the stage of employment at which the test is implemented, and the method used to select employees for testing. MacDonald and Roman (1994) provide an overview of the nomenclature of workforce testing policies (see also Lane 1992).

1. Pre-employment screening - potential employees are tested for alcohol and drugs before an offer of employment is made. Pre-employment screening is the most common and widely accepted form of workforce drug testing. The research literature indicates that trade unions are less likely to object to this form of screening, and few liability concerns exist, as there is no legal obligation to satisfy the demands of non-employees. Pre-employment testing does not necessarily reduce drug taking in the workplace as candidates can simply abstain from drug use prior to interview, resuming drug taking habits after employment is secured.

---

<sup>4</sup> The gas chromatography technique vaporises the urine sample at high heat, which is then separated by carrying the vapour through a tube using pressurised helium. The vaporised sample is then fed into a mass spectrometer where the molecules are shattered resulting in a ‘molecular fingerprint’ or mass spectrum of the sample (Klinger 1991).

2. Random testing - drug testing is performed on a random basis and all employees have an equal chance of selection. This often involves testing employees without prior notice. Random testing has generated the most controversy, both amongst employee groups, as well as the research community, for several reasons. Trade unions typically criticise this programme for infringing the privacy of employees, there is also the potential for improper use as the employer decides who is tested and when testing occurs. Critics have argued that random testing strains working relationships by facilitating feelings of oppression, trepidation and insecurity in employees. The strain on working relations can potentially have as adverse an effect on productivity as substance abuse itself. Random screening programmes are also relatively expensive and inefficient. Alternatively, random testing has been described as the most effective method of deterring workforce drug use as employees are less likely to misuse drugs or alcohol whilst under the constant threat of testing.
3. Periodic testing - the most common example of this is testing on an annual basis as part of a medical check-up, usually completed to a predetermined timetable. Periodic testing has obvious limitations in that employees, receiving notice of screening, can abstain from drug use at that time. Any positive test from periodic testing is, however, likely to stand up to legal scrutiny. A study by the United States Centre for Disease Control, comparing periodic and pre-employment testing programmes, found that pre-employment tests were two and a half times more likely to yield positive test results than any other form of testing (Husbands: 1993). Furthermore, those employees having drug or alcohol problems will be less able to abstain from substance use, making this approach more appropriate in identifying problematic drug or alcohol users as opposed to infrequent users.
4. Probable cause testing - there are two types of probable cause testing. First, post accident testing, which as the phrase suggests, involves screening employees that have been involved in an industrial accident or injury. Second, testing employees who have displayed behavioural signs of drug or alcohol use. In relation to post accident testing, there is no obligation on the part of the employer to show that impairment may have been the cause, or a contributing factor in the accident. There are rarely legal implications surrounding this type of testing as employers are responsible for maintaining a safe workplace and therefore have a right, or responsibility, to investigate the cause of accidents. This type of testing may lead to a reduction in the reporting of minor accidents for fear of being tested. Testing following the identification of behavioural signs of drug or alcohol use may require training employers and supervisors to assist them in recognising symptoms. Training of supervisors to recognise substance abuse may lead to a stronger legal case following a positive test. Alternatively, symptoms may be misdiagnosed, leaving the employer open to accusations of workplace bullying and harassment. This could be particularly problematic in terms of racial or gender discrimination.
5. Reasonable suspicion - employees may be tested for alcohol and drugs following behavioural signs such as lateness or high absenteeism. It should be noted that the grounds for testing as a result of reasonable suspicion are less rigorous than for probable cause testing. While based on the same premise as probable cause testing, reasonable suspicion testing attracts more criticism than probable cause testing, due to the less stringent criteria used to identify what constitutes reasonable suspicion, in comparison with what constitutes a probable cause. Furthermore, criteria used to determine reasonable suspicion include absenteeism,

lateness and tardiness, which can also be symptoms of a non-drug, or alcohol related problem such as depression, family problems and assorted medical conditions. For example, medical conditions such as diabetes can produce symptoms similar to those of drug or alcohol use. Critics of testing policies cite such evidence in their arguments against workforce testing; it is possible for tests to identify medical conditions, even pregnancy, which can be considered breaches of employee privacy.

6. Post-treatment testing - employees are subject to alcohol and drug testing after having received some form of treatment for alcohol or drug abuse problems.

Other types of drug testing such as voluntary and transfer or promotion testing are not widely used, and as such little is known of the impact of this type of testing upon the workplace and relationships therein. They include:

7. Transfer or promotion testing - employees may be tested after a job transfer or promotion.
8. Voluntary testing - employees may choose to be tested but it is not a formal requirement.

MacDonald and Roman (1994) identify three possible outcomes of positive drug test results. In the case of pre-employment screening it is usual that the applicant will not be appointed, but they may be afforded the opportunity to reapply following treatment for the drug or alcohol abuse identified through the screening process. Other consequences of testing include dismissal, rehabilitation, treatment or no further action, and the sanction chosen may depend upon the rationale underpinning the testing policy. For example, in a company or organisation that views alcohol or drug use as a disciplinary issue, an employer will be more likely to dismiss a drug positive employee. The Institute of Personnel and Development surveyed 1500 personnel professionals in 1996, of which 10% conducted pre-employment screening and 5% conducted random testing. Of those that conducted random testing, 18% of respondents indicated that drug positive employees should be dismissed (Financial Times 02/02/98). Alternatively, for employers that view drug or alcohol use as a welfare issue, it is more likely that remedial treatment will follow a positive test result. It should be noted, however, that there are provisos on the levels of remedial treatment offered by the employer, and it is usual for the employee receiving remedial treatment to be tested both during and following treatment.

There are also pragmatic reasons for opting for rehabilitation rather than dismissal; the costs of hiring and training a new employee may exceed the costs of rehabilitation. Furthermore, dismissal of an employee may reduce the likelihood of seeking treatment and alternative employment. The treatment model may be seen as less effective in terms of increasing productivity and increasing health and safety levels, as their effectiveness, especially in the long term, is open to question. As different types of treatment are associated with different success rates, no single treatment, or combination of treatments, can be regarded as the correct course of action for all individuals with drug or alcohol related problems.

## **4. EMPLOYEE ALCOHOL AND ILLICIT DRUG USE AND WORKPLACE OCCUPATIONAL ACCIDENTS AND INJURY**

---

### **4.1 Overview**

Occupational accidents and injuries represent a significant workplace problem, posing significant costs to employees and employers every year (Macdonald and Pitney 2000). Kesselring and Pittman (2002: 293) report that the U.S. workforce suffers approximately 6500 job related deaths from workplace injuries, 13.2 million non-fatal injuries, 60,300 deaths from disease and 862,200 occupational illnesses per year. Kesselring and Pittman (2002) report that occupational accident, injury and illness costs U.S. business and industry approximately \$171 billion dollars per annum. These figures correlate with high prevalence rates for alcohol and illicit drug use across the general U.S. population, including substantial sections of those in employment.

It is within this context that researchers, working from within numerous disciplinary perspectives, have examined the nature and strength of the relationship between employee alcohol and / or illicit drug use and workplace occupational accidents and injuries. It is perhaps of no surprise that the overwhelming bulk of research emanates from North America, particularly the U.S., but also Canada. Since the late 1960s a relatively large body of research has emerged which 'has sought to demonstrate the association of employee substance abuse patterns to the frequency of accidents and injuries both on and off the job' (Martin et al 1994: 5). Despite differences in approach, the fundamental research question has remained the same: what role do alcohol and illicit drugs play in causing occupational accident and injury?

The academic and scholarly research literature reviewed in this section provides insufficient evidence to conclude that employee illicit drug use plays a substantial causal role in occupational accident and injury. A number of studies do provide evidence of a link between illicit drug use and occupational accident and injury. Others, however, do not make the link, although there is some research evidence in relation to the causal role played by employee alcohol use in occupational accident and injury. There is also evidence relating to the causal role played by non-substance misuse factors in occupational accidents and injuries.

The remainder of this section provides a review and summary of the research literature examining: (a) the relationship between illicit drug use and occupational accident and injury; (b) the relationship between alcohol use and occupational accident and injury; and (c) the relationship between non drug factors and occupational accident and injury.

### **4.2 Findings**

In addition to the reportage of findings from research examining the strength and nature of the relationship (between employee illicit drug and alcohol use and occupational accident and injury), there can be found within the literature, discussion of particular research approaches, presentation of industry specific 'case study' research, as well as examination of the nature of 'causality', and specifically of the role played by non drug factors in causing occupational accidents and injuries.

Within the literature there are differences between studies that compare workplace injuries of drug users and nonusers, determined through self-report studies; and those that compare accident rates of drug positive and drug negative employees, determined by pre-employment tests (Macdonald 1995). For Macdonald (1995: 130), 'studies that assess differences between drug positives (those testing positive for drug use) and drug negatives (those testing negative for drug use) in terms of workplace problems are the most relevant studies to use when assessing the effectiveness of drug screening in the workplace'. This is because such studies do not rely on self-report data and thus are less open to bias.

The studies carried out by Zwerling et al. (1990), Crouch et al (1989) and Normand et al. (1990) are examples of research that compare accident rates of drug positive and drug negative employees, determined by pre-employment screening. Zwerling et al (1990) carried out research with U.S. postal workers in Boston. The focus of the research was 2,537 applicants who had accepted the offer of employment. The study was concerned with the consequences of substance misuse upon accident, injury and disciplinary action, as well as on absenteeism and turnover (the latter two are discussed in the next section). Zwerling et al (1990) found that those who had tested positive for marijuana or cocaine were significantly more likely to have reportable accidents and work injuries. More generally, Zwerling et al (1990) identified statistically significant differences between drug users and non drug users with regard to accidents, injuries and disciplinary action. A two year follow up study identified that the risks of adverse outcomes declined among drug positive employees after the first year (Ryan et al 1992). Crouch et al (1989) report that drug users were five times more likely to have had a reportable vehicle accident than a non-drug using comparable sample, matched by age, sex, occupation, years of service and geographic location, although the authors suggest the findings should be treated as preliminary, especially given that the study was concerned with pre-employment drug use, thus not indicating regular drug use. Normand et al (1990) carried out a longitudinal study of 5,465 U.S. Postal Service applicants using a predictive design. Again, various criteria were used including absenteeism and turnover in addition to accidents and injuries. The former are discussed in the next section. With regards the latter two, the research suggests that differences in injuries and accidents between employees who reported illicit drug use and those who did not was not statistically significant.

Research carried out by Hingson et al (1985) and Bross et al (1992) offer comparisons between accidents and injuries of drug users and non users as determined through self report studies. These studies indicate varying degrees of association between general workplace drug misuse and employee injury and accident (Martin et al 1994). The study by Hingson et al (1985), which utilized a telephone survey of a random sample of 2,565 residents of New England, identified that 26% of employees who reported weekly use had also experienced an accident in the previous year, compared to 17% of their non drinking counterparts (see also the discussion in Martin et al 1994). The study also found that workers who consumed approximately five units daily were more likely than drug users and those who did not drink to have an accident or require medical assistance. Martin et al (1994: 7) also states that, '40% of respondents who reported weekly on the job drinking had experienced injury producing accidents in the previous year, and 8% had required hospitalisation'. The study by Bross et al (1992), focused upon chemically dependant workers in a manufacturing setting. It found

workers reporting drug use to be more likely to experience ‘strains and sprains, fractures and dislocations, and lacerations and contusions’ (Martin et al 1994: 7).

Much of the research literature provides inconclusive evidence as to the nature and strength of the relationship between illicit drug use and occupational accident and injury. In a relatively early review of the research carried out in the U.S. and Canada, Zwerling (1993: 14) notes, after reviewing three studies (Lewis and Cooper 1989; Parkinson 1986 (cited in Zwerling 1993); Alleyne et al 1991 (These studies are discussed below)), that while evidence of an association between illicit drug use and fatal occupational injury is lacking, these studies do not rule out the possibility of there being one either. With regards non fatal occupational injuries, Zwerling concludes that the conflicting results reported by Zwerling et al (1990) and Normand et al. (1990) could be consistent with a weak association between injuries and accidents and cocaine and marijuana use in the postal service. Similarly, Beswick (2002), in a recent review of twelve research studies, reports that there is only limited evidence to lend credence to the view that illicit drug use is associated with occupational accidents and injuries. For Beswick, ‘five studies have found some association between drug use and workplace accidents, whereas seven others have found little or no evidence of a link between drug use and workplace accidents’ (2002: 7). Beswick goes on to state that ‘Therefore the evidence appears inconclusive’ (2002: 7). The twelve research studies reviewed by Beswick (2002) are by Moody et al (1991), Shannon et al (1993), Holcom et al (1993), Pollack et al (1998), Hoffman and Larison (1998), French et al (1995), Alleyne et al (1991), Leirer et al (1991), SAMHSA (1994), Kaestner and Grossman (1988), Macdonald (1995) and Lewis and Cooper (1989).

A critical reading of a number of these studies confirms the divergence and variance in findings of the research. The research studies differ enormously in terms of type of study, methodology and findings. All were carried out either in the U.S. or Canada. Moody et al (1991) analysed data on post accident and post incident testing of 736 railroad employees in the U.S.. The findings of the research indicate that in a small but significant amount of cases, employee illicit drug use played a causal role in accidents, although the authors go on to acknowledge that the number of accidents attributed to alcohol and illicit drugs is less than that for car accidents. Moody et al (1991) detail that cannabis was the most commonly detected substance. Shannon et al (1993), in their Canadian study of the extent and strength of the relationship between illicit drug and alcohol use and 470 occupational fatalities found that among employees, the detection rate of cannabis appeared high. Their research also reports a lack of evidence of other illicit drug use amongst employees, and indicates the relevance of non-drug factors to explaining occupational fatalities.

Drawing upon the findings from a questionnaire distributed at work to municipal workers in one U.S. town, Holcom et al (1993) identify the existence of a relationship between substance use and occupation injuries in high risk positions (no relationship was found between substance use and occupation injuries in low risk positions). Their research also acknowledges the relevance of personal and work related factors in explaining occupational accident and injury, including dysfunctional personal backgrounds and stress and dissatisfaction with work. Alleyne et al (1991) in a study of occupational fatalities in Alberta, Canada, which assessed investigation data relating to 459 deaths at work over an eight year period offer evidence that alcohol is

most commonly associated with fatal injuries. More generally, Alleyne et al (1991) argue that alcohol is generally the more popular choice of substance used, with younger employees more likely to test positive for cannabis. Lewis and Cooper (1989) in their analysis of autopsy results relating to occupational fatalities in Texas, U.S., provide evidence that alcohol is more likely to be associated with fatal injuries, as are prescription drugs. Only one case of illicit drug use was found.

A number of further issues can be gleaned from the literature on the relationship between illicit drug and alcohol use and occupational accident and injury. First, where an association between illicit drug use and accident and / or injury is reported in the research, it appears to be highest for young employees. Pollack et al (1998) in a study of the risk of on-the-job injury for substance users compared to non substance users found higher rates of injury for substance users, most of whom had used alcohol. The greater prevalence of alcohol is supported by research carried out by French et al (1995) and Alleyne et al (1991). Kaestner and Grossman (1988) in an analysis of survey data suggest that drug use is significantly related to accidents for young adult males, but also report no such relationship for females. Second, there is evidence to suggest that injury and accident can arise from impairment resultant from actual on-the-job use (Hoffman and Larison 1998; Moody et al 1991), although this point is disputed by Alleyne et al (1991). Drawing upon data derived from the National Household Survey on Drug Abuse, Hoffman and Larison (1998) undertook research into the relationship between drug use, accidents and turnover. They state that 'if drug use is related to accidents in some respects, it probably involves impairment that results from on-the-job use' (1998: 360). In stating this, they acknowledge more generally that drug use is not associated with work related accidents, but may be related to the potential of being dismissed or resigning, although this is, to a degree, also dependent upon the nature of the employment and occupation. Third, the percentage of workplace injuries attributed to substance use is smaller than that for automobile accidents resultant from substance use. Fourth, compared with national averages, employees tended to have substance use profiles similar to or lower than those of the general U.S. and Canadian population, and that illicit drugs are not used as extensively as alcohol among employed people. Fifth, substance misuse / use may be associated with high-risk positions. Finally, for SAMHSA (1994) current illicit drug use and alcohol use amongst U.S. workers deserves serious attention from policy makers. Moreover, the use of drugs on-the-job has been exaggerated with little empirical evidence to support the notion of wide scale workplace drug use (see the work of Newcomb 1994).

Much of the research carried out to date has been industry specific. This is unsurprising, but is not solely a consequence of the practicalities and cost of carrying out manageable, valid and robust research. It is also a consequence of the fact that, as research evidence has indicated, the nature and type of industry is a crucial variable by which to assess the nature and strength of the relationship between illicit drug use and occupational accident and injury (Kesselring and Pittman 2002). For Kesselring and Pittman (2002), whose research study attempted to evaluate the relative efficacy of expenditure on drug testing by industry and commerce, and which drew upon data extracted from the Bureau of Labour Statistics for the years 1989, 1990 and 1991 (this data includes injuries and illnesses per 100 workers by state and by industrial classification) and across forty states, the 'evidence strongly suggest that the most overwhelming determinant of occupational injury is the industry of employment ... in

this model, neither the legal environment of the state nor any of its demographic characteristics had any significant statistical effect on injuries' (Kesseling and Pittman 2002: 300).

Zwerling (1993: 15) in reviewing the academic and scholarly research literature in relation to the transportation industry, noted that 'alcohol impairment is present in about 10% of occupational fatalities. The data are especially strong among heavy truck drivers. Those with a clinical history of alcohol abuse may also have a slightly elevated risk of non-fatal occupational injuries compared to those without such a history. However, the data here are not entirely consistent. The relationship between fatal injuries and illicit drug use is more difficult to define... In the heavy trucking industry, the evidence suggested that those with marijuana positive urines were not at increased risk of fatal injuries while those with urines positive for amphetamines and cocaine may have been. There was very little evidence concerning the association of drug use and non-fatal injuries'. He concludes by stating that 'in summary there is good evidence, at least in a single industry, that those individuals with positive pre-employment drug screens tend to have higher rates of absenteeism which lead to higher rates of disciplinary action' (1993: 17).

Much of the research carried out suffers from methodological and conceptual flaws (Macdonald and Wells 1994; Martin et al 1994). Presented together, Macdonald and Wells (1994) suggest that these limitations include the fact that several drugs are often combined into one category; users are often simply compared with non users; no break down of on-the-job-use and off-the-job-use is available; causality remains an insufficiently researched issue; moderate and heavy use is undistinguished; past and current use is never differentiated; sample sizes are small, response rates are often low and therefore non-generalisable; and comparisons across studies is difficult to undertake. Additionally, many research studies are limited to one industry, company, state and / or country. For example, many research studies focus upon particular types of employees and their workplaces (such as those working in the construction industry or the transportation industry). Often the research is 'localised'. That is research has focused upon one workforce and their workplace within one geographical location, such as U.S. Postal Workers in Boston (see Normand et al 1990). Little geographical comparative research has been carried out (across states within the U.S., or across countries). Similarly, little comparative analysis of different workforces and their workplaces has been undertaken. Moreover, a number of studies fail to differentiate between alcohol and illicit drug use in the presentation of their findings.

A similarly large body of research has focused upon the relationship between alcohol problems and occupational accidents and injuries (Webb et al 1994; Stallones and Kraus 1993; Zwerling 1993; Martin et al 1994; Macdonald 1995, 1997). A critical reading of the research indicates that there is more substantial evidence of the causal role played by employee alcohol use in causing occupational accident and injury. This is especially the case for problem drinking and alcohol dependence (Macdonald 1997). As Martin et al (1994) acknowledge, 'with few exceptions ... studies of problem drinkers ... support the hypothesis that accident rates are higher for these workers'. Martin et al (1994: 6) go on to point out that a number of studies indicate that employees injured on the job are more likely to have measurable blood alcohol levels than the control group (these studies included Weschler et al 1969; Lewis and Cooper 1989; Alleyne et al 1991; Lederman and Metz 1960).

As previously noted, Zwerling (1993) provides a useful, if somewhat early, review of the research literature on alcohol use and fatal and non-fatal occupational injuries. Regarding the former, Zwerling (1993: 11) suggests that research identifies acute alcohol impairment present in about 10% of fatal occupational injuries. He concludes his review by stating that 'alcohol plays a relatively restricted role in fatal occupational injuries'. A reading of the studies reviewed by Zwerling, including those by Berkelman (1985), Baker (1982) and Smith (1988) (cited in Zwerling 1993), indicates that this is an appropriate and balanced assessment of the research. Regarding non-fatal occupational injuries, Zwerling suggests that alcohol impairment is present in 5% of non-transport cases (1993: 12). A reading of the studies reviewed by Zwerling, including those by Wechsler et al (1969), Papoz et al (1986), Trent (1991) indicates again that this is an appropriate and balanced assessment of the research.

With regards problem drinkers Zwerling (1993) suggests that '...there was no statistically significant association between average alcohol consumption over a seven day diary or a history of binge drinking with occupational injuries' (1993: 13). Certainly it is the case that other studies have shown similarly mixed results. Zwerling does acknowledge that acute alcohol addicts may suffer impairments when sober, such as the effects from a hangover. Overall, for Zwerling, while alcohol abuse may be weakly associated with occupational injuries, 'the wide variety of methodological difficulties in the various studies of the association of a history of alcohol abuse and occupational injuries should make the reader cautious in drawing conclusions from this literature' (1993: 12). This is a view also supported by Webb et al (1994) and Stallones and Kraus (1993), both concluding insufficient evidence of an association between alcohol use and occupational injury.

Scott Macdonald (1995; 1997) and Macdonald and Wells (1994) offer a more recent review and slightly different reading of the research on alcohol use and occupational injury. In reviewing the work of Observer and Maxwell (1959), Webb et al (1990), Dawson (1994), Schlosser and McBride (1984), Macdonald (1995) suggests that; 'overall, some research studies suggest that alcoholics and problem drinkers are more likely to be involved in industrial injuries than non problem drinkers. Other studies have failed to find a relationship'. The latter include those conducted by Beaumont and Hyman (1987), Buchanan (1988), Hertz and Emmett (1986) and Powell et al (1971). Macdonald (1995) further reviews those studies that examine the relationship between blood alcohol concentration and performance and injuries (Coombs and McAndrews 1994; Lederman and Metz 1960; Baker et al 1982; Hollo et al 1993) (alcohol tests and breathalysers are able to determine an individuals Blood Alcohol Concentration (BAC), which correlates closely with degree of impairment). For Macdonald, both laboratory and epidemiological studies are conclusive that higher BACs are associated with decreased psychomotor coordination (1995: 705), and epidemiological studies have shown adverse effects of alcohol impairment, as measured by BAC readings, on work injuries. As well as reducing inhibitions, increasing risk taking and impulsive behaviour Macdonald concludes that such 'research evidence is conclusive that impairment by alcohol is related to occupational injuries' (1995: 705) (see also Macdonald 1999).

Research has also identified the potential causal role played by non drug factors in occupational accident and injury (Macdonald 1995). For Macdonald (1995) too little weight or attention has been given to the role of third variables in explaining occupational injury. For Macdonald (1995: 705-706), 'Three requirements of causality are that a relationship exists between two variables, that the cause precede the effect and that an observed empirical relationship cannot be explained by a third variable. Virtually all-empirical studies on the subject have addressed the question of whether a relationship between drug use and job injuries exists, and some studies have found significant relationships. However, little or no efforts have been made to assess whether the relationships found could be better explained by a third variable.' These 'third variables' may include work characteristics such as noise and dirt on the job, inadequate work procedures, poorly maintained equipment, inadequate training, supervision and management, excessive noise, heat and vibration, shift patterns, the monotonous nature of work, as well as demographic variables, lifestyle characteristics and individual health characteristics such as sleep deprivation and illness. The general conclusion forwarded by Macdonald, is that although some research studies indicate that 'a relationship exists between drug users and on the job injuries', 'since few studies have explored the role of drugs in work injuries, definitive conclusions cannot be drawn' (also see Macdonald and Wells 1994: 130).

Drawing upon findings from research conducted during the early 1990s with 882 Ontario, Canada, employees responding to a household survey, Macdonald questions illicit drug use as a major causal agent in job injuries. (Macdonald 1997: 254). He reports that any 'relationship only holds up for males and youngest age groups' (1995: 717), along with alcohol and some licit drug use. Rather, for MacDonald (1995: 718), 'many job injuries stem directly from the workplace itself. Dangerous working conditions, noise and dirt on the job, and conflicts at work appear to be the greatest predictors of job injuries. Sleeping problems, which may be exacerbated by shift work, also seems likely to be another direct cause of job injuries. Also, evidence exists for a causal role of alcohol problems and licit drug use in job injuries. Accident prevention programs might be more effective by focusing efforts on reducing the influence of these factors rather than illicit drug use.'

While it may seem plausible that there is the potential for occupational accident and injury resultant from alcohol use, especially compounded by wide-scale societal alcohol use, research indicates that this may be less so for occupational injury resulting from illicit drugs. What is interesting therefore, is that most tests are directed at illicit drugs rather than alcohol (BNA 1986). As Macdonald (1997) points out, 'while low rates of drug use do not, in themselves remove the possibility that substances lead to accidents, they do provide an indication of the magnitude of the problem. If few people use drugs, and fewer still use drugs on the job, then the proportion of job accidents caused by drugs is probably low' (Macdonald 1997: 256). Indeed, a number of commentators have criticized the focus on illicit drugs as misguided as alcohol abuse is a much larger problem and accounts for a larger proportion of morbidity in terms of health effects and accidents (see for example Osterloh and Becker 1990: 507).

## **5. ALCOHOL AND DRUG USE AND EMPLOYEE PRODUCTIVITY AND PERFORMANCE**

---

### **5.1 Overview**

Lowered employee productivity and performance represents a significant workplace cost (Elmuti 1994). Drawing upon research carried out by the U.S. Office of Applied Statistics, Mieczkowski and Lersch (2002) report that among full time employees, turnover, absenteeism, resignation and dismissal rates are significantly higher for drug users than non drug users. The association between lowered employee productivity and performance and increased employer costs with alcohol and illicit drug use has been promoted by many over a number of decades. In 1983, for example, Dan Quale, the U.S. senator, in accounting for the decline in U.S. productivity levels since 1977, listed nine explanatory reasons (focusing upon legal and regulatory issues), before adding that employee alcohol and drug use was a further and major contributory factor. Quale speculated that, during this period, lost productivity arising from employee alcohol and illicit drug use amounted to \$30.1 billion a year (Zwerling 1993: 5).

Writing in the early 1990s, Millard estimated that ‘substance abuse raises the cost of insurance by \$50 billion each year and costs more than \$36 billion in lost productivity, medical expenses, profits and damages’ (see also Elmuti 1994: 24). Moreover, Millard (1991: 46) suggested that employees who misuse ‘drugs not only take more sick days, but are more likely to make compensation claims against employers’. While the true costs of alcohol and illicit drug use on productivity and performance is not known, a number of researchers and commentators have offered estimates. For example, Nadell (2001: 29) reports that the National Institute of Health estimate an alcohol and / or drug abusing employee costs his or her employer between \$7,000 to \$10,000 annually, stating that ‘this is not a difficult figure to believe when considering all of the costs connected with drug and alcohol abuse including non-production, lateness, absenteeism, errors, accidents, insurance claims, turnover, and the discouraging effects of non-abusing co-workers. There is also the potential for theft, violence and lawsuits’ (see also Frankenfield and Kleiner 2000). Jardine-Tweedie and Wright (1998: 535) have recently estimated that drug abuse alone costs U.S. industry and the public over \$100 billion per year in annual losses, while more general estimates suggested the cost to the U.S. economy of employee substance misuse ranges from \$60 billion to \$140 billion annually (Elmuti 1994: 24), and between \$6 billion and \$200 billion annually for the U.S. and Canada combined (Seijts et al 2002). Such estimations have been disputed by the American Civil Liberties Union (1999), stating that they have little or no basis in fact. The conflicting political interests of these commentators undoubtedly account for their opposed conclusions regarding the costs of drug and alcohol use.

Estimation of such costs are not confined to the U.S., although, much less research has been conducted on estimating the cost of employee alcohol and illicit drug use for business and industry in Europe (Loup 1993). It is reported that in 1992 substance abuse cost the Canadian economy more than \$18.4 billion, a figure which represented 2.7% of GDP or \$649 per capita (Jardine-Tweedie and Wright 1998). Jardine-Tweedie and Wright (1998) go on to say that the authors of the reports from which

this data was extracted provide a very conservative approach to estimating the costs of substance abuse. They argue that total costs will be significantly higher, as many indirect costs cannot be quantified, such as diverted management and supervision time, friction amongst staff, damage to an employees public image and so on. In the UK, it has been suggested that alcohol related absence alone costs business £2 billion a year, while employee drink and drug use costs industry and commerce £3 billion annually (Makbool 1998). In a recent survey conducted by the London Chamber of Commerce, 22% of London businesses reported absenteeism as a consequence of drug misuse amongst employees.

Several workplace risk factors are associated with employee alcohol and illicit drug use. For our purposes here, these workplace risk factors are categorised fourfold. First, absenteeism. Second, labour turnover. Third, impaired employee performance, and finally other workplace outcomes. Such employer risks are usually discussed either in terms of the economic cost analysis framework or the human capital cost of illness (DiNardo 1994).

The academic and scholarly research literature reviewed in this section provides some evidence that alcohol use, and particularly alcohol abuse, is associated with decreased productivity and performance. With regard to illicit drugs, the evidence appears to be less conclusive, although some studies provide cursory evidence of an association. A number of writers indicate an association between illicit drug and alcohol use and other workplace factors. A number of commentators also point out that not all patterns of workplace drug misuse need be viewed in the generic category of costs. In the previous section we outline various problems associated with research undertaken on alcohol and illicit drug use and occupational accident and injury. Similar criticisms can be directed at many of the studies reported here. Certainly, questions relating to the ability of these studies to assess the nature and strength of causality remain. Furthermore, other problems arise, for example, many research studies focus upon one workplace location, making generalisability difficult. This is a problematic feature given that alcohol and drug use prevalence may vary by industry and geographical location (Kravitz and Brock 1997; Macdonald and Wells 1994). Other comments relate to the differences in methodology, between comparisons of positive and negative tests and the use of survey data. Additionally, it can be suggested that with regard to the substance misusing employee, the amount and type of drug consumed, the frequency and method of usage and the degree of addiction remain critical influences and are under researched.

The remainder of this section provides a review and summary of the research literature examining: (a) the relationship between alcohol and illicit drug use and absenteeism; (b) the relationship between alcohol and illicit drug use and turnover; (c) the relationship between alcohol and illicit drug use and impaired employee performance and (c) other workforce outcomes resultant from employee alcohol and illicit drug use. We conclude the section by reviewing a number of research studies that provide alternative ways of assessing the relationship between alcohol and illicit drug use and productivity and performance. In several instances we review research already discussed in the previous section. This is unavoidable as a number of research studies focus upon occupational accident and injury as well as productivity and performance.

## **5.2 Findings**

According to Martin et al (1994) who carried out an international literature review including research from the U.S., France, Sweden, Australia and the UK, there does appear to be an association between higher rates of absenteeism amongst employees who drink. In particular, for Martin et al (1994: 5), occupational 'absenteeism seems to be a marked characteristic of employed problem drinkers'. First, they suggest that rates of between two and eight times that of non-problem drinking are reported within the research literature. Second, they suggest that this association generalizes cross-nationally.

Albeit dated, research carried out by Maxwell (1960) on 406 recovered alcoholics indicated that 53% of the sample reported high levels of absenteeism during their problem-drinking period. More generally, these individuals reported higher than average rates of on-the-job absenteeism. This included temporary absences from work (44%), leaving work early (39%), taking longer lunch breaks (40%) and arriving late to work (33%). Trice (1962), utilising a similar methodology with one group of 84 Alcoholics Anonymous members and one group comprising 552 Alcoholics Anonymous members presents similar findings. In particular, Trice (1962) reports that over 70% of respondents reported that their rates of occupational absenteeism increased as their drinking became more problematic, with respondents in the second group reporting much greater than average rates of absenteeism. When compared with a control group, research carried out by Pell and D'Alonzo (1970) further indicates that alcoholics and problem drinkers are likely to have much greater levels of reported absenteeism rates.

Over recent years there has developed a literature on absenteeism rates and the use of drugs other than alcohol. Normand and Salyards' (1989) study of 4220 applicants to the U.S. Postal Service (354 tested positive and 3866 tested negative for illicit drugs) found that involuntary separation and job absenteeism rates were higher for those that tested positive for illicit drug use than for those who tested negative. Those testing positive for cocaine were more likely to be absent from work than those testing positive for marijuana. Normand et al (1990) found that the use of marijuana, barbiturates, and cocaine among 4396 job applicants to the U.S. postal service (395 tested positive and 4001 tested negative; positive and negative applicants were employed for the purpose of data collection) were associated with greater staff absence and involuntary termination of employment. Employees identified as drug users had a 60% higher absenteeism rate and a 47% higher rate of involuntary termination than applicants not identified as drug users. Sheridan and Winkler (1989) in a study of employees in the Georgia Power Organisation found similar rates of absenteeism amongst those testing positive and negative, although they found variations within some occupational categories. Sullivan et al (1990) in a national sample of 300 registered nurses recovering from alcohol and / or drug abuse, found that failure to attend work was the most frequently mentioned 'on the job' effect of individual drug dependence.

Crouch et al (1989) report that their research of employees at the Utah Power and Light Company found that drug positive rather than drug negative employees were more likely to have higher absence and sickness rates. Martin et al (1994: 5) report that Bross et al (1992), in their five year study of chemically dependent workers at a

manufacturing site, detail similar results identifying that chemically dependent 'workers average 5.71 periods of multi-day absence (totalling 181 days) compared to 0.86 periods of multi-day absence (totalling 25 days) among workers in a non-chemically dependent control group', while Zwerling and Ryan (1992: 596) in their review suggest 'a weak association between a positive employment drug screen and the adverse employment outcomes of absenteeism, injuries, accidents and turnover' before going on to suggest that 'the evidence is strongest for absenteeism'. Indeed, Zwerling et al (1990) report that a year after being hired, those testing positive for marijuana and those testing positive for cocaine had higher rates of absenteeism (7% and 19% respectively) than those originally testing negative for drug use (4%). For Hoffman and Larison (1998), in their analysis of data from the U.S. National Household Survey on Drug Abuse, drug use appears to be associated with a greater number of absences and a higher risk of being dismissed or voluntarily leaving a job.

It has been suggested by some commentators that one of the most hypothesized employer costs associated with alcohol and drug use is that of poor employee performance. At best it can be suggested that there is conflicting evidence as to the relationship between and the effects of alcohol and illicit drug use amongst employees on productivity and performance (see Beswick 2002; Martin et al 1994). Evidence drawn from research carried out by Maxwell (1960), Trice (1962) and Trice and Roman (1978) offer support for claims of an association between declining productivity and alcohol use, especially alcohol abuse. Maxwell (1960) reports that in his research problem drinking indicated lowered work performance. Lowered work performance is defined as a tendency to postpone undertaking tasks and responsibilities, to under perform in terms of the quantity and quality of work carried out, and to commit errors and mistakes more frequently. Trice (1962) reports similar findings in his research, with virtually all of his respondents displaying lowered performance at work resultant from alcohol use. For Martin et al (1994), one of the most comprehensive attempts to assess the effects of alcohol and illicit drug use and productivity and performance can be found in the work of Blum et al (1992). In this study of 136 problem drinking and non problem drinking employees, assessed on four categories of performance at work (conflict avoidance, technical performance, ability to exercise self direction at work, functioning in interpersonal relationships all cited in Martin et al 1994: 8), Blum et al (1992) report, that 'collateral assessments of the focal respondent's job performance in each of the four domains were significantly lower for those workers who were in the upper quartile (i.e. 52 or more drinks per month) on monthly alcohol consumption'.

With regards illicit drug use and productivity and performance, Walsh et al (1991), Burt (1981), White et al (1988) and Sullivan et al (1990) all provide cursory evidence of lowered productivity and performance resultant from illicit drug misuse. Walsh et al (1991) in a study of 224 alcohol and drug users participating in an EAP at an industrial plant report that cocaine use was found to be associated with supervisory warnings. Burt (1981) detail that 10% of employees who admitted drug use in the previous twelve months reported problems in their performance and productivity, while Sullivan et al (1990) report similar findings. Schwenk and Rhodes (1999) review research carried out and published by Kagel et al (1980) and Kaestner (1994) and indicate that there is no evidence to suggest that marijuana has a tendency to make people less productive; 'the relationship between marijuana use and job performance, if any, is the result of a third variable cause' (Schwenk and Rhodes

1999). Other studies unable to provide any correlation include Haas and Hendlin (1987). McDaniel (1988), drawing upon self report data on the drug usage of applicants for military service, report that individuals indicating abstinence from drug use prior to enlisting were less likely to be discharged for unsatisfactory performance within four and a half years of their application. McDaniel (1988) also acknowledges first time drug use and frequency of drug use as related to military discharge for performance reasons. However, Comer (1994) argues that drug use contributes only a small amount after controlling for the effects of personal and job factors.

With regard to employee turnover, Martin et al (1994: 8) suggest that ‘as in the case of job performance, evidence for a relationship of substance abuse to labour turnover is unclear’, although, as Martin et al (1994: 9) go on to state, ‘the relationship between turnover rates and the use of drugs other than alcohol appears to be better established in the literature’. This is a finding shared by a number of research studies conducted in the U.S. and Canada by Sullivan et al (1990), White et al (1988), Kandel and Davies (1990), Sheridan and Wrinkler (1989) and Kandel and Yamaguchi (1987), with a number reporting particular evidence for the younger age groups, young males. In research carried out by Zwerling et al (1990), it is reported that employees who use illicit drugs have higher turnover rates. In particular, Zwerling et al (1993) identified that employees testing positive for marijuana and cocaine had higher rates of involuntary turnover (14% and 7% respectively). Those testing negative had an involuntary turnover rate of 6%. Macdonald and Wells (1994: 131), report that Sheridan and Winkler (1989) found similar rates of absenteeism among drug positive and negative employees. Schwenk and Rhodes (1999) review four studies and conclude that employees who test positive on pre-employment drug screens are more likely to experience high rates of turnover than those who test negative. The study by Normand et al (1990), also found higher rates of involuntary turnover. With regards the relationship between alcohol use and employee turnover, a number of studies indicate that problem drinkers continue to be employed as their dependency increases or stabilises (see Trice 1962, Trice and Roman, 1978, Straus and Bacon, 1951 and Strayer, 1957). Kandel and Yamaguchi (1987) carried out a longitudinal study of young adults turnover, with the exception of marijuana, they report drug use was predictive of job loss, even when other job loss predictors were controlled for, including income, job type and education.

A final area of research has uncovered the association between substance misuse and what can be termed ‘other workplace outcomes’ including employee problem behaviour. Often, these ‘other workplace outcomes’ have arisen from the findings of research studies examining measures of lowered productivity and performance discussed above (see for example Lehman and Simpson 1992; McDaniel 1988; Normand et al 1990; Zwerling et al 1990; Bross et al 1992). Zwerling et al (1990) suggest alcohol abuse and use may be the primary association. For Kravitz and Brock (1997: 66), other studies merely show correlation ‘and thus the observed associations do not imply causation’. Indeed, they go on to state that ‘whether the association between drug use and employment problems is strong enough to ensure a positive utility of drug testing is another’ (1997: 66). Lehman and Simpson (1992) carried out a study of municipal workers using subjective outcome measures and found that employees who reported substance misuse away from / at work within the previous year were more likely to report psychological and physical withdrawal from work and to have experienced ‘antagonistic work behaviours’, such as ‘putting little effort in’,

'day dreaming', 'leaving work early', 'arguing with co-workers' and 'disobeying orders'. Bross, Pace and Cronin (1992) undertook a case control study of manufacturing plant workers, that found that chemically dependant workers had significantly more hypertension and mental disorders than the control group.

Research has also identified that not all patterns of workplace alcohol and illicit drug misuse need be viewed in the generic category of costs (Gill and Michaels 1992; Register and Williams 1992; Martin et al 1994: 24; Kravitz and Brock 1997; MacDonald and Pudney 2000). While job performance decrements are definite costs to the workplace, Martin et al (1994) argue this does not necessarily hold for absenteeism. Instead, absenteeism may reduce costs in comparison to those incurred had the employee remained within work.

Gill and Michaels (1992) report findings from their research that drug users earned higher wages than non drug users, while Register and Williams (1992) report that, apart from long term use and on the job use, employee use of marijuana had a positive effect on wages. Moreover, it is important to note that the introduction of workforce drug testing, far from addressing lowered employee productivity, may well further negatively effect the performance and productivity of employees. It may adversely affect employee attitudes towards the company or organisation, and / or it may also stimulate union activity. As Kravitz and Brock (1997: 67) point out, 'negative reactions to drug testing could decrease organisational productivity and profits'. It is also interesting to note that in the study of U.S. Postal Service applicants conducted by Normand et al (1990), 85% of the original applicants who tested positive for drug use remained in employment after one year, thus indicating that despite their predilection to using drugs, they were able to carry out the tasks they were employed to do.

For MacDonald and Pudney (2000: 1090), the traditional model that illicit drug use in particular has reduced labour market experiences, resulting in lowered aggregate levels of human capital accumulation, reduced overall productivity and living standards manifesting itself in lowered wages has been questioned by recent research, including their own more recent research. Most of the literature is again, according to Macdonald and Pudney (2000) U.S. based. Taking their focus as the effect of illicit drug use on labour market outcomes, and drawing upon analysis of UK data, MacDonald and Pudney (2000) suggest that the association between drug use and productivity is likely to be very complex and vary according to the age and gender of the individual. Moreover, they find very little evidence to support any relationship between illicit drug use and occupational attainment. Rather, they conclude by stating that 'We find compelling evidence to suggest that drug use, especially cocaine, opiates and crack cocaine is associated with increased risk of unemployment' (Macdonald and Pudney 2000: 1096).

From this discussion, a number of points can be identified. There does seem to be some evidence that alcohol use, and particularly alcohol abuse, is associated with decreased productivity and performance. With regard to illicit drugs, the evidence appears to be less conclusive, although some research studies do provide cursory evidence of an association. There is also evidence to suggest that other workplace related outcomes are associated with substance misuse, particularly alcohol use and abuse. However, the research also highlights the need for caution when assessing the

strength of the relationship between alcohol and illicit drug use and productivity and performance. A number of research studies, as Cromer (1994) points out, alert the reader to the potential for non drug predictors, including social and individual factors to effect workforce performance and productivity. As Cromer (1994: 260) states, 'Despite conventional wisdom, drug testing has not been definitively linked to organisational gains in safety or productivity'.

## **6. THE EFFECTIVENESS OF WORKFORCE DRUG TESTING**

---

### **6.1 Overview**

The effectiveness of workforce drug testing programmes is, according to Macdonald and Wells (1994: 127-128) measured by the extent to which objectives are achieved. Francis and Wynarczyk (1998) point out that drug testing can be implemented in a number of ways, and therefore effectiveness partly depends upon the type of programme, its implementation, its aims and objectives and the particular risk involved. In some countries, particularly the U.S., and for some employees working in specific industries or businesses, workforce drug testing is adopted because there is a legislative mandate to do so (Mendelsohn and Libbin 1988; Oswald and Harrison 1992). For example, certain Federal transportation employees in the U.S. are required to undergo mandatory drug testing.

Beyond ensuring that legislative requirements are met, the two major objectives of drug testing are to reduce occupational accident and injury and to reduce workforce productivity and performance problems (e.g. absenteeism and turnover). These two objectives are based largely on the assumption that alcohol and drug use are related to occupational accident and injury and workforce productivity and performance problems. We have discussed the research relating to these assumptions in the previous two sections and highlighted the inconclusive nature of much of the research findings published over the course of the last four decades. In addition, empirical studies have been carried out into the effectiveness of workforce drug testing. Some studies have indicated that the frequency of industrial accidents and performance problems have reduced considerably following the implementation of workforce drug testing, although others have been unable to report such findings. We discuss these in this section.

The effectiveness of testing is also promoted on the grounds that it is able to reduce general drug use across society. It is argued that workforce drug testing can achieve societal reductions in drug use through specific and general deterrence (Macdonald and Wells 1994). '*Specific* deterrence refers to the identification of individual drug users and intervention by punishment ... *General* deterrence refers to the process where users who have not been caught are deterred by the threat of being caught (emphasis in the original)' (Macdonald and Wells 1994: 128).

The evidence is inconclusive and is therefore unable to determine whether drug testing programmes actually reduce occupational accident, injury and performance problems. This point is cogently made by Macdonald and Wells (1994: 139), 'too few empirical studies on the effectiveness of drug screening programs exist at this time to prove that programs are effective in reducing drug use among employees, accidents and performance problems in the workplace, or drug problems in society as a whole'. We also acknowledge the findings of Francis and Wynarczyk (1998: 187) in their review of the literature, 'measuring the effectiveness of workplace drug employee testing programmes is ... problematic'.

The remainder of this section provides a review and summary of the research literature examining: (a) those research studies which focus directly on the

effectiveness of workforce drug testing to reduce workforce and / or workplace problems; (b) research studies which have attempted to map out the extent and nature of workforce reductions in drug use as a result of drug testing programmes and (c) the research on the deterrent effect of workforce drug testing in reducing general societal alcohol and drug use. In several instances we review research already discussed in the previous section. This is a consequence of a number of research studies focusing upon occupational accident and injury as well as productivity and performance.

## **6.2 Findings**

The effectiveness of workforce drug testing is premised upon a positive relationship between employee alcohol and illicit drug use and occupational accident and injury, and productivity and performance problems. However, as the previous two sections have highlighted, the research is inconclusive as to the nature and strength of this relationship. The effectiveness of workforce drug testing programmes is determined by the extent to which their objectives are achieved. Workforce drug testing is seen as a tool capable of identifying those employees that are not performing appropriately with regard to effort, efficiency and safe working practices. Testing is therefore based upon the identification of either those individuals who choose deliberately, and knowingly, to contravene company policies on substance abuse, or those in denial of a dependency problem, whose behaviour is determined by addiction. By identifying, and responding to these individuals, testing programmes are seen to provide a significant contribution to the creation and maintenance of a productive, safe and healthy workforce (IDS 2002; Blum et al. 1994; Pinsonneult 1994). Advocates of testing indicate that workforce drug testing can reduce absenteeism, turnover, accident, cost, injury, mistakes, theft, productivity and performance problems (Comer 1994). Mieczkowski and Lersch (2002) argue that with regards police officers, drug testing also can have an impact on identifying, controlling and suppressing police corruption related to drug crime.

Gerber and Yacoubian (2001) suggest that few studies have examined the relationship between drug testing and accident and illness rates. One study that has attempted to do this was conducted by Feinauer and Havlovic (1993), who looked at the nature and strength of this relationship across businesses in Wisconsin during 1984/1985. In doing so, their aim was to assess the effectiveness of drug testing as a strategy to reduce occupational injury. The methodology included survey analysis of forty eight businesses asked to provide archival drug testing data (pre-employment, post accident and reasonable cause) and longitudinal accident and illness data. The findings of the research proved inconclusive in relation to the reduction of work injuries in those businesses that operated drug testing programmes, although they did offer some support for a relationship between post accident testing and a decrease in injury, particularly when compared to pre employment screening. Twelve facilities with drug testing programmes in place did not experience significant reductions in occupational accidents and injuries compared to the thirty six facilities that did not have drug testing programmes in place. However, of the twelve businesses that did drug test, Feinauer and Havlovic (1993) state that 'post accident drug testing was significantly related to a decrease in accident and illness rates compared to the pre-testing period and to facilities using only pre-employment testing'. They conclude that 'the efficacy of pre-employment testing as a strategy for reducing occupational injuries is called into serious question by the findings of this study' (Feinauer and Havlovic 1993: 5),

although they do offer some encouragement for the implementation of post-accident testing to reduce occupational injuries. Criticisms directed at this study include a lack of generalisability, a small sample size, and a limited database.

Research carried out by Parish (1989) focused upon the use of workforce pre-employment drug screening, and found that of all new employees, 12% tested positive for drugs. Parish also found that 'there were no differences between drug-positive and drug-negative employees when job performance variables were compared – evaluations and job retentions – at the end of the year. Eleven drug-negative employees were fired and no drug-positive employees were fired during the period of this study' (Osterloh and Becker 1990: 508). Parish did not, however, look at alcohol use. Crouch et al (1989), suggest, in their research into absenteeism, accidents and costs of drug testing policy, that 'decreasing trends in vehicle and medical accidents demonstrate its [drug testing] effectiveness providing a safer working environment'. However, this study failed to explore non-drug variables and offered a small sample size.) Osterloh and Becker (1990) report a 40% reduction in absenteeism, a 50% decrease in disciplinary actions and 50% fewer accident claims by employees of General Motors following the introduction of drug testing.

Taggart (1989) reviewed the implementation of a drug testing policy for Southern Pacific Railroad. Between 1987 and 1988. He found that overall, 8.4% of all workers hired had a positive drug test; 13.3% of workers who had positive drug tests were fired within six months compared with 9.5% of workers with negative drug tests. There was a decline in personal injury rates (2,234 to 322) and the number of train accidents attributed to human failure (from 911 to 54) in the five-year period following the introduction of random workforce drug testing policies. He concludes that 'drug testing does make the workplace safer and increases overall public safety by substantially reducing accidents and injuries' (from 10% to 5%), and that testing acts as a powerful deterrent to drug use on the job. However, Macdonald and Wells (1994) note that the problem with this study, and with a number of similar studies, is that they do not always take account of other non-programme workplace developments. For example, regarding the study by Taggart in the Southern Pacific Railroad Company, Macdonald and Wells (1994: 138) point out that 'massive engineering improvements in the tracking system, the implementation of crew risk reduction programs, the expansion of training programmes and other safety improvements, ... occurred simultaneously with the use of the drug screening program (Jones, 1990). These measures may have accounted for the majority, if not all, of the reported reductions in accidents, injuries, and productivity problems'. Other criticisms that can be directed at Taggart's study include an absence of rigorous controls and absence of data regarding on-the-job use (Beswick 2002).

In spite of the industry specific nature of much research, Gerber and Yacoubian (2001) suggest that the construction industry has remained outside of the gaze of the research telescope, especially regarding the relationship between illicit drug use and occupational accident and injury. As a consequence of this perceived 'neglect', Gerber and Yacoubian (2001) attempt to assess the perception of substance misuse problems, explore factors associated with the implementation of drug testing, and examine the impact testing has on performance indicators, on incident rates and on employees compensation experiences within the construction industry. In doing so they combine an attitudinal survey of company officials (17% response rate from 405

questionnaires distributed (69 construction companies 49 of which had implemented workforce drug testing programmes)), with longitudinal / cross sectional analyses and analysis of incident data. With regards the impact of drug testing on injury incident rates, Gerber and Yacoubian (2001) report that those companies that test have experienced a general reduction in injury incident rates, from 14.6% per 200,000 work hours in 1988 to 8.8% per 200,000 work hours in 1998. 'The average company that drug tests in the study sample reduced its injury incident rate 51% within two years of implementation' (Gerber and Yacoubian 2001), from a rate of 8.9 injuries per 200,000 work hours to 4.4 injuries per 200,000 work hours. With regard to the impact of drug testing on performance indicators, Gerber and Yacoubian (2001) report that the top three organisational indicators, as reported by company officials, were an improvement in the overall safety the work environment, as well as in the quality of job applicants, alongside a reported reduction in workers compensation claims. With regards the latter, they state that 'the impact of drug testing in reducing MODs persists over time and is most effective in the first three years immediately following the implementation of a program' (Gerber and Yacoubian 2001: 443).

Elmuti (1994) conducted research in one manufacturing plant of a large, diversified, decentralised multidivisional corporation with a total of approximately 958 employees, located in the mid-western U.S.. The aim was to assess perceptual data on employee attitudes together with actual data on attendance and productivity rates. Questionnaire and archival data sources were used. The population sample included all full time employees from production workers, machine operators, supervisors and managers from all levels. Out of a total workforce of 958, 296 questionnaires were returned, generating a 31% response rate (Ten questionnaires were soiled, dropping the response rate to 30%). Analysis of organisational data drew upon a period spanning eighteen months prior to the adoption of a drug testing programme to twenty four months after the programme began. Elmuti (1994: 30) reports that following its implementation, for each measure assessed (percentage of time spent on production, efficiency rate, overall productivity rate, absenteeism, drug related injury) 'a great deal of improvement was shown', and 'The results indicate there were significant differences ( $p < 0.01$ ) between the two periods in percentage of hours spent on production ( $T = -3.78$ ), absenteeism ( $T = -4.60$ ) and drug related injuries ( $T = -3.85$ )' (Elmuti 1994: 30). Additional benefits of the implementation of workforce drug testing as reported by Elmuti (1994) include financial savings resulting from reductions in waste, sick leave, drug related injury and worker compensation payments. Other advantages include reduced property damage and improved performance.

A related argument forwarded by supporters of workforce drug testing policies is that the workplace can act as a forum for more general employee drug and alcohol reduction and education. This is premised on the belief that the implementation of workforce drug testing can have a deterrent effect. A number of research studies provide evidence of a reduction in employee alcohol and drug usage resultant from the introduction of workforce drug testing. For example, in the study by Taggart (1989) reported above, the percentage of positive tests amongst employee dropped from 22% to approximately 6% over the five year period.

Zwerling et al (1990), in their analysis of pre-employment testing of 2537 postal employees in predicting employment outcome suggest that 'many of the claims cited

to justify pre-employment drug screening have been exaggerated'. This was a view reinforced by Zwerling (1993) three years later; 'there are few data showing the effects of workplace drug screening on drug prevalence in the workforce'. They do identify that drug positive employees were more likely to be younger and black males. Criticisms which can be directed towards this study include the lack of control group, possible misclassification of drug screening, short term follow up review and that it did not differentiate between drug use on the job and pre-screening positive results. Ryan et al (1992) suggest in a follow up study to Zwerling et al that they 'remain concerned about the validity of projections of the benefits to industry of pre-employment drug screening beyond the first year of employment' (cited in Beswick 2002). Criticisms that can be directed at this study relate to the failure to explore social and behavioural characteristics, and the failure in providing information on the impairment hypothesis.

Zwerling (1993: 10-12) does report evidence of a reduction in drug use amongst the U.S. military resultant from the implementation of a drug testing programme. Using data from the Department of Defence undertaken by the Research Triangle Institute which focused upon all U.S. active military personnel across the world, with the exception of recruits, service academy students and persons absent without leave, Zwerling (1993) indicates a fivefold decrease in reported drug use. In 1980 the percentage numbers of service men that reported having used drugs in the last thirty days was 27.6%; in 1982 this figure had reduced to 19.0%; in 1985 the figure had reduced to 8.9%; with Zwerling reporting a further reduction to 4.8% in 1990. For Osterloh and Becker (1990: 508) the 'drug testing program of the military (U.S.) has been exemplary. The overall positivity rate has fallen from 48% in 1980 to 3% in 1987', although as they go on to point out, 'While these numbers reflect actual test positivity rates, the numbers from 1980 must be viewed with some scepticism because of the different testing techniques and criteria used in 1980 versus 1983 and thereafter'.

Borack (1998) details that the U.S. Navy's zero tolerance policy on drugs has been in effect since 1981, with the Navy utilising an 'aggressive' urinalysis programme. The objectives have been to deter and detect. For Borack (1998: 18), the 'deterrence effect of testing is the percentage decrease in users relative to those who would use drugs if no testing were conducted'. Borack (1998) reports that the number of Navy personnel reporting that they had used illicit drugs in the last thirty days reduced from 33% in 1980 to 4% in 1992. Borack (1998: 24) suggest that drug use in the Navy is estimated to be 60.2% lower than the rate of comparable civilian drug use. 'Drug testing appears to be an effective technique for reducing drug use in the Navy. The estimates ... indicate that approximately 56.5% of drug use is deterred by testing at present rates'.

Willette (1989) identifies that following the introduction of pre-employment drug screening, the U.S. Navy reported a reduction in positive tests, from 48% to less than 5%. Needleman and Romberg (1989), in research carried out on Navy recruits, Navy Service School members, Marine Corps Recruits and Marine Corps Service School personnel for the years 1983 and 1988 report a significant reduction in the marijuana rate for the four groups, the positive cocaine rate increased among all four groups, while the positive test rate for amphetamines and opiates remained relatively constant. Osbourne et al (1990 cited in Macdonald and Wells 1994; Martin et al 1994) conducted research into the effect of the implementation of a drug testing programme

in a nuclear power facility. Following the implementation of the programme over one year, they reported a reduction from 3% to 1% in the number of employees testing positive. Macdonald and Wells (1994) offer a sober response to a number of these studies. First, they highlight one crucial issue, the reduction in positive test results may be a result of drug users seeking employment in professions where screening is not conducted. Secondly, they draw attention to the fact that drug users may be able to cheat the testing process. Third, 'it may be that drug testing programs are implemented when unions are at their weakest; if so employees may resist using drugs in fear of being laid off or fired'.

In addition to its perceived deterrent effect, workforce drug testing is promoted as a means of detecting employee drug use. In part, the effectiveness of the detection function of drug testing depends on the nature of the programme implemented and the type of drug. There is no reason to believe that the presence of pre-employment testing will have an impact on employees' decisions to use substances once they are employed. For cause testing, which occurs after employees have been involved in an accident, may be useful for detecting drug users; but as employees do not anticipate being in an accident, for cause testing programmes are unlikely to have a deterrent effect. Random, unannounced drug testing has more potential to effect employee's behavior. Dupont et al (1995) identify that random tests are effective in identifying near daily users, but less effective in identifying infrequent users. The purpose of random testing is to intervene with heavy users of illicit drugs to discourage casual drug use in the workforce. 'Based on the nature of illicit drug use and the characteristics of random urine drug tests results, this study shows that random drug testing can be expected to accomplish both goals reasonably well' (1995: 16). However, because most employers administer random tests infrequently, the actual risk of detection may be too low to be a deterrent. There is also evidence, that some employees may thwart detectors by altering their own urine or even substituting drug free urine samples. Indeed, there is a growing cottage industry of 'beat the test' kits and related paraphernalia. Mieczkowski and Lersch (2002: 589), suggest that the potential for urine to underestimate employee use of particular drugs such as cocaine, necessitates the use of 'multiple drug-testing modalities in order to maximize the identification of different drugs'.

A more general argument forwarded by those supportive of workforce drug testing is that it can deter general societal drug using behaviours. Indeed, during the early 1980s the Organized Crime Commission in the U.S. promoted testing as a key element in a wider effort to combat the 'war on drugs', and it is a view that has been advocated ever since. Drug use, especially in the U.S. has declined over the last decade in the population as a whole – continuing a trend that began in the early 1980s. In 1979, approximately 14% of American adults reported having used an illicit drug in the month prior to the survey; a figure, which dropped to approximately 11% in 1985 and 6% in 1996. Three points of interest arise here. First, during the same period, the percentage of employee testing positive for drugs steadily declined. Second, this decline in drug use began prior to the introduction of workforce drug testing, and therefore it could be suggested that the declining percentage of positive tests merely reflects the decrease in overall drug use – 'a decrease that occurred among both employed and unemployed person' (American Civil Liberties Union 1999: 15). As the American Civil Liberties Union (1999: 15) go on to state, 'Since 1992, despite slight increases in rates of illicit drug use, the percentage of positive drug tests has continued

to fall'. A third point identified by the American Civil Liberties Union is that such figures relating to a decline in test positives is a result of a) the increase in the numbers of employees tested, b) growth in the nature and type of testing mechanisms, from for-cause testing (which usually identifies more positives test) to random and pre-employment testing (which are more likely to produce lower positive rates) and c) the nature and type of industry involved in testing has expanded (from heavy industry / transportation) to industries likely to employ more women and middle aged workers (who have low rates of illicit drug use). The American Civil Liberties Union (1999: 16) conclude by stating that 'More generally, it can be suggested that much of the research conducted on the effectiveness of drug testing suffers from methodological and conceptual flaws. For example, limitations often include small sample sizes, a general lack of data availability and questionable quality of data, an absence of rigorous controls and no differentiation between drug use on the job and pre-screening positives'.

The effectiveness of testing has also been promoted in terms of cost savings resultant from its implementation. NIDA estimates that the average cost of testing within the U.S., when accounting for the entire testing process from sample collection, storage, initial screening, confirmatory screening and evaluation by medical personnel, is around \$40 to \$60 per employee. Non-governmental sources indicate that this figure is higher at \$60 to \$85 per employee. In 1999, the United States House of Representatives Sub Committee on the Civil Service reported that 28,873 federal employees were tested at a total cost of \$11.7 million and only 0.53% tested positive, resulting in an average cost of \$77,000 to identify each employee who used drugs. These telling statistics provide powerful arguments in relation to the cost/benefit of testing for substance abuse in the workplace. Research has indicated that drug testing policies are not economically viable unless 10% of the workforce test positive for drugs, a situation less likely in an organisation with few employees. A prevalence of less than 1% positive tests would result in the testing policy losing money. If the incidence of positive tests is between 1 and 10% then the cost effectiveness of the policy will depend upon other cost assumptions (Zwerling and Ryan 1992) In addition, Crow and Hartman (1992) argue that the 'problem' of workplace drug taking has been exaggerated, with the cost effectiveness of screening programmes requiring re-evaluation. Concern is expressed about the over-willingness for organisations to spend large amounts of money combating perceived drug and alcohol abuse, without any prior assessment of the extent of the problem in their workplace. They argue that this has resulted in a moral panic facilitated by the media and political actors. They also point to the notion of 'contagious diffusion', a term used to describe the domino effect that may occur when one organisation implements a drug testing policy and others follow suit. For Crow and Hartman (1992) the reality is that too little is known about the extent and costs of drug taking and of testing, to warrant such a proliferation of screening policies. It has been argued that employers have a responsibility to wider society to use the workplace as a forum for drug deterrence and education, as the vast majority of people experiencing drug or alcohol problems are employed. In extending the arguments about the appropriateness of the workplace as a forum for drug and alcohol policies, Parrott (undated) argues that it will be necessary to satisfy several concerns prior to implementing any testing policies. These will assess whether or not

1. Drug testing poses a significant workplace problem
2. The proposed response will solve the problem
3. The benefits of intervention outweigh the costs

4. The response to a positive test is legally and ethically acceptable

He concludes by stating that the available research data is not sufficient to recommend workforce drug testing, suggesting that the data available offers little support for the effectiveness of such policies.

However, as Ozminkowski et al (2001: 68) point out, the true cost-benefit calculus remains unknown. Elmuti (1994), in his study of a mid western manufacturing plant reported that the implementation of workforce drug testing had proved to be cost effective over the twenty four months of its introduction. The study by Normand et al (1990) estimated that in excess of \$100 million would be saved on an annual basis if drug testing was implemented, savings would be made in leave time, termination procedures and overtime costs. Ozminkowski et al (2001), report on research into the cost effectiveness of two testing strategies (urinalysis at the work site versus off site testing) carried out in a large manufacturing company. They conclude that 'overall, the variable costs for on-site drug testing were significantly lower when compared with costs for off site drug testing ... total on-site drug testing costs were about \$17.31 lower per person tested, once at least 27 employees were tested' (Ozminkowski 2001: 67).

It is worth noting that the effectiveness of drug testing has also been promoted on the basis that it increases consumer and customer confidence. However, there is little research evidence on the impact workforce drug use has had, or can have, on the broader issue of customer and consumer relations. The potential detrimental effect of workforce drug use upon customer relations has not been taken for granted. For example, a guide on the dangers of drug use at work published in Great Britain by the Health and Safety Executive in 1998 states that successfully tackling drug taking within the workplace would enhance the public perception of that organization. However, at the time of writing, research is needed to determine the association and effects, if any, that drug use has on the customer, assuming causality or association is simply inadequate and problematic.

Beswick (2002: 37) asks 'is there any evidence that workplace policies are effective in reducing the ... business risks? Is there any evidence that workplace policies are effective in other areas relevant to employers and employees? E.g. enhancing the corporate image'. In response to these questions Beswick (2002: 37), argues 'A cursory glance at the literature suggest not'. In summarizing the research and scholarly research literature on the effectiveness of drug testing we would stress caution when reviewing the effectiveness of drug testing programmes in the workplace (Francis and Wynarczyk 1998: 188). First, prevalence rates remain low. Second, the causal link between illicit drug use and employee or employer risk is unsubstantiated. Third, research into the effectiveness of workforce drug testing is inconclusive. With regards research into pre-employment drug screening, Macdonald and Wells (1994) identify a number of limitations that question the efficacy of the method of testing. While some pre-employment studies have suggested lowered job performance, they neglect to analyse individual user characteristics (type of drug, nature of use and degree of addiction), and such studies do not include the large variety of over-the-counter and prescription drugs, which may also effect job performance. Moreover many studies (as cited earlier) indicate that minimal differences exist in terms of lowered job performance between those that test positive and those that test negative in pre-employment programmes. Finally, Macdonald and

Wells (1994: 137-9) stress caution in measuring the 'outcome effects' of regulation as measured in the percentage reduction of accidents, injuries and performance problems resultant from some form of regulatory mechanism, such programmes fail to take account of the possible and actual effect of non-drug testing factors (such as increased employee training, superior capital equipment and better management and supervisory arrangements) in reducing risk. Indeed, such measures may account for the majority of the reduction of risk, thus problematising the effectiveness of workplace regulatory mechanisms themselves.

Given these points, Macdonald (1995) suggests that drug testing does not appear justifiable especially in light of the punitive consequences of testing positive. He concludes by stating that 'faced with current evidence regarding the relationship between drug use and injuries coupled with the numerous issues surrounding testing, the intrusive and punitive nature of such programs, the costs associated with implementing them, and the negative consequences of testing, drug testing programs do not appear to be an effective or desirable means of reducing injuries in the workplace' (Macdonald 1995: 718).

## **7. EMPLOYMENT ISSUES AND WORKFORCE DRUG TESTING**

### **7.1 Overview**

The research literature suggests that that difference in perspectives between employers and employees toward drug testing programmes can be expressed as of competing interests between the employers right to a drug-free workplace and the employees right to privacy. While employers who test their respective workforces for substance use see workforce drug testing programmes as a reasonable course of action, research indicates that some employee groups, worker organisations (including trade unions) and researchers tend to see workforce drug testing programmes as intrusive and unnecessary.

The research literature suggests employee attitudes toward workforce drug testing vary according to their assessment of the 'fairness' of the testing programmes and the particular testing strategy used (Mastrangelo and Popovich 2000). Within the literature there is evidence of a relationship between 'unfair' employee perceptions of testing and increased conflict with employers, evidenced by a reduction in morale and performance, and negative perceptions of the organisation (Ambrose 2000). It would also appear that these responses, and the application of testing programmes, are contingent on the wider social values and norms of individual employees, in addition to their past drug use history (Truxillo et al. 2000). Research also suggests that drug testing programmes are more likely to be accepted by employees if worker organisations and trade unions are involved in both the development and implementation of them (DeCresce et al. 1989; Knowles and Riccucci (2001)

Research also suggests that beyond the workplace, workforce pre-employment screening may deter high quality candidates from applying for employment, with some employers forgoing this type of testing in times of low unemployment (Sulman 2000; Ambrose 2000). There is also a developing body of research evidence suggesting that chronic substance use significantly impacts on employment status and occupational attainment, although non-chronic use appears to have little impact (Madonald and Pudney 2000b; French et al. 2001)

The remainder of this section provides a review and summary of the research literature examining: (a) the differing attitudes of employers and employees toward workforce drug testing; (b) employee reactions to differing drug testing programmes; (c) the impact social norms and values, and individual drug histories, have on employee perceptions of drug testing; (d) the role worker organisations play in the development and implementation of testing programmes; (e) the impact of testing on organisational labour supply; and (f) the relationship between drug use and employment status, occupational attainment and wage levels.

### **7.2 Findings**

Firmly located within the study of personnel management, a number of researchers have identified that workforce drug testing is seen as analogous to other pre-employment selection criteria - as a device for selecting appropriate employees (Blum et al. 1994; Trice and Steele 1995; Arthur and Doverspike 1997). The main

stakeholders involved in testing in the workplace are employers, employees, and to an increasing extent, the members of the judicial system, all promoting their own self-interests and needs (Knowles and Riccucci 2001). For employers, drug testing represents a way to combat the use and abuse of both legal and illegal substances amongst employees. Employees, both individually and collectively through trades unions, legitimately seek to limit the intrusiveness of testing programmes and to ensure fairness. The judicial system is involved in setting the parameters of what is, and what is not, legal.

A number of researchers have identified that testing for alcohol and illicit drug use in the workplace is a growing trend, especially in the U.S. workplace (Murphy and Thornton 1990; Konovsky and Cropanzano 1993; Macdonald and Wells 1994; Kaestner and Grossman 1995; Macdonald 1995 Brunet 2002).

Providing evidence from research undertaken in 1988 and 1991 with human resource managers in organisations with over 250 employees, in 297 sites in Georgia in the U.S., Blum et al. (1994) suggest that while some employers initially elected not to follow the testing trend, the numbers of such employers are decreasing. This research suggests that, in both research 'time' periods respondents were positive about the effectiveness of testing in relation to workplace safety and performance, although their replies indicated a clear decrease in the perception that testing posed a threat to individual privacy over the same time period. Respondents did not report a concern with accuracy and cost of testing programmes. The main conclusions drawn by Blum et al. (1994) are that among human resource managers, drug testing is becoming a more acceptable, legitimate and worthwhile workplace practice. Increasing exposure to, and experience of drug testing does not affect this view. As might be expected, those human resource managers from organisations that did not test were the least positive with regard to workplace drug testing. Interestingly, those production sites without an EAP were more likely to support testing. Blum et al (1994) conclude that isolated testing programmes may be perceived by some employers as a technological short cut to solving drug related problems in the workplace, and a substitute for more comprehensive (and potentially more expensive) approaches to substance misuse in the workplace.

Cranford (1998), while supporting the concept of workforce drug testing, argues that in many instances workforce drug testing amounts to treating employees simply as a means to an economic end, and therefore testing is fundamentally inconsistent with the central values of human resource management (HRM): human worth and personal dignity. In looking at the 'place' of drug testing in relation to staffing and other performance management functions within organisations, he suggests that for some employers profit maximisation is the main justification for testing. He concludes that if drug testing were not perceived as being in the best interests of the company in financial terms, then it would not be the issue it is today.

Cromer and Buda (1996) in a survey of 134 human resource managers (50 of whose organisations tested employees and 84 did not) found that those respondents who were aware that testing could not assess impairment were more likely to see testing as invasive. In a more recent study, Beck (2001) reports that some human resource professionals are beginning to question the effectiveness of testing, identifying organisational consequences such as a lowering of employee morale and difficulty in

recruiting suitable applicants in addition to ethical issues relating to the invasiveness of testing.

For employees, some research suggests that workforce drug testing programmes result in a perceived continuous need to prove innocence, even when there is no suspicion of guilt. (DeCresce et al. 1989; Knowles and Riccucci 2001) Additionally, as testing for alcohol and illicit drug use involves forensic, rather than medical testing, a number of researchers have identified that scientific principles become merged with legal issues, converging workplace and criminal law enforcement (DeCresce et al. 1989, Lieberwitz: 1994). Furthermore, the literature suggests that testing can adversely affect the work attitudes and behaviours of employees (Comer 1994), producing negative attitudes towards the company (Vecchio 1996), and creating suspicion and mistrust (Seijts et al. 2002). See also Konovnsky, and Cropanzano, (1991); Sujak et al (1995); Arthur and Doverspike (1997); Ambrose (2000). In a 2 year study of 296 employees from testing firms in the U.S., Elmuti (1994) found employees expressing negative feelings and actions toward their employer; exhibiting decreased motivation; and a lowering of morale.

Konovsky and Cropanzano (1993: 179) suggest that, ‘Although drug testing is an intrusive personnel selection and evaluation device and is often considered a threat to employee rights, much of the available data indicate that employees have surprisingly favourable attitudes toward drug testing’. For Gilliom (1994), U.S. employees’ opinions of testing have been significantly affected by the political and media portrayal of a national drugs crisis in the late 1980s, which led many employees to accept the significant intrusions into their private lives brought by drug testing programmes. For Gilliom (1994), however, this analysis is simplistic as social crises may create quiescence but other contexts and values can and will mitigate their impact. The individual’s assessment of drug use in their own place of work, and their personal beliefs around whether testing violates individual rights to privacy and the due process of the law, impacted heavily upon employees’ attitudes towards testing.

Based on a study of the experiences and opinions of individual workers from one large U.S. union, Gilliom’s (1994) research, while not claiming an insight into all employees’ views, does offer valuable insights into the views of individual workers. The defining context of employees’ response to testing is for Gilliom, (1994: 62) ‘the cultural abstraction known as a right’. Gilliom’s (1994) research provides an overview of employees’ opinions with regard to four types of testing programme (see table below).

	<b>Random</b>	<b>Pre-employment</b>	<b>Post-employment</b>	<b>Suspicion / Accident</b>
<b>Oppose</b>	67%	43%	34%	34%
<b>Undecided</b>	10%	12%	19%	10%
<b>Support</b>	24%	46%	47%	56%
<b>Total Res.</b>	797	783	773	777

Source: *Gilliom (1994)*

The greatest significance of these figures can be seen in the difference between programmes based on random testing (67% oppose testing), and those based on suspicion (56% support testing). Gilliom (1994) concludes that these disparities can

be traced to individual beliefs on the severity of the drug problem, and the extent to which drug testing threatens or advances individual values. Alternatively, it could be argued that results may be influenced by the respondent's identification with the position of the tested. Gilliom (1994) importantly identifies the relationship between different types of testing policies and employees' attitudes towards such policies. The programme most threatening to the employee (random testing) has the least number of employees opposing it, and the programme least threatening (testing on suspicion or following an accident) has the largest majority of employees supporting it.

Gilliom's (1994) findings are supported by Butler's (1993) research carried out with Canadian workers in the transportation industry. The following table shows the responses from workers within each transport sector. The respondents were employed by organisations that operated drug-testing programmes; the post accident test clearly emerges as the least problematic for employees. An interesting point is that workplace testing programmes are not rejected by the participants, including the testing method which is most 'threatening' to employees, the random test.

<b>Testing situation</b>	<b>Airport</b>	<b>Aviation</b>	<b>Marine</b>	<b>Surface</b>
<b>Pre-employment</b>	66% - 74%	45% - 88%	41% - 56%	70% - 75%
<b>On transfer or Promotion</b>	48% - 61%	24% - 48%	29% - 35%	37% - 52%
<b>Returning to work after leave/lay-off</b>	37% - 53%	22% - 55%	22% - 28%	38% - 52%
<b>On reinstatement after treatment</b>	74% - 81%	63% - 86%	56% - 67%	78% - 84%
<b>Following and accident/incident</b>	90% - 95%	79% - 98%	72% - 80%	93% - 94%
<b>For Cause</b>	72% - 87%	48% - 88%	51% - 64%	79% - 81%
<b>Unannounced random testing</b>	48% - 61%	30% - 71%	30% - 36%	49% - 62%
<b>As part of routine medical check-up</b>	68% - 80%	54% - 86%	48% - 57%	68% - 85%

Source: *Butler (1993)*

Butler (1993) outlines similar evidence from surveys carried out by Imperial Oil and Gallup. Respondents (employees) generally supported testing: for cause (66%); on reinstatement (65%); pre-employment (48%); following an accident or incident (44%); and random testing (27%). For safety sensitive positions, the figures relating to support for drug testing were unsurprisingly higher: for cause (80%); on reinstatement (83%); pre-employment (72%); following an accident or incident (62%); and random testing (46%). In the Gallup (1994) survey, 95% of respondents thought testing should be allowed in certain circumstances, and only 4% reported that testing was unnecessary.

Recent research carried out by Mastrangelo and Popovitch (2000) reports that the perceived affect drug testing programmes have on organisational climate and employee behaviour is based on limited empirical evidence. Following a survey of 66 manufacturing employees in one U.S. firm, Mastrangelo and Popovich (2000) found that while employee attitudes of fairness did indeed negatively impact on employee attitudes of testing, those perceptions were significantly influenced by social factors

both inside and outside the workplace, as the employees' subjective norms on testing were determined by the attitudes of family and friends toward testing. Mastrangelo and Popovich (2000) also agree with Cranford (1998) that the negative impact of testing is also mitigated by increased exposure to and experience of testing, eventually creating acceptance. Kravitz and Brock (1997) state that employee responses to drug testing programmes vary dramatically, with age; education; political attitudes; income; and knowledge about the testing programmes affecting individual responses. Despite the apparent ambiguity in these studies, the concept of 'fairness' is one that runs throughout the literature concerned with employee attitudes to drug testing programmes (Crant and Bateman 1989; Konovsky and Cropanzano 1991; Sujak et al. 1995; Mastangelo and Popovich 2000; Bennet 2000). For Ambrose (2000), as the incidence of testing increases so do the concerns of employees, with the characteristics of different programmes affecting individual concepts of fairness as evidenced above from Butler (1993) and Gilliom (1994). According to Arthur and Doverspike (1997) testing programmes will only be perceived as fair if testing is for probable cause; following advanced notice, rather than random testing; is specific to safety sensitive occupations; with results kept confidential. Any testing programme, these authors suggest, should be based on clearly established need, developed and implemented with trade union participation, and the consequences of positive test results should be rehabilitative rather than punitive.

Perceptions of fairness may also be constructed by personal drug use history. Truxillo et al. (2000) in an examination of employee attitudes towards workplace drug testing using the variable of personal drug use history, found that those employees who had never used drugs reported testing 'fairer' than non-drug users with a history of use. Current users, as may be expected, found testing less fair. This study highlights that the element of self-interest is very important in any understanding of individual attitudes toward drug testing. The testing programme most acceptable (or fairest) for employees, causing the least disruption to the employment relationship, would appear to be those based upon pre-employment and / or for cause; with the least acceptable testing programmes appearing to be random testing without notice (Buler 1993; Gilliom 1994; Kravitz and Brock 1997; Ambrose 2000).

The impact of drug testing programmes in the workplace is also contingent on other social factors. For example Bennet et al (2000) argue that testing programmes require a supportive workplace environment, especially supportive employees. Bennet et al (2000) argue that co-workers of substance abusers can be part of the problem, in that they can actively enable use by making the substance available; or by picking up the slack for 'using' colleagues. Co-workers can, by facilitating the using employee to seek help, also be part of the solution. This research is supported by that of Delaney and Ames (1995) who found that supportive colleagues and positive relationships with supervisors have the potential to rule out abuse. This contrasts with Hazeldon's (2002) research findings that suggest that abusing employees do not self-report due to the fear that they will lose their jobs.

Key to the success of any testing programmes are the structures for reporting abuse, and the role of supervisors within these structures. (Hood and Dunhorn 1995). Hood and Dunhorn (1995) following a survey of 498 nurses, offer 2 models of reporting strategies for workers confronted by abusing colleagues. Firstly, the vulnerability model: where workers in the least secure positions are unlikely to make formal

reports, due to a fear of the consequences to themselves. Secondly, the occupational hegemony model: where administrators may avoid formal reporting to maintain control over their own work environments. To understand the difference between policy structure and policy implementation, attention must be paid to who loses and who gains from the testing policy. The deficit between the policy aims and policy outcomes can be discovered in the differences between what the authors describe as the 'street knowledge' about what goes on in the workplace, and the 'book knowledge' about what should happen (Hood and Dunhorn 1995). The occupational hegemony model offered by Hood and Dunhorn (1995) places supervisors at the heart of policy implementation, and as the general literature on the role of the supervisor in the workplace suggests (Delbridge and Lowe 1997), they are the people in the middle, acting as buffers between senior managers and the shop-floor. In contrast to the occupational hegemony model offered by Hood and Dunhorn (1995), Bamberger and Sonnerstuhl (1995), from their study of referral networks, conclude that 'peer counsellors', especially when they come from the lower ranks of an organisation, are more successful conduits for referral than supervisors and those in senior positions, as these individuals have difficulty in gaining access to the networks of the lower ranks

Worker organisations have been major players in the drug testing arena, seeking to protect the rights of employees from unnecessary or unwanted government intrusion. They have also been vociferous critics of employee drug testing on the grounds that testing is an unfair, proving unwarranted intrusion into employees' privacy rights. Despite U.S. Supreme Court rulings, trade unions have continued to wage constitutional challenges to drug testing policies and programmes, seeking to represent the rights of their members. In addition to case law, trade unions have relied on labour and administrative law to influence drug testing, in particular pushing a number of states in the U.S. to make drug testing and its various procedures mandatory issues of bargaining. In short, unions view drug testing as a 'threat to members rights, and, therefore, a threat to the unions' security as the employees' exclusive bargaining agent' (Knowles and Riccucci 2001) Thus, the formulation, implementation and assessment of any workforce drug testing policy will arise through a process of negotiation. At the heart of any negotiation over testing programmes will be the need to balance management rights with employees' privacy (Alvi 1994).

DeCresce et al. (1989) suggest that organised labour in the U.S. is, at best, ambivalent towards workforce testing. While a number of U.S. trade unions have disputed workplace drug testing policies, others have acknowledged that employers and individual employee's concerns about safe working environments deserve consideration. For example, some unions, representing employees who work in safety sensitive occupations have welcomed programmes with an acceptable testing policy combined with opportunities for welfare and support. (DeCresce et al. 1989)

Research has also indicated that other trade unions in the U.S. have taken the view that testing policies are first and foremost a threat to employee rights, and as a consequence, to the trade unions' position as the exclusive bargaining representative. In order to maintain this position when faced with the proposed introduction of drug testing, trade unions have, according to DeCresce et al. (1989) negotiated, arbitrated or capitulated. They go on to argue that trade union challenges to testing policies will be reduced if employers emphasise the seriousness of the need to test; promulgate a

policy that accounts for the limitation of testing systems; and develop procedures that provide a greater certainty of outcome. Where testing policies have been resisted, the principle weapon of the trade unions has been either to attempt to invalidate the arguments for testing as a whole, or to challenge the procedural practices and disciplinary outcomes in individual cases (DeCresce et. al. 1989). Some unions have attempted to shift the focus away from testing policies towards EAPs. and co-operation increases when a trade union has been involved in the formulation of the testing policy, and where officials are included in the training sessions given to supervisors. The most successful outcomes are achieved when supervisors and stewards work together before formal discipline is imposed.

Research suggests that employees in non-union workplaces are forced to promote their rights individually or as a group, but overall, they lack the benefit of protection provided by a collective-bargaining contract, not to mention the institution of the union itself. Thus they tend to find themselves confronted with drug-testing programmes that are less well defined and are devoid of any concern for employee rights (Knowles and Riccucci 2001).

There is a also a growing body of evidence that suggests that testing for alcohol and drug use, (especially pre-employment testing which is by far the most common type of drug testing (Current 2002)), can impact negatively on recruitment. It is argued that pre-employment testing has resulted in large numbers of well qualified potential employees excluding themselves from organisations that test. (Lloyd 1998; Crant and Bateman 1999, Murphy et al. 1990; Ambrose 2000; Sulum 2000; French et al. 2001) For example, Lloyd (1998) reports evidence from three large employing organisations in the U.S. where there is evidence that 'fear of pre-employment testing programmes' may be deterring candidates from applying for posts'. In particular, the Colorado Department of Transport demonstrates that, prior to the introduction of pre-employment testing, an average of 3,000 applications were received for each position. Following the introduction of pre-employment testing, this figure had fallen to approximately 300 applications per post. The Colorado Department of Transport also reported a 50% positive test rate in the first year of testing, a figure now standing at 2%, cursory evidence that suggests habitual drug users exclude themselves from the labour market. Crant and Bateman (1990 cited in Bader and O'Hara: 1991) from a survey of undergraduate business students, concluded that the respondents would be less inclined to apply for posts in organisations that test for drug or alcohol use. The authors argue that this does not indicate a fear of testing positive for substance use, but rather, that respondents would prefer to work in organisations where drug testing programmes were unnecessary. For Crant and Bateman (1990), this is further evidence that drug testing policies have the potential to negatively impact upon the labour market and recruitment efforts. Population statistics suggest a decline in the pool of entry-level employees in the U.S., and this combined with reluctance of some potential employees to apply to organisations with drug testing policies, may lead to an even greater labour market impact.

In 2000 the American Civil Liberties Union argued that testing was making it harder for employers to attract highly qualified applicants (Sulum 2000). Ambrose (2000) argues that the attitude of applicants toward testing can generalize to the employer, and may affect job search behaviour, acceptance patterns and loyalty to the employer post-hiring. This can be a major problem at times of low unemployment with a

reduced pool of candidates to choose from (May 1999). Such has been the seriousness of this problem that, as a response, firms short of employees are lowering their recruitment standards. This has included the suspension of pre-employment testing in times of labour shortage (Lloyd 1998; Beck 2001 Spell and Blum 2001). In the most recent literature concerned with the consequences of pre-employment testing, Mastrangelo and Popovich (2000) suggest that job seekers now perceive pre-employment testing to be more acceptable than other commonly used personnel procedures such as personality testing.

Research indicates that one of the most significant impacts on the labour market is not that of workforce testing, but the impact drug and alcohol use has on labour market participation. French et al. (2001), in estimating the relationship between illicit drug use and labour market status, found a significant association between chronic drug use and unemployment, with non-chronic use not statistically related to unemployment. Most significantly in this study is the lack of any meaningful association between casual drug use, unemployment and labour force participation. In a study of drug use in England and Scotland, Macdonald and Pudney (2000b) make the distinction between hard and soft drugs. Their findings underpin those of French et al. (2001) in relation to hard drug use, but report a positive relationship between soft drug use and occupational attainment in younger people. In a similar study Macdonald and Pudney (2000) found no association between past drug use and occupational attainment. With alcohol, Macdonald and Pudney (2002) found positive returns with moderate use of alcohol, returns that decrease as consumption increased.

The impact of drug use on wages is at best ambiguous, and vary according to the substance of abuse and the characteristics of the individual user. For example, Kaestner (1991; 1994b) and Gill and Michaels (1992) find a positive association between the use of marijuana and cocaine and wages. Kandel et al. (1995) concluded that this positive association disappears with age, becoming a negative association with increased age and use. However, using the same data as Kandel et al., (1995), Burgess and Propper (1998) saw no impact of drug use and wages. For Macdonald and Pudney (2000) the ambiguities over the relationship between drug use on wage levels is caused by inadequate data.

## **8. WORKFORCE DRUG TESTING, SURVEILLANCE AND SOCIAL CONTROL**

---

### **8.1 Overview**

Alongside the growing popularity of workforce drug testing has arisen a concern within the research literature about the process and outcome of testing (Ambrose 2000; Cromer 1994). For a number of researchers, workforce drug testing can be delivered discriminately, produces ‘false positives’ whereby non-alcohol and / or drug using employees are identified as ‘users’, and there is a potential infringement of an employee’s right to privacy. For a number of these researchers, workforce drug testing represents an extension of surveillance and social control, in which traditional distinctions between an employee’s personal and professional life become ‘blurred’ or indistinguishable.

Most of the research literature is North American, although over recent years there has been an increase in the number of articles written by researchers working in the UK and Europe. Some of it draws upon empirical field research studies, although much of it is speculative and theoretically based, drawing upon contemporary debates popular within various academic disciplines including politics, criminology, sociology and economics.

This section provides a review and summary of the research literature examining (a) questions relating to the fairness and accuracy of workforce drug testing and (b) workforce drug testing as a technique of surveillance and a form of social control.

### **8.2 Findings**

McCahill and Norris (2002) locate discussion of workforce drug testing in a review of three consequences of contemporary technologies of surveillance. First, they suggest that individuals can be disproportionately targeted (e.g. on the grounds of age, sex and race). Cromer (1994) reports that the research conducted in the late 1980s on U.S. Postal Service employees raised questions as to the possible ethnic discrimination in workforce drug testing (see the work by Normand et al 1990; Zwerling et al 1990). For example, the study by Zwerling et al (1990) identified that ‘despite having lower absenteeism, fewer injuries and no more accidents, the African-American workers were 143% more likely to be terminated’ (Cromer 1994: 261). McCahill and Norris (2002) also identify that ‘some writers have argued that technologies such as hair testing have a built in bias that discriminates on the grounds of race’ (2002: 132).

Second, McCahill and Norris (2002) suggest that information gathered can be used inappropriately or not in accordance with stated aims and objectives. For example, research has noted that licit substances and ‘medical conditions’ may be identified as part of the testing process. McCahill and Norris (2002) detail that the results of drug testing have been used to screen female candidates for pregnancy and to ascertain the medication employees and applicants are prescribed. McCahill and Norris (2002) also highlight, drawing upon the work of Holtorf (1998 cited in McCahill and Norris 2002: 135-136) ‘that information from drug tests is also being shared via computer

databases with other employers, government agencies, and insurance companies, leading to a form of 'high-tech blacklisting'.

Third, they suggest that workforce drug testing has the potential to produce 'false' information that may have negative consequences for employees (McCahill and Norris 2002: 121). One crucial example concerns the production of 'false positives' (DeCresce et al 1989). Research has identified that false positives can occur when employees have consumed over the counter medications and prescription medications (DeCresce et al 1989); and as a result of digesting certain foods (the metabolites of certain foods are similar to, and can be mistaken for, those of illicit drugs). An example here, according to McCahill and Norris (2002: 138) are poppy seeds, which are 'collected from the same plant that produces morphine and codeine and can produce a false positive'. Another determining factor in the production of false positives, as identified in the research literature, is the testing process itself (Cromer 2000).

For Gilliom (1994), research has identified that error is an inescapable factor with regards the process of workforce drug testing. In research carried out by Morgan (1988), it is suggested that EMIT will be 'mistaken' in between 5% and 38% of cases. While the Gas Chromatography / Mass Spectrometry (GC/MS) method is 100% accurate under laboratory test conditions, Morgan (1988) has suggested that even this technique could be inaccurate in between 3% and 5% of cases. For Gilliom, while the accuracy of testing has improved considerably over recent years, and therefore these figures are of less value today, research continues to identify factors that can impact upon the accuracy of testing (Abbasi et al 1988; Elliot 1989; Feit and Holosko 1990).

A particular element of the testing process that research has indicated is open to error is the chain of custody stage. Ensuring that the testing process is professionally delivered, that test samples are not mixed up, and that test results are attributed to the person who provided the corresponding sample, are all factors that can produce error. One important issue here concerns human failing. Gilliom (1994) reports that 'while error rates can be brought down to a tiny level with expensive replication and verification, the ever present spectres of human error, cost cutting and the imperfections of science mean that mistakes will always be made' (Gilliom 1994: 8). Another aspect concerns the nature and quality of the 'testing' industry. Research suggests that as testing has expanded, and respectable laboratories have received increasingly heavy workloads, there has been a growth in inexpensive and low quality laboratories. As the BNA (1986: 30-31) point out, 'unskilled laboratories are entering the business to cash in on the boom in drug testing'. Cromer (1994) reports that in the U.S., the National Institute has set standards for laboratory certification for Drug Abuse; however, less than 7% of U.S. drug testing laboratories had met these standards in the early 1990s.

Research has also acknowledged that positive test results do not establish impairment (CWD 1993; Gilliom 1994; DeCresce et al. 1989; Cromer 1994). Drug tests can only distinguish between employees who have been exposed to a drug and those who have not (Cromer 1994), and can only measure whether metabolites are present or absent in the body. These metabolites are, according to Gilliom (1994), 'a poor indication of the time or degree of drug use because individuals vary in the rate at which they process them. Since both the generation of metabolites and the generation of urine vary both

with individuals and circumstances (e.g. heavy water consumption or exercise), there is no way to establish a urine-based measure of the recency or intensity of drug use' (1994: 9). A positive result does not indicate patterns of alcohol and drug use or the nature of dependency. Moreover, it does not provide any information as to how exposure to the drug occurred, and the detection period differs across drug types. Macdonald (1997) highlights that alcohol tests can determine whether an employee is under the influence of alcohol and the degree of impairment (Macdonald 1997: 252).

As time of ingestion and degree of impairment cannot be identified, some researchers have suggested that drug testing has simply become an insidious means of subverting the normal requirement of 'just cause' before an employer can discipline or discharge an employee (DeCresce et al 1989). Baumrin (1990) explores 'social welfare versus worker freedom issues' arising from drug testing and suggests that the benefits of the social welfare argument have not been substantiated, whilst employee freedoms have been challenged. Furthermore, researchers suggest that testing has the potential to negatively impact upon the relationship between the employer and the employee. As DeCresce et al (1989: 133) state, 'The threat that the employer may regulate what [the employee] can and can not do on their own time may eventually convert loyal and dedicated employees to suspicious and antagonistic employees, or lead them to resign'.

Such concerns have led a number of researchers to develop arguments suggesting that workforce drug testing is a technique of surveillance and a form of social control (see for example Hecker and Kaplan 1994; Gilliom 1994; McCahill and Norris 2002; Moore and Haggerty 2001). Locating the development of testing within a wider social, political and cultural context, Hecker and Kaplan (1994) advance what they see as a contemporary control paradigm - 'the new sobriety' (1989: 701). Drawing upon arguments from sociology and political science about the growth of an ever increasing disciplinary society based upon sophisticated 'scientific' systems of surveillance, regulation and control supported by technological advances, Heckler and Kaplan (1994) view drug testing as part of a movement towards a 'Brave New Workplace' (1989: 694). For these writers, the difference between earlier historical periods and the present are 'more the specific techniques than in the essence of workplace surveillance, discipline and control, which are integral to industrial and post-industrial capitalism'. For example, Hecker and Kaplan (1989) detail how employers are increasingly using technology to listen to, and watch employees through CCTV, the recording of phone calls, and the monitoring of emails. In the case of substance abuse, medical technology has allowed the panoptic workplace to extend its surveillance, control, and discipline into the body of the worker and into his or her off-duty life. In this sense, drug testing, rather than being a necessary requirement to deal with a social problem, is simply a logical extension of the control process made possible because the technology exists. In other words, some employers may test for substance simply because they can. Certainly there is evidence that workforce drug testing has been implemented by many employers with little or no research to ascertain whether alcohol or illicit drug use is a problem in their organisation, and with little or no understanding of the shortcomings of testing (Crow and Hartman 1992).

For Gilliom, (1994) the expansion of testing can only be understood within the broader social and political context of the last thirty or forty years, and in particular

the Reagan administration's 'war on drugs' programme; 'the controversy over employee drug testing is inseparable from the broader intensification of the society's focus on illegal drugs in the mid 1980s' (Gilliom, 1994: 17). For Gilliom (1994: 43) 'the conservative law and order philosophy that prevailed in the 1980s eschewed ... strategies (dealing with poverty and inequality) as ineffective and turned instead to heightened surveillance and tougher punishments ... testing was a central tool in the arsenal'. Indeed, for Gilliom (1994), drug testing is not an isolated policy, but part of a wider programme of control that is expanding across a variety of sectors, workplaces and more informal settings in which new means of systematic surveillance are enhancing various organisations and enforcement agencies ability to monitor behaviour. Examples Gilliom (1994) provides include computer matching for welfare fraud, income tax evasion, computerization of police records, and eavesdropping on phone calls.

According to Heckler and Kaplan (1989) such developments raise various issues for employee rights and union resistance. Additionally, Heckler and Kaplan argue that wide scale support for testing raises serious problems as to the extent to which detractors of testing are able to be critical of such developments without being derided for questioning the effectiveness and efficacy of the new 'surveillance'. Hecker and Kaplan (1989) summarise the dilemma facing trade unions by stating that 'The seemingly depoliticised positive overtones of the concept of the "drug free workplace" make any resistance to measures that are aimed at controlling private habits seem like the advocacy of insobriety and inefficiency'. (1989:704)

The central argument of these writers is that whilst drug testing policies tend to be viewed as protecting the collective interests of all (employee, employer and customer alike) in a society where drug consumption is widely prevalent, particularly alcohol consumption, they can also represent an additional workplace control mechanism, one which extends beyond the workplace. For the first time, testing policies have given management access to, and some control over, the body of the employee, (Blaze-Temple 1990). This control extends outside the workplace and working time, giving the employer influence over the social and physiological life of the employee. This intensification of surveillance and, by implication social control, not only blurs the boundary between work and non-work activities but places a premium upon the latter not being detrimental to the former. The employee must not only be an appendage to a machine but constantly monitored to ensure their being a healthy and productive appendage (Francis and Wynarczyk 1998). Acknowledging the potential for drug testing as a mechanism of surveillance and control, demands acknowledgement also that employers have never been omnipotent, and employees have often done everything in their power to resist, circumvent, even ignore, all other forms of control (Blaze-Temple 1990; Beaumont and Hyman 1987; Ackroyd and Thompson 1999).

Moore and Haggerty (2001) examine the development and growth of home drug testing kits and the industry responsible for it. They suggest that as a less state-centred approach to anti-drug strategies has developed (as a result of the perceived failure of the war on drugs in the U.S.), home testing has emerged as a means of state-free drug regulation offered to specific populations. Indeed, they go on to suggest that the war metaphor, so closely related to strategies promoting the reduction in drug use in the U.S. is slowly being supplanted, or at least augmented by the reintroduction of a disease metaphor. They suggest that rather than allowing for an environment where

harm reduction can be embraced, the disease metaphor leaves existing governmental strategies largely unreconstructed, while at the same time allowing for the emergence and expansion of new strategies of drug control to regulate populations traditionally outside the main thrust of anti-drug initiatives. 'The advent of home drug testing is congruent with neoliberal trends towards mobilizing private entities like the family to engage in regulatory practices that were previously concerns of the state ... Home drug testing is theorised as a tool of surveillance that offers a very particular scientific gaze trained on the seemingly indefensible adolescent body' (2001: 377).

## **9. The Extent and Nature of Societal Alcohol and Illicit Drug Use and Workforce Alcohol and Illicit Drug Use**

---

### **9.1 Overview**

This section reviews the research literature on the extent and nature of alcohol and illicit drug use as it relates to the general population and to those in employment. The data presented is based upon the most recent survey evidence available in the U.S. and the UK. Comparisons are also made with previous surveys and research studies.

While there is a wealth of research evidence relating to the prevalence of alcohol and illicit drug use, statistical and other data is at best partial and at worst unreliable (Francis and Wynarczyk 1998). For Beswick (2002), measures, both qualitative and quantitative on societal and workplace use differ across countries; surveys tend to focus on the young and are not longitudinal; while information and data collected by enforcement agencies such as the police and customs are collected to meet the demands of the enforcement communities rather than for an exploration of underlying trends; and they identify those who are 'known' to them through detection and enforcement.

With regards alcohol and illicit drug use in the workplace, Martin et al (1994:3) report that, 'there have been few systematic attempts to document these behaviours [alcohol and illicit drug use] empirically among employed persons', and those that do suffer from serious methodological and conceptual weaknesses (Macdonald and Wells 1994). In consequence, as Francis and Wynarczyk (1998) point out, while it is relatively easy to assert that alcohol and drug use is a major workplace problem, it is much more difficult to empirically demonstrate. In part, the lack of information is the result of the difficulties of measurement. Fillimore and Caetano (1982) have documented the difficulties associated with securing reliable estimates of employee alcohol prevalence rates, and for the most part obtaining reliable documentary estimates of workplace illicit drug use is similarly, if not more problematic. Findings range from gross average 'guesstimates' based upon a proportion of employees across a number of companies, to details about individual addicted persons. Such variety in the use of 'operations and populations' to assess levels of maladaptive uses of alcohol and drugs contributes to uncertainty, given that estimates generally vary depending upon the population studied and the measures utilized (Martin et al 1994: 10).

International comparisons of the prevalence of drug use are equally as complex. For example, as the European Monitoring Centre for Drugs and Drug Addiction (EMCDDA) point out 'Illicit drug use is strongly related to age. A major pitfall for cross-national comparisons is that they do not take into account that prevalence rates refer to different age groups' (EMCDDA 2001:107). They go on to state: 'Prevalence rates for illicit drugs are usually higher for males than females. Therefore, prevalence rates should be reported separately for males and females' (EMCDDA 2001:107 original emphasis).

Research has also identified conceptual and definitional problems surrounding measuring workforce alcohol and drug use. There are differing ways of defining both nature and boundaries of use. Workplace drug use is, as Newcomb (1994: 40)

highlights, the ingestion of alcohol or drugs at work during periods of explicit employment. 'Based on this definition', Newcomb continues, 'a three martini lunch or two joint break would not be considered drug use on the job' as such use is during the employees free time, and often well away from the actual place of employment. Difficulties in defining the nature and boundaries of workplace drug misuse further problematise the availability, accuracy and reliability of the data on workforce prevalence.

The remainder of this section provides a review and summary of the research literature examining: (a) an overview of general societal prevalence of illicit drug and alcohol use in the U.S. (the majority of U.S. evidence is taken from the National Household Survey of Drug Abuse (NHSDA) (SAMHSA 2001)); (b) survey data relating to the prevalence of illicit drug and alcohol use in the UK, primarily England and Wales (the British Crime Survey provides most of this evidence); and (c), an overview of evidence relating to employee illicit drug and alcohol use in the U.S. and in the UK. Comparisons are also made with previous surveys and research studies. Evidence from other countries is extremely sparse and has therefore not been included in this review.

## **9.2 Findings**

***Prevalence of drug and alcohol use in the U.S. general population*** The National Household Survey on Drug Abuse (NHSDA) 2001 reported that an estimated 7.1% of the U.S. population aged twelve and older had used an illicit drug in the month prior to the survey being carried out (SAMHSA 2001). This percentage figure represents an increase in usage from the NHSDA conducted in 1999 in which an estimated 6.3% of the population were considered current illicit drug users. Significant increases were noted in 2001 for the current illicit drug use of marijuana and cocaine, as well as for licit substances including painkillers and tranquillizers. Overall, the research indicates that marijuana is the most commonly used illicit drug in the U.S.. In 2001, marijuana was used by over three quarters of current illicit drug users (76%) (SAMHSA 2001).

There is substantial variation in drug use by age in the U.S.. The 2001 survey reflected findings in previous years that drug use increases with age up to a peak age of eighteen to twenty years, after which drug use declines (SAMHSA 2001). The age distribution of drug users however, is also related to the type of drug used. For example, hallucinogen and inhalant users were primarily aged between twelve and twenty-five whereas cocaine and non-medical psychotherapeutic drug users were reportedly aged mostly over twenty-five. Again, reflecting findings of previous surveys, the NHSDA 2001 (SAMHSA 2001) reported that drug users in the U.S. were primarily male. There was a significant relationship between illicit drug use and use of licit substances, namely alcohol and tobacco. The rate of current illicit drug use among youths who smoked cigarettes was approximately nine times higher than illicit drug use among youths that did not smoke. Of those youths that were considered heavy drinkers in 2001, 65.3% were also considered current drug users. Only 5.3% of non-drinkers were considered current illicit drug users.

Regarding alcohol use, almost half of those surveyed in 2001, aged twelve and over reported being current alcohol users (48.3%) (SAMHSA 2001). This represents an increase of both the rate of alcohol use and the number of alcohol consumers since

2000. Slightly more than one fifth of those surveyed reported binge drinking at least once in the thirty days prior to the survey. In 2001, 5.7% of those surveyed reported heavy drinking. Heavy and binge drinking was most likely to occur in those aged between eighteen and twenty-five. Similarly to illicit drug use, alcohol consumption increased with age and peaked at age twenty-one. However, unlike illicit drug use which declined after this time, alcohol consumption remained steady.

***Prevalence of drug and alcohol use amongst the general population of the UK and Europe*** The Youth Lifestyles Survey 1998 (Stratford and Roth 1999) reported that 27% of twelve to thirty year olds had used drugs in the past year (men: 32%; women: 22%). There were distinct differences between age groups within this category, with those aged twenty-one reporting the highest level of drug use (54% of those surveyed had used drugs in the past year). The survey also indicated that drug use declines with age with 25% of those aged between twenty-six and thirty having taken drugs in the past year. Fifty percent of young drug users (aged 12-30) took drugs on average once a month or more. Thirty-two per cent reported drug use on average once a week. Similarly, the Office for National Statistics surveyed young people in England and Wales in 1998 and found that the most commonly used drug was cannabis with 32% of males and 22% of females aged sixteen to twenty-four reporting use in the last year (Social Trends 1998). The same survey reported an increase in alcohol use in the last week amongst pupils from 24% in 2000 to 26% in 2001.

The Department of Health (2002) conducted a Survey in 2001 of school children aged eleven to fifteen which reported that 12% of pupils had used drugs in the last month and 20% had used drugs in the last year. Boys were more likely to have used drugs in the last month than girls and cannabis was the most frequently used drug. 42% of pupils reported having been offered one or more drugs in the last year. Over three-quarters of school children that participated in the Youth Survey 2002 (MORI 2002) reported that they had tried alcohol (78%). Regular drinking was more prevalent in older children aged fifteen and sixteen. Almost half of the respondents in this age group reported drinking at least once a week. Regular drinking was also found to be more common amongst white children, and amongst boys. Regional differences in drinking habits were also established in this survey. In particular, school children in the North-East of England were more than twice as likely as those in London to drink regularly. The Youth Survey 2002 found that 22% of children had been offered cannabis. Older children were more likely to have tried illicit drugs, and the proportion of children that had actually ever used cannabis was 14%. When breaking this down by age, children aged fifteen to sixteen are the most likely to use cannabis (33%). Boys are marginally more likely to take illicit drugs than girls and, as with alcohol, children from Black and Minority Ethnic groups are less likely to use cannabis and tobacco than white children.

The Office of Population Censuses and Surveys (OPCS 1993/4 cited in Beswick 2002) estimates that 1.5% of the female population and 2.9% of the male population in the UK are dependent upon one or more drugs (Beswick 2002). The Regional Drug Misuse Database reported that in England in September 2000, 33,100 drug users presented themselves to drug misuse agencies. Heroin was the most frequently used drug. These statistics have to be noted with caution as they are likely to be an under representation of the actual numbers of drug users as only those with significant drug misuse problems are likely to attend such agencies (Beswick 2002). When examining

those drug users that have presented for treatment between 1993 and 1998, a steady increase in drug misuse in England and Scotland can be identified, the number of people presenting for treatment in Wales did not dramatically change (Bean 2002).

The 1994 British Crime Survey (BCS)<sup>5</sup> provided 'best estimates' of the number of people that could be using four specific substances, aiming to address the issue of underreporting that plagues self report surveys. The estimates, broken down by drug type are provided below and describe use in the last month by sixteen to twenty-nine year olds, the most prolific drug users (Ramsey and Percy 1996 in Bean 2002) Cannabis: 1486,000, Amphetamines: 303,000, LSD: 152,000, Ecstasy: 121,000.

The 1998 BCS indicated that the highest level of drug misuse occurred amongst young people aged between sixteen and twenty-nine. One quarter of this age group had used an illegal substance at some point in the last year and 16% had done so in the last month. Of all of those surveyed, almost half (49%) had used an illegal substance in the last month or year. The comparison between the estimates for 1994 and 1998 should be noted with caution as they are comparing slightly different age groups, across different categories of drugs. The figures for 1998 are as follows (Ramsey and Partridge 1999 in Bean 2002), Cannabis: 1095,000, Cocaine: 65,000, Opiates: 65,000, Any Drug: 1220,000. The BCS 1998 also indicated that the gap between male and female drug use might be widening. Female drug use remained at around the same level as it had been in previous surveys (19%) whereas male drug use increased from 23% in 1994 to 28% in 1998, cannabis use, in particular increased significantly (Mirrlees-Black et al 1998 and Ramsey and Partridge 1999). The BCS 1998 also suggested that the highest rates of drug use occurred in deprived areas and amongst the unemployed. Evidence suggests that responsibility for children and being married may be protective factors.

The BCS 2000 (Kershaw et al 2000) suggests that women are more experimental with regard their drug use but women also 'grow out' of drug use at an earlier age. Thirty-four percentage of those surveyed (aged between sixteen and fifty-nine) reported having used drugs at some time in their life. Within this, those aged between twenty and twenty-four were the most likely to report lifetime use (58%). The corresponding statistics for drug use in the last year was 11% overall, again the twenty to twenty-four age group were most likely to report drug use in the last year (30%). Regarding drug use in the last month, 6% of the sample overall reported recent drug use. Once again the group aged twenty to twenty-four were most likely to have experienced recent drug use (20%).

DrugScope, facilitated by several government agencies, edited a report on the UK drug situation in 2001 for inclusion in the EMCDDA 2002 'Annual Report on the State of the Drugs Problem in the European Union and Norway'. Drawing primarily

---

<sup>5</sup> Drug misuse first became a substantial self-report focus of the British Crime Survey in 1992 and involved the use of an additional self-complete paper questionnaire, in which individuals were asked about their drug misuse over their lifetime, during the past year and within the last month. More recent surveys (conducted during 1994 and 1996) have involved a computerized system of self-completion, allowing for greater comparisons to be made across years and a greater accuracy of response. Within both reports, cross tabulations between drug misuse and employment status are provided, allowing for a number of generalized findings about illicit drug misuse within the workplace to be made.

upon findings from the BCS 2000, it summarised a significant increase in cocaine use amongst sixteen to twenty-nine year olds from 6% in 1998 to 10% in 2000. Cocaine use is more common than use of amphetamines and ecstasy. Evidence suggests that this may be due to a more positive attitude towards cocaine compared to other illicit substances, as it is perceived to be more socially acceptable and easier to control. The BCS 2000 also indicated an increase in cocaine use in the North of England although London has consistently higher rates of 'any drug' use than all other regions. In the UK in 2000, ecstasy and heroin use remained stable and relatively low in comparison to use rates of other drugs (DrugScope 2001). Cannabis was the most commonly reported used drug in the UK in 2000, 44% of those aged sixteen to twenty-nine reported using cannabis, an increase from 1998 (DrugScope 2001). Cannabis use is also more prevalent than use of other illicit substances in the U.S. and other European Union countries.

In the European Union as a whole, cannabis is the most commonly used illicit drug (EMCDDA 2001; 2002). For cannabis, amphetamines and ecstasy use, England and Wales had the highest prevalence rates amongst all adults of all of the EU countries included in the comparison. Spain had the highest rate of cocaine use, but England and Wales were the second highest consumers. Regarding younger adults (15-44), England and Wales had the highest prevalence rates for all types of drugs. The comparisons provided by EMCDDA have to be interpreted with caution as the sample sizes; age ranges and methods of data collection and analysis vary between countries, as do the years in which the surveys were performed.

***Prevalence of drug and alcohol use in the U.S. workforce*** Data on the prevalence of substance misuse in the workplace are often based on guesstimates. For example, Backer (1987 in Newcomb 1994) estimates that the rate of dangerous drug use amongst the U.S. workforce could be anywhere between 10% and 23%. Newcomb (1994) offers an early summary of studies estimating workplace prevalence. First his review identifies that 61% of trade union representatives / members thought that drug use was a problem in the workplace, with 95% of employers having had experience of drug problems among employees. Second, with regard to general population estimates, Newcomb identifies that apart from occasional cannabis use, alcohol use is the most frequently reported drug use on the job; most people use drugs away from the worksite, and most surveys estimate that less than 10% of employees report using substances on the job. Finally use of drugs in the workplace is more common among men than women. Newcomb (1994: 413) concludes by stating that 'therefore, while there is certainly cause for concern regarding drug use on the job, since it obviously occurs to at least a modest extent and can have tragic consequences, the extent and scope of this problem appears limited'.

More recent research evidence continues to indicate that alcohol is generally thought to be the most commonly used substance in the U.S. workplace. Despite this many organisations do not test for alcohol. The NHSDA (SAMHSA 2001) found that of those in full time employment and aged eighteen and over, 59.3% were current alcohol users. The corresponding percentage for those who were unemployed was 52.5%. Regarding binge and heavy drinking, NHSDA report a higher prevalence rate for unemployed individuals (SAMHSA 2001). With regards illicit drug use, the National Institute on Drug Addiction (NIDA) suggests that 10% of the U.S. workforce use drugs whilst on the job. Furthermore, it is estimated that 44% of employed drug

users sell drugs to other employees (May 1999). The NHSDA 2001 reported that current employment status is highly correlated with illicit drug use. Of those aged eighteen and over, an estimated 17.1% of unemployed adults were current illicit drug users. The estimate for those employed full time was 6.9% and 9.1% for part time employees (SAMHSA 2001).

From the research evidence in the U.S., there appears to be correlation between risks associated with job type and substance use. Holcom, Lehman and Simpson (1991 in Newcomb 1994) found that 13% of employees in 'high-risk' occupations (measured by potential for accident) admitted using a psychoactive drug at work. The comparable figure for 'low risk' employees was 8%. Regarding On-The-Job substance abuse, Mastrangelo and Jolton (2001) and Newcomb (1994) cite Hollinger (1988) who suggests that prevalence of on-the-job substance abuse varies by occupation in the U.S.. It is estimated that 3.2% of hospital employees partake in on-the-job substance abuse in comparison with 7.2% of retail employees and 12.8% of manufacturing employees. Schneck et al (1991 in Newcomb 1994) found that 6% of transportation employees reported having used alcohol at times which would result in on-the-job impairment. The corresponding percentage for illicit drug use was 3%. Guinn (1983 in Newcomb 1994) conducted a relatively small piece of self report research on long distance drivers in which over 80% indicated that they had used a substance in the previous year to remain 'awake and alert' whilst driving ('substance' did not include over the counter medication). In this particular occupation, employees could perceive substance use whilst at work as performance enhancement.

Quest Diagnostics, a U.S. drug testing company report drug positivity rates for U.S. employees by comparing the number of positive drug test results with the number of drug tests performed. A decline in positivity rates was reported from 2000 to 2001. The reduction was relatively small from 4.7% in 2000 to 4.6% in 2001. However, amongst safety sensitive workers positivity rates reached 2.9% in 2001, again a decrease on the previous year but also the lowest percentage ever recorded (Teterboro 2002). From 1997 to 2001 safety sensitive employees have consistently provided lower positivity rates than the general U.S. workforce (Teterboro 2002). Testing 'for cause' produced the highest positivity rates for both safety sensitive and general workforce employees (Teterboro 2002). The drug most often identified in both groups of employees was marijuana, although alcohol was not included. Of all employees tested by Quest Diagnostics in 2001 (6.3 million tests), 60.6% of positive results related to marijuana. The second most commonly found drug was cocaine. SmithKline Beecham Clinical Laboratories found similar results in 1998 (May 1999). Steelcase Corporation compared competing drug detection methods and found an 18% drug positivity rate amongst U.S. job applicants when hair testing was used. Urine testing typically produces a 3-5% drug positivity rate (Nadell 2001). There are associated difficulties with hair testing however, and the research was conducted using a smaller sample than those reporting for urinalysis.

***Prevalence of drug and alcohol use in the UK workforce*** Jackson (1999) cites evidence from a joint Trades Union Congress, Alcohol Concern and Institute for the Study of Drug Dependence (now DrugScope) conference held in 1998, which suggests that around 75% of people with alcohol problems and 25% of people seeking help with drug problems are employed in the UK. Furthermore, 29% of full time employees have used illicit drugs and 46% of companies or organisations have

received reports of alcohol misuse by employees in the last year. This represents a rise from the corresponding percentage reported in 1996 (35%). Similarly, 18% of companies or organisations had received reports of illicit drug taking by employees in the last year (Jackson 1999).

Eckersley and Williams (1999) cite evidence that 17% of employees will be using illicit drugs in such a way that their work performance will be affected. The corresponding figure for alcohol use is 30%. Moreover, they estimate that between 35% and 45% of full time employees will be using drugs. It is important to note that the relationship between drug and alcohol use and impairment has not been sufficiently well established to give much credence to these statistics. Furthermore, the authors are supportive of drug testing.

A survey carried out by Alcohol Concern and DrugScope (BBC News 07/08/01) indicated that 30% of companies have experienced employee absence due to drug use. MacDonald (2002) conducted research into the impact of drug use upon labour market participation and in doing so provide a useful overview of the prevalence of drug use in England and Wales and Scotland, including the drug use of those in employment and those unemployed. For clarity, unemployed individuals are defined as those that are actively seeking work and therefore excludes students, retired individuals, those that are considered disabled or suffering from illness and home makers. He contends, "There is some debate about causality between drug use and employment status. Sociological research tends to conclude that "high unemployment serves to foster drug use" (Peck and Plant 1987:67) rather than the other way round" (MacDonald 2002:2).

As may be expected, given our discussion in section one, estimates of, and research into, workplace illicit drug misuse in England and Wales, is generally less expansive, especially at a national level, and are certainly no more informative of actual rates. That said, findings from recent sweeps of the British Crime Survey (see Ramsay and Spiller 1997; Ramsay and Percy 1996) provide some comparable material. Ramsay and Percy (1996) generalize that those in full time employment have a lower level of drug taking than those who are not employed (with the exception of the 30-59 age group); that those not employed were more susceptible to misuse within the last month across all age bands; and that there was no clear pattern for those employed part-time. In the more recent British Crime Survey, Ramsay and Spiller (1997: 21) indicate that the data collected suggest that 'drug misuse is spread relatively evenly across all social groups, manual and non manual, inner city and suburban, rich and poor'. As the authors of the report go on to state, 'while low income is a modest pointer to drug misuse in general ... not having a job is at least as important a factor, if only in the case of the 16-29 age group' (Ramsay and Spiller 1997:22). In particular the authors indicate the contrast between those aged 16-29 who are employed and those not, suggesting that as many as 45% of that age group who are unemployed reported drug misuse within the last year.

The British Crime Survey 2000 (Kershaw et al 2000) indicates that certain types of drug use have declined amongst the employed and unemployed since 1994 namely use of LSD and mushrooms. Cocaine use has declined amongst the unemployed since the 1998 BCS but has increased amongst the employed. Overall, use of any drug has remained stable for those who are employed but has decreased for those who are

unemployed since 1998. Despite this, drug use is consistently higher amongst the unemployed for all drug types.

While far from conclusive about the size or nature of the problem, the data derived from the various sweeps of the BCS does provide some patterns of drug misuse amongst those individuals who are in both full-time and part-time work across the UK, patterns which are similar to those reported by Martin et al (1994); namely that illicit drug misuse at work is comparatively rare amongst employees; that it is mostly a youthful phenomenon; that there is no significant differences in response between those employed part time and those employed full time; and that there is some evidence of differences in consumption by occupational level. While such data must be read with caution, it seems to be the case that illicit drug misuse within the workplace setting is both a relatively rare and a predominantly youthful activity, and that other pressures may also affect misuse, most notably a persons lifestyle characteristics (Ramsay and Percy 1994).

## **REFERENCES**

---

- Ackroyd, S. and Thompson, P. (1999) Organisational Misbehaviour London: Macmillan
- Alcohol and Drugs in the Workplace: Costs, Controls and Controversies.' (1986) Bureau of National Affairs Special Report Washington, DC: Bureau of National Affairs
- Abbasi, S. Hollman, K. and Murrey Jr, J. (1988) 'Drug Testing: The Moral, Constitutional and Accuracy Issues' Journal of Collective Negotiations Vol. 17 No. 3: 221-235
- ACAS websites: [www.acas.org.uk](http://www.acas.org.uk)
- Alleyne, B. C., Stuart, P., and Copes, R. (1991) 'Alcohol and Other Drug Use in Occupational Fatalities', Journal of Occupational Medicine 33: 496-500
- Alvi, S. (1994) 'Union Perspectives on Workplace Drug Testing' in Macdonald, S. and Roman, P. M. (eds.) Research Advances in Alcohol and Drug Problems, Volume 11: Drugs Testing in the Workplace. New York, Plenum Press.
- Ambrose, M.L. (2000) 'Drug Testing and procedural Fairness: The Influence of Situational Variables.' Social Justice Research Vol. 13, no. 1: 25-40.
- American Civil Liberties Union (1999) 'Drug Testing: A Bad Investment.' Washington, DC:
- Annual Report on the UK Drugs Situation (2001) Submitted to EMCDDA after consultation with the Home Office, Department of Health, Scottish Executive, the National Assembly for Wales and the Northern Ireland Department of Health and Social Services and Public Safety. Edited by DrugScope.
- Arthur, W., Doverspike, D (1997) 'Employment-Relayed Drug Testing: Idiosyncratic Characteristics and Issues.' Public Personnel Management, Vol. 26 No.1: 77-87.
- Autry, J. H. and Freideman, J. B. (1992) 'Drug Abuse in the Workplace' in The Medical Review Officers Guide to Drug Testing
- Axel, H. (1989) 'Characteristics of Firms with Drugs Testing Programs', in Drugs in the Workplace: Research and Evaluation Data, NIDA Research Monograph, No. 91, Washington, DC: U.S. Government Printing Office
- Axel, H. (1990) 'Corporate Report with Drug Testing Programmes' The Conference Board Research Report 941.
- Backer, T. E. (1987) Strategic Planning for Workplace Drug Abuse Programs DHHS (Publication No. ADM-87-1538) Rockville, MD: National Institute on Drug Abuse
- Bader, T. E. and O'Hara, K. B. (1991) Organisational Change and Drug Free Workplaces Templates for Success New York: Ouorum
- Bader, T.E. and O'Hara, K.B. (1995) Substance Abuse in the Workplace. CRC Press.
- Baker, S. P. Samkoff, J. S. Fisher, R. S. and Van Buren, C. B. (1982) 'Fatal Occupational Injuries.' Journal of the American Medical Association 248: 692-697
- Bamberger, P. Sonnenstuhl, W. J. (1995) 'Peer Referral Networks and Utilisation of a Union Based EAP', Journal of Drug Issues Vol. 25 No. 2: 291-312
- Banta, W. F., and Tennant, F. Jr. (1989) Complete Handbook for Controlling Substance Abuse in the Workplace. Medical facts, Legal Issues and Practical Solutions New York: Lexington Books.

- Baumrin, B. H. (1990) 'To Test or Not to Test? Social Welfare Versus Worker Freedom', Journal of Psychoactive Drugs 22/4: 485-487
- Bayer, R. and Oppenheimer, G. M. (1993) Confronting Drug Policy. Illicit Drugs in a Free Society Cambridge: Press Syndicate of the University of Cambridge
- Bean, P. (200) Drugs and Crime. William Publishing.
- Beaumont, P. B. and Hyman, J. (1987) 'The Work Performance Indicators of Problem Drinking: Some British Evidence' Journal of Occupational Behaviour 8: 55-62
- Beck, E. (2001) 'Is the Time Right for Impairment Testing? (Judging Fitness for Duty)', Workforce February
- Bennet, J.B., Lehman, W.E.K., Reynolds, G.S. (2000) 'Team Awareness for Workplace Substance Abuse Prevention: The Empirical and Conceptual Development of a Training Program.' Prevention Science Vol.1. No. 3: 157-172.
- Best, D., Vingoe, L., Strong, J. (2001) Dangerousness of Drugs. Report produced by the National Addiction Centre for the Department of Health. [www.doh.gov.uk/drugs/dangerous.pdf](http://www.doh.gov.uk/drugs/dangerous.pdf)
- Beswick, J. (2002) Review of the Literature on Illegal Drugs in the Workforce. Sheffield: Health and Safety Laboratory.
- Blackwell, J. C. (1994) 'Drug Testing: The War on Drugs, Workers, and the Workplace: Perspectives from Sociology', in Macdonald, S. and Roman, P.M. (eds.) Research Advances in Alcohol and Drug Problems, Volume 11: Drugs Testing in the Workplace. New York, Plenum Press.
- Blaze-Temple, D. (1990) 'Drug Testing in the Workplace: Overviews of the Issues' Paper presented to the 5<sup>th</sup>. Madurah Addiction Research Symposium, Madurah 13<sup>th</sup>. Dec.
- Blum, T.C., Fields, D.L., Milne, S.H., and Spell, C.S. (1994) 'The Interrelations of Drug Testing with Other Human Resource Management Practices and Organisational Characteristics' in Macdonald, S. and Roman, P.M. (eds.) Research Advances in Alcohol and Drug Problems, Volume 11: Drugs Testing in the Workplace. New York, Plenum Press.
- Borack, J. I. (1998) 'An estimate of the Impact of Drug Testing on the Deterrence of Drug Use' Military Psychology Vol. 10 No. 1: 17-25
- Bottomley, P. (1998) 'Drug Testing in the Workplace', ACW March/April: 14-15, 20
- Brannstrom, G. and Hopstadius, B. (1994) 'A Comparative Study Between the ILO's Guiding Principles and Drug Testing at Workplaces in Stockholm, Sweden' Employee Counselling Today Vol. 6 No. 5: 4-6
- Broad Perspective. Bulletin of New York Academy of Medicine. Vol. 65 No. 2 Feb: 173-184.
- Bross, M. H., Pace, S. K., and Cronin, I. H. (1992) 'Chemical Dependence: Analysis of Work Absenteeism and Associated Medical Illnesses', Journal of Occupational Medicine 34: 16-19
- Brunet, J.R. (2002) 'Employee Drug Testing as Social Control: A typology or Normative justifications.' Review of Public Personnel Administration, Vol.22: 193-215.
- Buchanan, D. J. (1988) 'Studies on Blood Alcohol in the Workers of a Zambian Copper Mine' Alcohol and Alcoholism 23: 239-242
- Bureau of National Affairs (1986) Alcohol and Drugs in the Workplace: Costs, Controls and Controversies A BNA Special Report Washington, DC: Bureau of National Affairs

- Burgess, S. M. and Propper, C. (1998) 'Early Health Related Behaviours and their Impact on Later Life Chances: Evidence from the U.S.', Health Economics Vol. 7: 381-399
- Burt, M. R. (1981) 'Prevalence and Consequences of Drug Abuse Among U.S. Military Personnel: 1980', American Journal of Drug and Alcohol Abuse 8: 49-439
- Business Editor 'Nine out of Ten Employers Conducting Drug Testing, or Plan To.' Business Wire. August 2001.
- Butler, B (1993) Alcohol and Drug Testing in the Workplace. Butterworths Toronto.
- Butler, B. (1997) 'Alcohol and Drug Testing in Canada', Occupational Health and Safety Canada Vol. 13: 28-31
- Campbell, D. (1997) 'Work Samples', The Guardian October 29: 6
- Campbell, R.C. and Langford, R.E. (1995) Substance Abuse in the Workplace. New York: Lewis.
- Castro, J. Beattie, J. Dolan, V. (1986) 'Battling the Enemy Within' Time March 17<sup>th</sup>: 52-61
- Coams, B. R. and McAndrews, M. P., (1994) 'The Effects of Psychoactive Substances on Workplace Performance' in Macdonald, S. and Roman, P.M. (eds.) Research Advances in Alcohol and Drug Problems, Volume 11: Drugs Testing in the Workplace. New York, Plenum Press.
- Cohan, S. (1984) 'Drugs in the Workplace.' Clinical Psychiatry Vol 45. No. 12: 4-8.
- Comer, D,R, (1994) 'A Case Against Workplace Drug Testing.' Organization Science Vol.5 No.2: 259-267.
- Comer, D.R., Buda, R. (1996) 'Drug Testers versus Non-testers: Human Resource Managers' Perceptions and Organisational Characteristics.' Employee Responsibilities and Rights Journal. Vol 9 No. 2: 131-148.
- Coombs, R. H. and West, L. J. (1991) Drug Testing: Issues and Options. Oxford: Oxford University Press
- Cranford, M. (1998) 'Drug Testing and the Right to Privacy: Arguing the Ethics of Workplace Drugs Testing' Journal of Business Ethics Vol. 17: 1805-1815
- Crant , J.M., Bateman, T.S. (1990) An Experimental Test of the Impact of Drug-Testing programs on Potential Job Applicants' Attitudes and Intentions.' Journal of Applied Psychology 75, --127 – 131.
- Crant, J.M., Bateman, T.S. (1987) 'A Model of Employee Responses to Drug Testing programs.' Employee Responsibilities and Rights Journal, 2: 173-190.
- Crouch, D., Webb, D., Peterson, L., Buller, P., and Rollins, D. (1989) 'A Critical Evaluation of the Utah Power and Light Company's Substance Abuse Management Program: Absenteeism, Accidents and Costs' in Drugs in the Workplace: Research and Evaluation Data, NIDA Research Monograph, No. 91, Washington, DC: U.S. Government Printing Office
- Crow, S. M.. and Hartman, S. J. (1992) 'Drugs in the Workplace: Overstating the Problems and Cures'. The Journal of Drug Issues Vol.22(4). 923-937.
- Cullen, F. (1996) 'Prisons in Crisis: The American Experience', in R. Matthews and P. Francis (Eds.) Prisons 2000: An International Perspective on the Present State and Future of Imprisonment Basingstoke: Macmillan
- Current, W.F. 'Cut Costs and Increase Safety with Pre-Employment Drug Testing.' Occupational Hazards July 2002.
- Dawson, D. (1994) 'Heavy Drinking and the Risk of Occupational Injury' Accident Anal Prev 26: 655-65

- DeCresce, R. P. Lifshitz, M. S. Ambre, J. Mazura, A. C. Tilson, J. E. and Cochran, K. M. (1989) Drug Testing in the Workplace American Society of Clinical Pathologists Chicago Ill: American Society of Clinical Pathologists.
- Delaney, M.M., and Hanana, D.R. (1994) International Guide to the Workplace: Substance Abuse Prevention Institute for a Drug Free Workplace Washington DC:
- Delaney, T. J. (1987) 'The EAP Part of the Personnel Function', Public Personnel Management 16: 359
- Delaney, W.P. Ames, G. (1995) 'Work Team Attitudes, Drinking Norms, and Workplace Drinking.' The Journal of Drug Issues 25(2): 275-290.
- Delbridge, R. and Lowe, J. 'Manufacturing Control: Supervisory Systems on the 'New' Shop Floor'. Work, Employment and Society. Vol. 31 No. 3 1997.
- Denenberg, T. S. and Denenberg, R. V. (1983) Alcohol and Drugs – Issues in the Workplace. Washington: BNA Books
- Denenberg, T. S. and Denenberg, R. V. (1994) 'Arbitration of Drug testing Disputes' in S. Macdonald and P. Roman (Eds.) Research Advances in Alcohol and Drug Problems Volume 11 Drug Testing in the Workplace New York: Plenum Press
- Department of Health Press Release 15/03/02 "Drug Use, Smoking and Drinking Among Young People in England in 2001: Preliminary Results. Statistical Press Notice.
- Department of Health Statistical Bulletin. Statistics on Young People and Drug Misuse: England, 1998. National Statistics.
- Dickenson, F. (1989) Drink and Drugs at Work: The Consuming Problem London: IPM
- DiNardo, J. (1994) 'A Critical Review of the Estimates of the Costs of Alcohol and Drug Use', in Macdonald, S. and Roman, P.M. (eds.) Research Advances in Alcohol and Drug Problems, Volume 11: Drugs Testing in the Workplace. New York, Plenum Press.
- DrugScope (2001) Annual Report on the UK Drug Situation: London: DrugScope
- 'Drunk and Disordered: A Guide to Tackling Alcohol and Drugs at Work' Trades Union Congress. (2001) London: TUC
- DuPont R.L. (1989) 'Never Trust Anyone Under 40: What Every Employer Should Know About Drugs in the Workplace.' Policy Review. Spring
- DuPont, R. L., Griffin, D. W., Siskin, B. R., Shiraki, S. and Katze, E. (1995) 'Random Drug Tests at Work: the Probability of Identifying Frequent and Infrequent Users of Illicit Drugs', Journal of Addictive Diseases 14/3: 1-17
- DuPont, R.L. (1990) 'Medicines and Drug Testing in the Workplace.' Journal of Psychoactive Drugs. Vol.22 (4) Oct/Dec
- Eckersley, E.K. and Williams, D.A. (1999) "Training your Staff (and the Boss) to Deal with Drugs" Industrial and Commercial Training 31:6 219-223
- Eckersley, K. (1995) 'Dealing with Drugs Part 1: The Employers Burden.' Employee Counselling Today. Vol. 7. No. 3: 13-15.
- Ehrlich, I. (1973) 'Participation in Illegitimate Activities: A Theoretical and Empirical Investigation', Journal of Political Economy
- Elliot, R. H. (1989) 'Drug Testing and Public Personnel Administration', Review of Public Personnel Administration Vol. 9 No. 3: 15-31
- Elmuti, D. (1994) 'Effects of a Drug Testing Programme on Employee Attitudes, Productivity and Attendance Behaviours' Employee Counselling Today Vol. 6 No. 5: 24-32. Also published in the International Journal of Manpower Vol. 14 No. 15 (1993): 58-69

- European Monitoring Centre for Drugs and Drug Addiction (EMCDDA). Annual Report on the State of the Drugs Problem in the EU 2001. EMCDDA. Luxembourg: Office for Official Publications of the European Communities 2001.
- European Monitoring Centre for Drugs and Drug Addiction. Annual Report on the State of the Drugs Problem in the European Union and Norway. EMCDDA 2002. Luxembourg: Office for Official Publications of the European Communities 2002.
- Fay, J. J. (2000) The Drug Free Workplace. Woburn MA: Butterworth-Heinemann.
- Feinauer, D. M. and Havlovic, S. J. (1993) 'Drug Testing as a Strategy to Reduce Occupational Accidents: A Longitudinal Analysis' Journal of Safety Research 24: 1-7
- Feit, M. D. and Holosko, M. J. (1990) 'Drug Testing: A Research Strategy', Compensation and Benefits Management Vol. 6 No. 9: 219-224
- Fendrich M and Sookim J. (2002) 'The Experience and Acceptability of Drug Testing: Poll Trends', The Journal of Drug Issues Vol. 32 No. 1: 81-96
- Fillimore, K. and Caetano, E. (1982) 'Epidemiology of Alcohol Abuse and Alcoholism in Occupations', Occupational Alcoholism: A Review of Research Issues, NIAAA Research Monograph 8 Washington, DC: Government Printing Office: 21-88
- Financial Times 'Drug Demand', 11 March 1998
- Fine C.R., Reeves, T.Z., Hamey, G. (1996) 'Employee Drug Testing: Are Cities Complying with the Courts?' Public Administration Review. Jan/Feb Vol. 56 No1.
- Francis, P. and Wynarczyk, P. (1998) 'Regulating the Invisible? The Case of Workplace Illicit Drug Use' in P. Davies, P. Francis and V. Jupp (eds.) Invisible Crimes London: Macmillan
- Frankenfield, G. and Kleiner, B. H. (2000) 'Effective Employment Screening Practices', Management Research News Vol. 23 No. 7/8: 24-29
- French, M.T., Roebuck, M., Christopher, A. (2001) 'Illicit Drug Use, Employment and Labour Force Participation.' Southern Economic Journal. Vo.68 Issue 2: 349-368.
- Frey, B. S. (1997) 'Drugs, Economics and Policy', Economic Policy October: 389-398
- Gerber, J. K. and Yacoubian Jr, G. S. (2001) 'Evaluation of Drug Testing in the Workplace: Study of the Construction Industry', Journal of Construction Engineering and Management Nov./Dec. Vol. 127 No. 6: 438-442
- Gerstien and Grossman. (1998) 'Building a Cumulative Knowledge Base About Drugs in the Workplace' in Gust, S.W., and Walsh, J.M. (ed) Drugs in the Workplace: Research and Evaluation Data NIDA Research Monograph No. 91 Washington DC: Govt. Printing Office.
- Gill, A. M. and Micheals, R. I. (1992) 'Does Drug Use Lower Wages?', Industrial and Labor Relations Review Vol. 45 No. 3: 419-434
- Gilliom, J. (1994) Surveillance, Privacy and the Law: Employee Drug Testing and the Politics of Social Control. Ann Arbor: Uni. of Michigan Press.
- Guppy, D. and Marsden, J. (1995) 'Drug Related Problems in the Workplace: A British Perspective' in Proceedings of the Occupational Psychology Conference. Leicester: British Psychological Society.

- Guppy, D. and Marsden, J. (1996) 'Alcohol and Drug Misuse and the Organisation' in Schabracq, M.J. Winnubst, J.A.M., Cooper, C.C. (Eds) Handbook of Work and Health Psychology. London: John Wiley and Sons.
- Hart, C. (1998) Doing a Literature Review: Releasing the Social Science Research Imagination London: Sage
- Harris and Greising (1998) 'Alcohol and Drug Abuse as Dysfunctional Workplace Behaviours' in Griffin, R.W., and O'Leary – Kelly, A. (ed) Dysfunctional Behaviour in Organisations: Violent and Deviant Behaviour: Monographs in Organisational Behaviour and Industrial Relations. Vol. 23 Parts A and B Stanford: JAI Press.
- Harris, M. M. and Heft, L. (1992) 'Alcohol and Drug Use in the Workplace: Issues, Controversies, and Directions for Future Research', Journal of Management Vol. 18 No. 2: 228-239
- Hawks, D. (1991) 'Alcohol and Drugs in the Workplace: Reducing the Costs.' The Medical Journal of Australia. Vol.155.
- Hazeldon Foundation (2002) 'Workplace Recovery Benefits Survey.'
- Hecker, S. and Kaplan, M. S. (1989) 'Workplace Drug Testing as Social Control', International Journal of Health Services 19/4: 693-707
- Hertz, R. P. and Emmett, E. A., (1986) 'Risk Factors for Occupational Hand Injury' Journal of Occupational Medicine 28: 36-41
- Hingson, R. W. Lederman, R. I. and Walsh, D. C. (1985) 'Employee Drinking Patterns and Accidental Injury: A Study of Four New England States' Journal of Studies on Alcohol 46: 298-303
- Hitchen, K. (2001) 'Workplace Drug Testing: How Is It Changing?' Medical Laboratory Observer February
- Hoffman, J. and Larrison, C. (1998) 'Drug Use, Workplace Accidents and Employee Turnover.' Journal of Drug Issues Vol.29(2): 341-364.
- Holcomb, M. L. Lehmen, W. E. K. and Simpson, D. D. (1993) 'Employee Accidents, Influences of Personal Characteristics, and Substance Use in Jobs Differing in Accident Potential' Journal of Safety Research 24: 205-221
- Hollo, C. D. Leigh, J. and Nurminen, M. (1993) 'The Role of Alcohol in Work-Related Fatal Accidents in Australia 1982-1984' Occupational Medicine 43: 13-17
- Hood, J.C., Dunhorne, P.L. (1995) 'To Report or not to Report: Attitudes Toward Reporting Co-Workers Suspected Substance Abuse.' The Journal of Drug issues 25(2):. 313-339.
- Huestis, M. Oyles, J. Cone, E. Wstadik, A. Schoendorfer, D. Joseph, R. E. (1999) 'Sweat Testing for Cocaine, Codeine and Metabolites by Gas Chromatography – Mass Spectrometry', Journal of Chromatography Vol. 13 No. 733: 247-264
- Husbands, R. (1993) 'Employment Testing: An International Comparison' Conditions of Work Digest Vol. 12/2: 9-36
- Incomes Data Services Studies 734 (2002) Alcohol and Drug Policies. August
- Institute of Personnel Management (1986) The IPM Guide on Substance Misuse at Work London: IPM
- International Labour Office (1991) International Information Exchange on Drugs in the Workplace Bergen, Norway 28-30 August: Bergen, Norway: International Labour Office
- IWA-Canada Policy Guidelines on Joint Union/Management Employee and Family Assistance Programmes. Prepared for the International Labour Office

- International Information Exchange on Drugs in the Workplace Norway 28 – 30 August 1991.
- Jackson, T. (1999) Drugs and Alcohol Policies. London: Institute of Personnel Development.
- Jardine-Tweedy, L. and Wright, P.C. (1998) 'Workplace Drug Testing: Avoiding the Testing Addiction.' Journal of Managerial Psychology. Vol. 13.No. 8.
- Jacobs, J. B. and Zimmer, L. (1991) 'Drug Treatment and Workplace Drug Testing: Politics, Symbolism and Organisational Dilemma', Behavioural Sciences and the Law Vol. 9: 345-360
- Javaid, M. (1998) 'A Policy of Substance.' People Management. Vol. 4 No. 24.
- Jellineck Consultancy. (1997) 'Drug Demand Reduction in the Workplace: Interim Report.'
- Jones, J. P. (1990) 'Drug Testing did not Reduce Southern Pacific's Accident Rate' Forensic Urine Drug Testing June 2-4
- Kaestner, R. (1994) 'New Estimates of the Effects of Marijuana and Cocaine on Wages', Industrial and Labor Relations Review No. 47: 454-470
- Kaestner, R. and Grossman, M. (1988) 'The Effect of Drug use on Workplace Accident' Labour Economics 5: 267-294
- Kaestner, R. and Grossman, M. (1995) 'Wages, Workers' Compensation Benefits, and Drug Use: Indirect Evidence of the Effects of Drugs on Workplace Accidents', American Economic Review, Papers and Proceedings, May 1995: 55-60
- Kagel, J. H. Battalio, R. C. and Miles, G. C. (1980) 'Marihuana and Work Performance: Results From an Experiment' Journal of Human Resources 15: 372-395
- Kandel, D. B. and Yamaguchi, K. (1987) 'Job Mobility and Drug Use: An Event History Analysis', American Journal of Sociology 92: 836-878
- Kandel, D. B. and Davies, M. (1990) 'Labour Force Experiences of a National Sample of Young Adult Men: The Role of Drug Involvement', Youth and Society 21: 411-415
- Kay, J. (1989) 'Workplace Drug-Programmes in Britain: Does it Bake More Biscuits?' Druglink November/December: 8-9
- Kershaw, C. Budd, T. The 2000 British Crime Survey (England and Wales). Home Office Statistical Bulletin 18/00.
- Kesselring, R. G. and Pittman, J. R. (2002) 'Drug Testing Laws and Employment Injuries', Journal of Labor Research Vol. XXIII No. 2: 293-302
- Klingner, D. (1991) Workplace Drug Abuse and Aids. New York: Quorum.
- Knowles, E.A., Riccucci, N.M. 'Drug Testing in the Public Sector: An Interpretation Grounded in Rosenbloom's Competing-Perspectives Model'. Public Administration Review. July/August 2001 Vol 16. No. 4.
- Konovsky, M.A., Cropanzano, R. (1991) 'Perceived Fairness of Employee Drug Testing as a Predictor of Employee Attitudes and Job Performance.' Journal of Applied Psychology 76: 698-707.
- Konovsky, M. A. and Cropanzano, R. (1993) 'Justice Considerations in Employee Drug Testing', in R. Cropanzano (Ed.) Justice in the Workplace: Approaching Fairness in Human Resource Management New Jersey: Lawrence Erlbaum Associates. Inc
- Kravitz, D.A., Brock, P. (1997) 'Evaluations of Drug Testing Programs.' Employer Responsibilities and Rights Journal. Vol.10. No. 1.
- Lane, B. (1992) The Encyclopaedia of Forensic Science. Headline Book Publishing.

- Lederman, S. and Metz, B., (1960) 'Les Accidents Du Travail et L'Alcool' Population 15: 301-316
- Lehman, W.E.K., and Simpson, D.D. (1992) 'Employee Substance Use and On-The-Job Behaviour'. Journal of Applied Psychology 77(3): 309-321.
- Lehman, W.E.K., Farabee, D. J. Holcom, M. L. and Simpson, D. D. (1995) 'Prediction of Substance Use in the Workplace: Unique Contributions of Personal Background and Work Environment Variables', Journal of Drug Issues 25/2: 53-74
- Leirer, V. O. Yesavage, J. A. and Morrow, D. G. (1991) 'Marijuana Carry-Over Effects on Aircraft Pilot Performance' Aviat. Space Environ. Med. 62: 221-227
- Lewis, R. J. and Cooper, S. P. (1989) 'Alcohol, other Drugs, and Fatal Work-Related Injuries', Journal of Occupational Medicine 31: 23-28
- Lieberwitz, R. L. (1994) 'Constitutional and Statutory Treatment of Drug Testing in The United States' in S. Macdonald and P. Roman (Eds.) Research Advances in Alcohol and Drug Problems Volume 11 Drug Testing in the Workplace New York: Plenum Press
- Lloyd, J. (1998) 'How Drug Testing has Changed the Job Market.' The Christian Science Monitor. Friday, November 20<sup>th</sup>.
- Loup, S. (1994) 'Drugs and Alcohol in the Workplace.' Employee Counselling Today. Vol. 6 N0.5.
- Lucas, E. G. (1987) 'Alcohol in Industry' British Medical Journal 294: 460-461
- Macdonald, S. (1995) 'The Role of Drugs in Workplace Injuries: Is Drug Testing Appropriate?' Journal of Drug Issues 25/4: 703-722
- Macdonald, S. (1997) 'Workplace Alcohol and Other Drug Testing: A Review of the Scientific Evidence', Drug and Alcohol Review 16: 251-259
- Macdonald, S. and Dooley, S. (1991) 'The Nature and Extent of EAPs and Drug Screening Programs in Canadian Transportation Companies', Employee Assistance Quarterly 6: 23-40
- Macdonald, S. and Roman, P. (Eds.) (1994) Research Advances in Alcohol and Drug Problems Volume 11 Drug Testing in the Workplace. New York: Plenum Press
- Macdonald, S., and Wells, S. (1994) 'The Prevalence and Characteristics of Employee Assistance, Health Promotion and Drug Testing Programmes in Ontario.' Employee Assistance Quarterly. Vol. 10(1).
- Macdonald, S. and Wells, S. (1994) 'The Impact and Effectiveness of Drug Testing Programs in the Workplace', in Macdonald, S. and Roman, P.M. (eds.) Research Advances in Alcohol and Drug Problems, Volume 11: Drugs Testing in the Workplace. New York, Plenum Press.
- Macdonald, S. Wells, S. Giesbrecht, N. and Cherpitel, C. (1999) 'Demographic and Substance Use Factors Related to Violent and Accidental Injuries: Results From an Emergency Room Study' Drug and Alcohol Dependence 55: 53-61
- Macdonald, Z. and Pudney, S. (2000) 'Illicit Drug Use, Unemployment and Economic Attainment', Journal of Health Economics Vol. 19: 1089-1115
- Martin, J. K. Kraft, J. M. and Roman, P. M. (1994) 'Extent and Impact of Alcohol and Drug Use Problems in the Workplace: A Review of the Empirical Evidence', in S. Macdonald and P. Roman (Eds.) Research Advances in Alcohol and Drug Problems Volume 11 Drug Testing in the Workplace New York: Plenum Press
- Mastrangelo, P.M. and Jolton, J.A. (2001) "Predicting On-the-Job Substance Abuse With a Written Integrity Test" Employee Responsibilities and Rights Journal . 13:2 95-106.

- Mastrangelo, P.M., Popovich, P.M. (2000) 'Employees' Attitudes Toward Drug Testing, Perceptions of Organizational Climate, and Withdrawal from the Employer.' Journal of Business and Psychology. Vol.15, No. 1: 3-18.
- Maxwell, M. A. (1960) 'Early Identification of Problem Drinkers in Industry' Quarterly Journal of Studies on Alcohol 21: 655-678
- May, D. (1999) 'Testing by Necessity.' Occupational Health and Safety. Vol. 68. No. 4: 48-51.
- McCahill, M. and Norris, C. (2002) 'Victims of Surveillance' in P. Davies, P. Francis and V Jupp (eds.) Victimisation: Theory, Research and Policy London: Palgrave
- McDaniel, M. A. (1988) 'Does Pre-Employment Drug Use Predict On the Job Suitability?', Personnel Psychology Vol. 41 No. 4: 717-729
- Mendelsohn, S. R. and Libbin, A. E. (1988) 'Employee Alcohol – and Drug Testing Programs' Personnel September: 65-70
- Mieczkowski, T. and Lersch, K. M. (2002) 'Drug Testing Police Officers and Police Recruits: The Outcome of Urinalysis and Hair Analysis Compared', Policing: An International Journal of Police Strategies and Management Vol. 25 No. 3: 581-601
- Mieczkowski, T (ed) (1999) Drug testing Technology. Anna Arbor: CRC.
- Millard, T. L. (1991) 'Combating Drug Abuse in the Workplace: Effective Intervention Strategies and Techniques', Employee Assistance Quarterly 7/1: 45-56
- Mirrlees-Black, C. Mayhew, P. and Percy, A. (1996) The 1996 British Crime Survey (England and Wales) Home Office Research and Statistics Directorate.
- Mirrlees-Black, C. Budd, T. Partridge, S. and Mayhew, P. (1998) The 1998 British Crime Survey (England and Wales). Home Office Statistical Bulletin 21/98.
- Moody, D. E. Crouch, D. J. Smith, R. P. and Cresalia, C. W. (1991) 'Drug and Alcohol Involvement in Railroad Accidents' Journal of Forensic Sciences 36: 1474-1484
- Moore D and Haggerty K (2001) 'Bring it on Home: Home Drug testing and the Relocation of the War on Drugs', Social and Legal Studies Vol. 10 No. 3: 377-395
- Morgan, J. P. (1988) 'The Scientific Justification for Urine Testing' The University of Kansas Law Review 36: 693-697
- MORI Youth Survey 2002. Research Study conducted for the Youth Justice Board. January-March 2002.
- Murphy, K. R. and Thornton, G. C. (1990) 'Characteristics of Employee Drug Testing Policies: Manuscript Submitted for Publication' Cited in Cropanzo R. (ed.) Justice in the Workplace Approaching Fairness in Human Resource Management New York: Lawrence Erlbaum Associates Inc.
- Murphy, K.R., Thornton III, G.C., Reynolds, D.H. (1990) ' College Student's Attitudes Toward Employee Drug Testing Programs.' Personnel Psychology. 43: 615-631.
- Nadell, B. J. (2001) 'Is Your Corporate Culture on Drugs?', Occupational Health and Safety, Vol. 70 Issue 8 August:28-31
- National Household Survey on Drug Abuse 1994-5 Cited at <http://www.samhsa.gov/oas/workplace/httoc.htm>.
- National Household Survey on Drug Abuse 2002 Cited at <http://www.samhsa.gov/oas/workplace/httoc.htm>
- National Statistics. "Percentage of 16 to 24 year olds who have used drugs in the past year, 1998" Social Trends 30.

- Naylor, T. (2001) 'Will Drugs Cost You Your Job?' Drugs in the Workplace: 86-90.
- Needleman, S. B. and Romberg, R. W. (1989) 'Comparison of Drug Abuse in Different Military Populations' Journal of Forensic Science 34: 848-857
- New York Police Department (1990) 'Drugs in the Workplace.'
- Newcomb, J. (1994) 'Predictors of Drug Use and Implications for the Workplace', in Macdonald, S. and Roman, P.M. (eds.) Research Advances in Alcohol and Drug Problems, Volume 11: Drugs Testing in the Workplace. New York, Plenum Press.
- Normand, J. and Salyards, S. (1989) 'An Empirical Evaluation of Pre-Employment Drug Testing the United States Postal Service: Interim Report of Findings' in Drugs in the Workplace: Research and Evaluation Data NIDA Research Monograph No. 91 Washington, DC: U.S. Government Printing Office
- Normand, J. Salyards, S. D. and Mahoney, J. J. (1990) 'An Evaluation of Pre-Employment Drug Testing', Journal of Applied Psychology 75: 629-639
- Observer, and Maxwell, M. A. (1959) Some Legal Aspects of Drug Testing in the Canadian Workplace: Human Rights, Collective Bargaining and Labor Arbitration and The Canadian Charter of Rights and Freedoms
- Osterloh, J.D. and Becker, C.E. (1990) 'Chemical Dependency and Drug Testing in the Workplace.' The Western Journal of Medicine. May
- Oswald, S. L. and Harrison, A. (1992) 'Drug Testing: What are the Rights of Employees, Employers and Unions?' Journal of Business Strategies Vol. 9 No. 1 Spring: 27-37
- Ozminkowski et al. (2001) in 'The Cost of On-Site Versus Off-Site Workplace Urinalysis Testing for Illicit Drug Use'. Health Care Manager. Vol 20 No. 1: 59-69.
- Papoz, L. Weill, J. L'Hoste, J. Chich, Y. Got, C. and Goehrs, Y. (1986) 'Biological Markers of Alcohol Intake among 4796 Subjects in Accidents' British Medical Journal 292: 1234-1237
- Parish, D. C. (1989) 'Relation of Pre-Employment Drug Testing Result to Employment Status: A Year Follow Up' Journal of General Internal Medicine 4 Jan/Feb: 44-77
- Parrott, S. (undated) Drugs and the Workplace: Report to the Health Education Authority York: Centre for Health Economics
- Pell, S. and D'Alonzo, C. A. (1970) 'Sickness Absenteeism of Alcoholics' Journal of Occupational Medicine 15: 120-125
- People Management (2001) Law on Cannabis is Relaxed. Personnel Today 8<sup>th</sup>. November
- Pinsonneault, M (1994) 'Some Legal Aspects of Drug Testing in the Canadian Workplace' in S. Macdonald and P. Roman (Eds.) Research Advances in Alcohol and Drug Problems Volume 11 Drug Testing in the Workplace New York: Plenum Press
- Pollok, A. S. Franklin, G. M. Fulton-Kehoe, D. and Chowdhury, R. (1998) 'Risk of Job Related Injury Among Construction Labourers with a Diagnosis of Substance Abuse' Journal of Occupational and Environmental Medicine 40: 573-577
- Potter, B.A. and Orfali J.S. (1990) Drug Testing at Work: A Guide for Employers and Employees. Berkeley CA. Ronin Publishing Inc.
- Powell, P. Hale, M. Martin, J. Simon, M. (1971) Accidents London: National Institute of Industrial Psychology

- Prinz, A. (1997) 'Do European Drug Policies Matter?', Economic Policy October: 373-385
- Ramsay, M. and Percy, A. (1996) Drug Misuse Declared: Results of the 1994 British Crime Survey Home Office and Research Study No. 151 London: Home Office
- Ramsay, M. and Spillar, J. (1997) Drug Misuse Declared in 1996: Findings From the British Crime Survey Home Office and Research Study No. 172 London: Home Office
- Register, C. A. and Williams, D. R. (1992) 'Labor Market Effects of Marijuana and Cocaine Use Among Young Men' Industrial and Labor Relations Review Vol. 45 No 3: 435-448
- Robinson, F. Keithley, J. Robinson, S. and Childs, S. (1998) Exploring the Impacts of Crime on Health and Health Services: A Feasibility Study Durham: Department of Sociology and Social Policy, University of Durham
- Robinson, F. and Keithley, J. (2000) 'The Impacts of Crime on Health and Health Services: A literature Review', Health, Risk and Society Vol. 2 No. 3: 253-266
- Rockmore, B. W. Zimmerer, T. W. and Jone, F. F. (1997) 'Building a Socially Responsive Drug Testing Programme', Journal of Workplace Learning Vol. 9 No. 7: 220-224
- Rosse, J.G., Ringer, r., Miler, J.L. (1996) 'Personality and Drug Testing: An Exploration of the Perceived Fairness of Alternatives to Urinalysis.' Journal of Business and Psychology. 10: 459-475.
- Royal College of Physicians (1994) Guidelines for Testing on Drugs of Abuse in the Workplace London: Royal College of Physicians
- Ryan, J. Zwerling, C. Jones, M. (1992) 'The Effectiveness of Pre-Employment Drug Screening in the Prediction of Employment Outcome' Journal of Medicine 34: 1057-1063
- SAMHSA (1994) Office of Applied Studies SAMHSA National Household Survey on Drug Abuse <http://www.samhsa.gov/oas/wkplace/httoc.htm>
- SAMHSA (2001) National Household Survey on Drug Abuse (NHSDA). Office of Applied Studies. U.S. Department of Health and Human Services. August 2002. <http://www.jointogether.org/sa/news/summaries>
- Scanlon, W.F. (1998) Alcoholism and Drug Abuse in the Workplace
- Schlosser, D. and McBride, J. W. (1984) 'Estimating the Prevalence of Alcohol and Other Drug Related Problems in Industry' New South Wales Drug and Alcohol Authority Research Grant Report Series B84/3. Sydney: New South Wales Drug and Alcohol Authority
- Schottenfeld, R. S. (1989) 'Drug and Alcohol Testing in the Workplace - Objectives, Pitfalls, and Guidelines', American Journal of Drug and Alcohol Abuse 15/4: 413-427
- Schur, P.B., Broder, J.F. (1990) Investigation of Substance Abuse in the Workplace. Butterworth-Heinemann.
- Schwenk, C., and Rhodes S. (1999) Marijuana and the Workplace: Interpreting Research as Complex Social Issues. Westport: Quorum
- Seijts, G.H., Skalicki, D.P., Gilliland, S.W. (2002) 'Reactions to Managing Counterproductive Behaviour Through the Implementation of a Drug and Alcohol Testing program: Americans and Canadians are More Different Than You Think.' International Journal of Selections and Assessment. Vol 10. No. 1-2: 135-142.

- Seymore, R.A. and Smith, D.E. (1990) 'Identifying and Responding to Drug Abuse in the Workplace: An Overview.' Journal of Psychoactive Drugs. Vol 2 (4) Oct – Dec: 382-405
- Shain, M (1994) 'Alternatives to Drug Testing: Employee Assistance and Health Promotional Programmes' in Macdonald, S. and Roman, P.M. (eds.) Research Advances in Alcohol and Drug Problems, Volume 11: Drugs Testing in the Workplace. New York: Plenum Press.
- Shannon, H. S. Hope, L., Griffith, L. and Stieb, D. (1993) 'Fatal Occupational Accidents in Ontario 1986-1989' American Journal of Industrial Medicine 23: 253-264
- Sheridan, J. and Wrinkler, H. (1989) 'An Evaluation of Drug Testing in the Workplace', in Drugs in the Workplace: Research and Evaluation Data, NIDA Research Monograph, No. 91, Washington, DC: U.S. Government Printing Office
- Smith, L. (1996) 'If you Want a Job, Better 'Just Say No'', The Washington Post September 18: A1, A14, A16
- Spell, C.S. and Blum, T.C. (2002) 'Organisational Adaption of Pre-employment Drug Testing.' Journal of Occupational Health Psychology: 115-175.
- Spicer, J. (ed.) (1987) The EAP Solution. Current Trends and Future Issues New York: Plenum Press.
- Stallones, L. and Kraus, J. F. (1993) 'The Occurrence and Epidemiological Features of Alcohol-Related Occupation Injuries' Addiction. 88: 945-51
- Steele, P.D. (1995) Worker Assistance Programs and the Labour Process: Emergence and Development of the Employee Assistance model.' The Journal of Drug Issues. 25(2): 423-450.
- Stratford, N. and Roth, W. (1999) The 1998 Youth Lifestyle Survey: Technical Report. London: National Centre for Social Research.
- Straus, R. and Bacon, S. D. (1951) 'Alcoholism and Social Stability: A Study of Occupational Integration of 2023 Male Clinic Patients' Quarterly Journal of Studies on Alcohol 12: 231-260
- Strayer, R. (1957) 'A Study of Employment Adjustment of 80 Male Alcoholics' Quarterly Journal of Studies on Alcohol 18: 276-287
- Stuck, M., English, A., James, C., Smith, W. (1998) 'Comparison of Positive Screening and Confirmatory Results.' Professional Safety. Vol43 No.11.
- 'Substance Abuse Pt2. Tackling Drugs in the Workplace.' (2001) Fact Sheet No. 5 November Occupational Health Helpline London: Chamber of Commerce and Industry in conjunction with the Corporation of London.
- Sujak, D.A., Villanova, P., Daly, J.P. (1995) 'The Effects of Drug-Testing Program Characteristics on Applicants' Attitudes Towards Potential Employment.' The Journal of Psychology. 129(4):. 401-416.
- Sullivan, E. J., Bissell, L., and Leffler, D. (1990) 'Drug Use and Disciplinary Actions Among 300 Nurses', International Journal of the Addictions 25: 375-391
- Sullum, J. 'Pissing Contest.' Reason. January 2000.
- Sunday Times 5 April 1998 'Addicts Face Tagging to Curb Drug Crime'
- Sunday Times 8 March 1998 'Zero Tolerance' Comment and 'Drugs Tsar Targets Jails and Schools'
- 'Tackling Alcohol and Drugs in the Workplace.' (2002) London: Policy Forum.
- Taggart, R. W. (1989) 'Results of the Drug Testing Program at Southern Pacific Railroad' in Gust, S. W. and Walsh, G. M. (eds) Drugs in the Workplace:

- Research and Evaluation Data NIDA Research Monograph No. 91 Washington DC: U.S. Government Printing Office
- Teterboro, N.J. (28/06/02) "Workplace Drug Use Decreased After September 11, 2001, According to Quest Diagnostics' Drug Testing Index". Quest Diagnostics Drug Testing Index.
- The Institute of Alcohol Studies (1993) Testing For Drugs and Alcohol in the Workplace: Proceedings of a Conference held at Alliance House 20 June 1990 London: Institute of Alcohol Studies
- The Legal Solution' Drug and Alcohol Workplace Service': DrugScope and Alcohol Concern (2001) London: DrugScope
- The Observer January 25: 9 1998 'Hair Test Identifies Army's Crack Troops',
- Trice, H. (1962) 'The Job Behaviour of Problem Drinkers' in Pittman, D. and Snyder, C. R. (eds.) Society, Culture and Drinking Patterns New York: Wylie: 493-510
- Trice, H. and Roman, P. (1978) Spirits and Demons at Work Second Edition New York, Ithaca: Cornell University
- Trice, M.H., Steele, P.D. (1995) 'Impairment Testing: Issues and Consequences with Employee Assistance Programs.' The Journal of Drug Issues. 25(2):471-503.
- Truxillo, D.M., Normandy, J.L., Bauer, T.N. (2001) 'Drug Use History, Drug Test Consequences, and the Perceived Fairness of Organisational Drug Testing.' Journal of Business and Psychology. Vol 16. No. 1: 87-99.
- Vecchio, R.P.(1996) 'The Influence of Employee Screening on Employee Attachment'. Employee Responsibilities and Rights Journal. Vol 9. No. 2.
- Verstraete, A. G. and Pierce, A. (2001) 'Workplace Drug Testing in Europe', Forensic Science International Vol. 121 Issue. 1-2 September:2-6
- Walsh, D. C., Hingson, R. W., Merrigan, D. M., Cupples, L. A., Levenson, S. M., and Coffman, G. A. (1991) 'Associations Between Alcohol and Cocaine Use in a Sample of Problem-Drinking Employees', Journal of Studies on Alcohol 52: 17-25
- Webb, G. (1992) 'The Relationship Between Alcohol and Work Injuries: A Review of the Evidence', paper presented to the Fifth Winter School in the Sun Brisbane Australia
- Webb, G. R., Redman, S., Hennirkus, D. Rostas, J. A. P., Sanson-Fisher, R. W. (1994) 'The Prevalence and Socio-demographic Correlates of High-Risk and Problem Drinking at an Industrial Worksite' British Journal of Addiction 85: 497-507
- Wechsler, H. Kasey, I. H. Thumb, D. and Demone, H. W. (1969) 'Alcohol Level and Home Accidents: A Study of Emergency Service Patients' Public Health Reports 84: 1034-105
- Weiss, C. and Millman, R.B., (1989) 'Alcohol and Drug Abuse in the Workforce in Broad Perspective'. Bulletin of New York Academy of Medicine. Vol. 65 No. 2 Feb: 173-184.
- White, H. R., Aidala, A., and Zablocki, B. (1988) 'A Longitudinal Investigation of Drug Use and Work Patterns Among Middle-Class, White Adults', Journal of Applied Behavioural Science 24: 455-469
- Wight, S., (ed) (1994) Anthropology of Organisations. Routledge: London
- Willette, R. (1989) 'Methodology, Efficacy and Validity of Drug Testing.' in Weiss, C. and Millman, R.B (eds) Alcohol and Drug Abuse in the Workforce
- Williams, J. (1998) 'Tinker, Tailor, Soldier, Smackhead: Doctors on Heroin, Nurses on Pills, Executives on Coke. How Serious is Drug Taking at Work?' The Big Issue February 9-15: 14-15

- Workers' Privacy Part III: Testing in the workplace' (1993) Conditions of Work Digest Vol. 12, 2.
- Yang, J.M., Lewandrowski, K.B. (2001) 'Urine Drugs of Abuse Testing at the Point-of-care: Clinical Interpretation and programmatic Considerations with Specific Reference to the Syve Rapid Test (SRT).' Elsevier Science:27-32.
- Zigarelli, M.A. (1991) 'Random Drug Testing in the Public Sector: The Legal Parameters.' Employee Relations L.J./Vol 17, No. 3/ Winter.
- Zimmer, L. and Jacobs, J. B. (1990) 'Mapping The Drug Testing Industry and its Implication', in A. S. Trebach and K. B. Zeese (Eds.) The Great Issues of Drug Policy Washington, DC: Drug Policy Foundation: 219-226
- Zwerling, C. Ryan, J. and Orav, E. J. (1990) 'Costs and Benefits of Pre-Employment Drug Screening', Journal of the American Medical Association 267: 91-93
- Zwerling, C., and Ryan, J. (1992) 'Pre-Employment Drug Screening: The Epidemiological Issues'. Journal of Management Studies. 43(6): 595-599.
- Zwerling, C., (1993) Current Practice and Experience on Drug and Alcohol Testing in the Workplace. Geneva: International Labour Office