Financial Viability of Screening for Drugs of Abuse

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Urine drug testing is now a common practice in the American workplace; a recent survey indicated that >90% of companies with >5000 employees have some type of testing program. These programs have indeed reduced the rate of drug-positive test results; for example, recent data from the Federal Aviation Agency show that the rate for 1993 was 0.82% compared with 0.95% for 1992. Many corporations have stated that urine drug testing, as a component of a substance abuse policy, results in significant savings, e.g., from decreased absenteeism and turnover. The United States Postal Service recently completed a longitudinal study on the economic benefits and found that, over the average tenure of an annual intake of employees, there were savings of more than $100 million. Although this study clearly demonstrates the financial benefits of preemployment drug testing, the decision to test is not based solely on this but also on the regulatory environment and on the potential impact of a major accident attributable to the use of drugs or alcohol in the workplace.

Indexing Terms: urine/drug testing

Although recent national surveys have reported declines in overall drug use, >11 million Americans still reported using one or more illicit drugs in 1992 (1). In addition, results from several studies targeting specific populations, particularly students in high school and college, show that this downward trend has started to reverse itself (2, 3). In response to the numerous reports on the incidence of alcohol and drug abuse in the workplace (1, 4, 5), many employers have introduced substance abuse programs, one component of which is urine drug testing.

Workplace urine drug testing is now performed by many laboratories; however, several very important differences between this type of testing and the laboratory testing performed for diagnostic reasons affect the outcome of the results:

• The test is not performed on a patient; instead, a specimen is collected from a donor.
• The test result is not used to support a diagnosis; it is a single collection that is used in decisions relating to hiring, suspension from employment, referral to employee assistance programs (EAP), and, occasionally, dismissal of the employee.1 Unlike a true clinical test, it has no medical data to support its veracity and, except in rare circumstances, the collection cannot be repeated.
• For industries in which drug testing is required, the laboratory has to be certified by the Department of Health and Human Services (6). This certification from the Substance Abuse and Mental Health Services Administration (SAMHSA; formerly the National Institute on Drug Abuse) has become the “standard of care” for all drug testing, including that performed for nonregulated industry. This certification mandates that the laboratory uses certain analytical procedures, including gas chromatography–mass spectrometry, for confirming immunoassay results, and that it follows a rigid chain of custody, quality assurance, and data review guidelines.
• The result may be used in the legal environment to support disciplinary action.

Reviewing the evolution of workplace drug testing since the early 1980s helps place the current situation into perspective. This type of testing began with the US military after an accident aboard the USS Nimitz. Postaccident toxicology testing of the deck crew revealed the presence of marijuana metabolites in several members of the crew. Subsequent confidential surveys of Navy personnel indicated that >40% of them admitted to illicit drug use in the past 30 days. These data, and others, led the military to introduce a drug testing program based on random collections, standardized testing procedures, rehabilitation, and strict disciplinary action, including court martial. After the introduction of this program, drug use in the Armed Forces decreased dramatically in the past decade.

American businesses also started testing in the early 1980s, primarily for preemployment purposes. However, unlike the military, no control was placed on the analytical procedures, and occasionally results of dubious quality were reported. All this began to change in 1986 with President Reagan’s Executive Order requiring federal employees in safety- and security-conscious positions to be tested for drugs. As part of that order, the Department of Health and Human Services was mandated to develop an accreditation program for laboratories performing drug testing; in 1988, the Mandatory Guidelines for Federal Workplace Drug Testing Programs were published in the Federal Register (7).

In the mid-1980s, several well-publicized accidents and incidents focused public attention on drug abuse; these included the Amtrak Conrail railroad accident in Chase, MD, in which the engineer of the Conrail train admitted to marijuana use before the accident, and the death of Len Bias, the first-round draft pick of the

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1 Nonstandard abbreviations: EAP, employee assistance programs; SAMHSA, Substance Abuse and Mental Health Services Administration; and USPS, United States Postal Service.

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Boston Celtics in the National Basketball Association, from an overdose of cocaine. Such events led the Department of Transportation to require drug testing of workers in the transportation industry. This testing program included preemployment, random, and post-accident collections and was introduced in 1990. Testing has now spread to all sectors of the American workplace, and in 1992, 93% of companies with >5000 employees had some type of drug-testing program (8).

The majority of drug-testing programs in place today focus on illicit drugs; however, as of January 1, 1995, industries in the transportation sector are required to add alcohol testing. This was mandated as part of the Omnibus Transportation Employee Testing Act of 1991, which also added intrastate truckers and workers in mass transit to those required to undergo drug testing. As of 1995, ~7 000 000 transportation workers are subject to drug and alcohol testing. The inclusion of alcohol testing in the Omnibus Act was triggered by an accident on the New York City subway and by concern over alcohol use in the maritime industry.

Considering the amount of drug testing performed over the past decade, it might be expected that data on its financial effectiveness would be readily available. However, that is not the case, except for a controlled study by the United States Postal Service (USPS), in which significant economic benefit to preemployment drug testing was demonstrated (9–11). Other companies have indicated significant savings (12) without publishing supporting data.

This report will discuss the prevalence of drug use in today's workplace, the cost of substance abuse programs, and the USPS study. It is important to stress that the decision by a company to do drug testing is not based solely on its financial effectiveness but also on regulatory requirements, safety concerns, and the company's public relations image. These other factors may outweigh the financial benefits.

Prevalence of Drug Use in Today's Workplace

Over the past 6 years, SmithKline Beecham Clinical Laboratories (Collegeville, PA; press release, 1994) has tested several million urine specimens from the workplace. From 1987 to 1993, the positive rate decreased dramatically, from 18.1% to 8.4%, as substance abuse programs, including urine drug testing, were introduced into the American workplace. This survey also reports positive rates for the transportation industry; in 1993, the positive rate for preemployment testing in safety-sensitive positions increased from 3.11% to 3.38%. However, the positive rate for already employed personnel in similar positions declined.

A decrease in the number of drug-positive test results has also been observed in the various sectors of the transportation industry. For example, the Federal Aviation Administration (FAA News, Washington, DC, 1994) reported that in 1993 the positive rate was 0.82%, compared with 0.95% and 0.96% for 1992 and 1991, respectively. A review of the positives by occupation is valuable: >60% of the positives were in main-

| Table 1. Percent positives in a four-state study.* |
|-----------------------------------|---------|--------|
| Drugs | Alcohol |
| Minnesota | 4.7% | 0.43% |
| New Jersey | 4.1% | 0.09% |
| Nebraska | 3.2% | 0.14% |
| Utah | 4.0% | 0.19% |

* From ref. 13.
ever, these direct and variable costs are offset by increased productivity, decreased absenteeism, decreased turnover, decreased costs for healthcare benefits, decreased disciplinarian action, and improvements in safety and employee morale. Some of these savings have been well documented in the USPS study.

**USPS Study**

In 1987, the USPS began a longitudinal study (9-11) to determine the impact of preemployment drug testing. Drug test results were obtained from 4396 applicants between September 1987 and May 1988. A total of 4396 of these applicants were eventually hired and made up the study group. Results of the drug testing were maintained in a confidential manner, and applicants were hired irrespective of the drug testing results. Most applicants were informed at the time of their medical examination that drug tests would be performed, but at some of the larger sites, they were informed 2 to 5 days in advance. Specimens were tested for amphetamines, barbiturates, benzodiazepines, cocaine, marijuana, methadone, opiates (morphine and codeine), and phencyclidine, with use of the cutoff values commonly accepted in 1988. Four independent drug test variables were used to evaluate the data:

1) Overall test, defined as positive if the presence of drug was confirmed.
2) Marijuana, defined as positive if only the marijuana metabolite was confirmed positive.
3) Cocaine, defined as positive if benzoylecgonine (cocaine metabolite) or benzoylecgonine and marijuana metabolite were confirmed positive.
4) Other, defined as positive if the presence of any of the other drugs were confirmed positive.

Overall, 9% of the new employees tested positive; 68% of these tested positive for marijuana, 23% tested positive for cocaine, and 9% tested for one or more of the other drugs.

Over the next 3.3 years, several variables characterizing employment were monitored, including absenteeism, turnover, referrals to EAP, medical claims, and disciplinary actions. Comparison data were corrected for age, sex, and race. The results of the study are shown in Figs. 1–4, and the results of the comparisons in each of five categories are summarized below:

**Absenteeism** (Fig. 1). After 3.3 years, the mean absenteeism rate of 11.4% for the employees who tested positive was significantly different from the rate of 6.85% observed for the drug-negative group. Over the first year, employees who tested positive for marijuana were 1.5 times more likely to be heavy leave-of-absence users than employees who tested negative. Those who tested positive for cocaine were >4 times as likely to be heavy leave users.

**Turnover.** After 3.3 years, the drug-positive group had a 77% higher rate of involuntary turnover compared with the drug-negative group. Moreover, the disparities in firing rates between the two groups continued to increase throughout the 3.3-year period; after 1 year, this disparity was only 47%.

**Fig. 1. USPS study: absenteeism rates (hours).**

**Fig. 2. USPS study: EAP referrals.**

**Fig. 3. USPS study: medical claims.**

**Fig. 4. USPS study: disciplinary actions.**
EAP referrals (Fig. 2). After 3.3 years, 14.4% of the positives were referred to the EAP for assistance as against 2.7% of the negatives. In fact, the positives were 2.7 times more likely than the negatives to be referred. Separate analysis by drug type indicated that marijuana positives were twice as likely, and cocaine positives were 6.3 times as likely, as the drug-free group to be referred to the EAP. When the type of problem involved was examined, the positive group was more likely to be referred for problems relating to drug or alcohol abuse than for interpersonal or other types of problems.

Health benefits and medical claims (Fig. 3). After 3.3 years, the median number of claims filed by the positives was 51% higher than the negatives. The median dollar amount of these claims was 83% higher for the positives ($487) than the negatives ($265). Moreover, employees who tested positive were 3.4 times more likely than those testing negative to receive one or more alcohol- or drug-related diagnosis.

Disciplinary action (Fig. 4). After 3.3 years, for those applicants testing positive, the odds of being disciplined were 2.4 times those of applicants testing negative. Cocaine positives were 5.5 times more likely to be disciplined than their drug-negative peers.

In determining the economic impact of these data, the authors made several realistic assumptions:

- The average tenure of career employees was 10 years.
- Average salary and benefits were weighted by job category.
- An estimated 9% of the average number of applicants (61,588) hired in 1 year would be screened out and replaced by those testing negative for drug use.
- The total number of applicants tested each year is ~180,000, and the average cost of testing one applicant is $10.96.
- After 3.3 years, the impact of the positive drug group stabilized, and the differences between those employees and the negative group would not increase over the remaining 7 years.

The authors considered the impact of the drug-testing program on one annual set of new employees over the average 10-year period and computed the following savings:

<table>
<thead>
<tr>
<th>Issue</th>
<th>Cost</th>
</tr>
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<tbody>
<tr>
<td>Absenteeism</td>
<td>$103,596,258</td>
</tr>
<tr>
<td>Turnover</td>
<td>$1,312,710</td>
</tr>
</tbody>
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These two factors alone total $104,905,968 savings over a 10-year period, or a savings of ~$19,000 for every positive applicant who is not hired. These savings would be greater if they included the estimated savings in EAP and medical costs.

Other less well-controlled studies (5, 14, 15) have published similar data; for example, Sheridan and Winkler (14) found that employees testing positive in a "for-cause" testing program used a significantly higher amount of health benefits than their matched controls ($1,377 vs $163 per year, respectively). Several corporations have also indicated that their drug-testing program produces significant economic savings (12); for example: "In 1993, Upjohn's program cost the company approximately $476,000. With gross savings of more than $1 million, the company realized a net savings of approximately $560,000. Savings of $799,000 were realized in two areas alone: reduced absenteeism ($450,000) and reduced turnover ($349,000)."

Summary

The USPS study clearly demonstrates the economic benefits of preemployment drug testing; similar data are available within other American companies. Obviously, there may be a point at which the economic benefits are outweighed by the cost of a substance abuse program; however, with the apparent reversal in the downward trend of drug use among high school and college students, workplace drug testing still serves as a valuable deterrent. It is also extremely important to stress that the costs to society of a major accident that can be directly attributable to drug or alcohol use far outweigh the costs of these programs.

References