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Federal Transit Administration

FTA Drug and Alcohol Program Assessment

U.S. Department of Transportation
Research and Special Programs Administration
John A. Volpe National Transportation Systems Center
Cambridge, MA 02142-1093

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This report presents the results of a Substance Abuse Program and Methods of Evaluation study conducted by the Volpe National Transportation Systems Center in fiscal year 2000. The study determines the progress of the Drug and Alcohol Compliance Program in meeting U.S. Department of Transportation and Federal Transit Administration (FTA) strategic goals and objectives. The analysis also allows the FTA to determine whether the current program is operating effectively and efficiently while providing options for allowing limited resources to optimize results. Utilizing 5 years of data and 7 years of experience administering the program, the assessment demonstrates the effectiveness of the FTA Drug and Alcohol program and the ability of transit agencies to contribute significant economic benefits to both industry and society as a whole by effectively enforcing the regulations.

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PREFACE

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1 mile (mi) = 1.6 kilometers (km)	1 meter (m) = 1.1 yards (yd)
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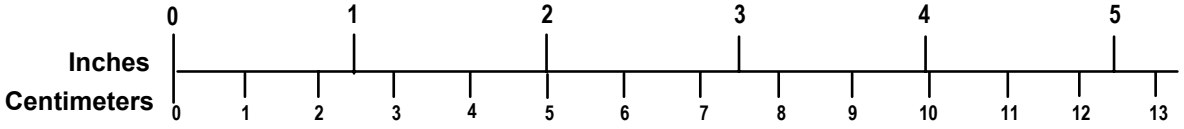

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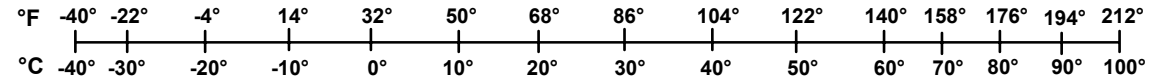

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EXECUTIVE SUMMARY

Introduction

In fiscal year 2000, the Volpe National Transportation Systems Center (Volpe Center) was directed to develop a Substance Abuse Program and Methods of Evaluation study in order to determine the progress of the Drug and Alcohol Compliance Program in meeting US Department of Transportation and Federal Transit Administration (FTA) strategic goals and objectives. To determine the progress of the program, the results are measured and compared to US DOT FTA Strategic Goal One: Outcome A: reducing the number of transit-related fatalities, injuries, and incidents. In formulating these measures, the results are derived primarily on the empirical knowledge and performance of the FTA substance abuse initiatives. These initiatives include the Drug and Alcohol Compliance Program (audits) and the Drug and Alcohol Management Information System Program (DAMIS), in support of 49 CFR Parts 40, 653, and 654. Although the update to the rules (49 CFR part 655) is now in effect, this assessment does not consider it, as the update was not in place during the 1995-1999 timeframe.

Overall, the concept of this assessment is to evaluate the Drug and Alcohol Program and to determine its effectiveness in reducing the number of transit related incidents. There are now seven years of experience administering the rule and six years of data, of which five years are included in the assessment. Therefore enough empirical data is available to observe clear statistical trends and develop informed assumptions. This assessment synthesizes economic and safety benefit models through the use of the aforementioned Drug and Alcohol Program data, National Transit Database Safety data and other benchmarks arising from the substance abuse industry and other government agencies.

The purpose of this analysis is two-fold. First, it serves as a report card so that the program can determine if it is meeting the goals and objectives established through the rules. Second, this assessment allows the FTA to determine whether the current program is operating effectively and efficiently. This analysis measures various components of the program by cost effectiveness and therefore provides options for allocating limited resources to optimize results.

The Volpe Center was originally asked to use a creative approach to determine the effectiveness of the program. It is recognized that there is some tentativeness with this type of assessment. However, this is due to the fact that the program itself is still relatively new, that there are many other factors at play that prohibit the attribution of performance results to this one program, and that such measurements may need more time series data to be more conclusive. Notwithstanding these limitations, this assessment identifies potential measures based on circumstances that could be expected as the program matures.

Summary Results

This assessment demonstrates the effectiveness of the FTA Drug and Alcohol Program and the ability of transit agencies to contribute significant economic benefits to both the industry and society as a whole by effectively enforcing the regulations.

Utilizing 5 years of data and 7 years of experience administering the program, the FTA has provided an overwhelming cost/benefit ratio. For instance, in 1999, the total cost of the program for both the FTA and the industry was $34 million. However, in 1999 the economic benefit was $393 million. **Thus there was a total societal economic benefit of $359 million due to the FTA Drug and Alcohol Program in 1999. Cumulatively, over the 1995-1999 period, the FTA Drug and Alcohol Program had a net economic benefit of $1.007 billion ($1.161 billion in benefits and $154 million in costs).**

More than economic benefits result from the FTA Drug and Alcohol Program. Through the reduction in drug and alcohol use within the transit industry, the FTA has ensured a safer public transportation system. Over the first 3 years of the program, there were eight fatalities that had post-accident positive drug tests. In the most recent 3 years, there has been only one. The program has helped the transit industry avoid an estimated 596 accidents, which has **saved 5 lives and avoided 524 injuries over the 1996-1999 period**.

The 17,483 drug using and alcohol misusing employees that have been mitigated directly by testing over the 1995-1999 period would have incurred a total societal economic cost of $343 million in 1999 in the absence of the FTA Drug and Alcohol Program. Each mitigated drug using and alcohol misusing employee would have incurred a total societal economic cost of $19,595 in 1999. The following breaks out the test-mitigated users and economic benefits by testing category:

- **In 1999, the 7,102 potential drug using and alcohol misusing employees that were avoided through the use of pre-employment testing would have incurred a total societal economic cost of $139 million.**

- **In 1999, the 6,979 drug using and alcohol misusing employees that have been mitigated through random testing over the 1995-1999 period would have incurred a total societal economic cost of $137 million.**

- **In 1999, the 805 drug using and alcohol misusing employees that have been mitigated through reasonable suspicion testing over the 1995-1999 period would have incurred a total societal economic cost of $16 million.**

- **In 1999, the 1,427 drug using and alcohol misusing employees that have been mitigated by refusing to take a test over the 1995-1999 period would have incurred a total societal economic cost of $28 million.**

- **In 1999, the 1,170 drug using and alcohol misusing employees that have been mitigated through post-accident testing over the 1995-1999 period would have incurred a total societal economic cost of $23 million**.

In addition, this assessment demonstrates that 1,926 potential drug using and alcohol misusing employees were deterred from using drugs and/or misusing alcohol due to the simple presence of the FTA Program in 1999. **The 1,926 employees that were deterred from using/misusing would have incurred a total societal economic cost of $38 million in 1999.**

This assessment also focuses on the costs and benefits of the second chance programs. In 1999, it was found that these programs saved $17.6 million in new employee training costs and incurred $4.4 million in additional testing, administration, and recidivism costs. **Thus, the net economic benefit of second chance programs was $13.2 million in 1999.**

Concerning regulatory compliance audits, FTA spends $1.4 million a year and it can be estimated that the average audit bears a cost of $51,852 as the FTA has conducted 133 since beginning the program. Therefore, each audit need help to mitigate only 2.65 substance abusers in a post 5-year period to have paid for itself. This figure can be derived by mitigating one substance-abusing employee over 2.65 years or any similar calculation.

1. DRUG AND ALCOHOL PROGRAM BACKGROUND

1.1 Introduction

This assessment presents an analysis of the results of mandatory drug and alcohol testing conducted by transit systems that receive funds from the Federal Transit Administration (FTA). Under the Omnibus Transportation Employee Testing Act passed by Congress in 1991, the FTA was required to establish regulations for drug and alcohol testing of transit employees performing safety-sensitive functions. The purpose of requiring transit agencies to implement drug and alcohol programs is to achieve a drug and alcohol free workforce in the interest of the health and safety of transit employees and the traveling public.

FTA regulations require that recipients of specific FTA funds implement an anti-drug program to deter and detect the use of prohibited drugs by transit employees and to establish a program to prevent prohibited alcohol use. Covered under these regulations are employees of transit systems who receive grant funds and employees of contractors to those transit systems. Large operators (i.e., those providing transit services in urbanized areas of 200,000 or more in population) were required to begin their drug and alcohol testing programs for calendar year 1995. Small and rural operators (i.e., those providing transit services in areas of less than 200,000) were required to begin their drug and alcohol testing programs for calendar year 1996.

1.2 Who Must Report

Transit systems that receive funding from the FTA sources listed in Figure 1.1 are required to have drug and alcohol testing programs. Under FTA regulations, in the time period used for this document assessment (1995-1999), all recipients must implement the required drug and alcohol testing programs and must report the results of their programs to the FTA annually. The results must be submitted to the FTA on specific Management Information System (MIS) forms or data diskettes.

Section 5307 (Section 9). Formula Program

Section 5309 (Section 3). Capital Program

Section 5311 (Section 18). Non-urbanized Area Program

Figure 1-1. FTA Federal Funding Sources

Section 5307 refers to block grants for capital projects and financing for the planning, improvement, and operating costs of equipment, facilities, and associated capital maintenance items for use in mass transportation. Section 5309 refers to discretionary grants and loans for capital projects, new and existing fixed guideway systems, an efficient mass transportation system coordinated with other transportation systems, the introduction of new technologies, the enhancement of urban economic development or the incorporation of private investment, and mass transportation projects to meet the needs of the elderly and individuals with disabilities. Section 5310 refers to grants and

loans for the special needs of the elderly and individuals with disabilities. Section 5311 refers to financial assistance for non-urbanized areas.

Some recipients provide mass transit services directly. Others rely on additional public or private entities to provide services in whole or in part. In these cases, the direct recipient of FTA funds is legally responsible for assuring that any entity operating on its behalf is in compliance with FTA testing rules.

Transit systems that receive funding directly from the FTA must certify annually that they are in compliance with the drug and alcohol testing regulations. States must certify regulatory compliance on behalf of the transit systems that receive FTA funding through a state agency.

Failure of a recipient to establish and implement a drug and alcohol testing program–either in its own operations or in those of an entity operating on its behalf–may result in the suspension of federal transit funding to the recipient. Because a recipient may not always provide transit services directly, the FTA uses the term "operator" or "employer" to describe those who actually provide transit services and who, therefore, must implement the FTA requirements.

1.3 Employees Who Must be Tested

Under the FTA's drug and alcohol testing regulations, employees and supervisors are considered safety-sensitive employees if they perform any of the following functions:

1. Operate a revenue service vehicle, including when not in revenue service (includes employees who operate a passenger vehicle, whether or not a fare is collected);

2. Maintain revenue service vehicles or equipment used in revenue service (except 5311 recipients' contractors);

3. Dispatch or control revenue service vehicles;

4. Operate a non-revenue service vehicle (e.g., snowplow or wrecker), which requires a Commercial Drivers License (CDL), and is not already covered by another employee category; and/or

5. Provide security and carry a firearm.

Maintenance contractors (except for 5311 recipients' contractors) that perform routine, ongoing repair, or maintenance work for FTA recipients and subrecipients must comply if their employees perform any of the identified safety-sensitive functions. In addition, supervisors who perform, or could be called upon to perform, any of the safety-sensitive functions are also included.

1.4 Tests

Employees who perform safety-sensitive functions are subject to six different types of tests:

1. **Pre-employment testing** for drugs is performed on each prospective employee, including individuals who are being transferred into safety-sensitive positions. Employees may not be hired unless they have a verified negative drug test result. (This is no longer applicable for alcohol — the FTA suspended required pre-employment testing for alcohol on May 10, 1995, as a result of a U.S. Court of Appeals decision.)

2. **Random testing** must be unannounced and unpredictable. The tests must be based on a scientifically valid random-number selection method. All safety-sensitive employees must have an equal chance of being selected for testing each time a selection is made, must be included in the selection pool, and must remain in the pool after being tested. For 2000, the number of random tests conducted must equal at least 50 percent (for drugs) and 10 percent (for alcohol) of the total number of employees performing safety-sensitive functions. Transit systems have the option of joining a consortium, an entity that arranges testing services and that acts on behalf of the employers. If a transit system joins a consortium for random testing, the testing rate applies to the total number of safety-sensitive employees within the consortium. As a result, some individual transit operators may not meet the random testing requirement.

3. **Post-accident testing** is required for accidents where there is loss of human life. For non-fatal accidents that meet FTA-defined conditions, testing is required unless the covered employee's performance can be completely discounted as a causative or contributing factor. When an accident occurs, safety-sensitive employees operating the vehicle must be tested, as well as any other safety-sensitive personnel not on the vehicle whose performance could have contributed to the accident. Tests must be administered as soon as possible but no later than 8 hours after the accident for alcohol and 32 hours for drugs.

4. **Reasonable suspicion testing** is conducted when an employer suspects that an employee has used a prohibited drug or has misused alcohol as defined in the regulations. Reasonable suspicion determinations are made by trained supervisors and must be based on specific, contemporaneous, articulated observations concerning the appearance, behavior, speech, or body odor of the safety-sensitive employee.

5. **Return-to-duty testing** occurs when an employer's policy statement permits an employee who violated the regulations (i.e., tested positive for drugs, had an alcohol result of ≥ 0.04, refused to submit to a test) to return to duty to perform a safety-sensitive function after completion of rehabilitation. The employee must, however, be evaluated by a Substance Abuse Professional (SAP) and pass a return-to-duty test prior to performing a safety-sensitive function.

6. **Follow-up testing** occurs after an employee has been returned to duty after a positive drug or alcohol test. The employee is subject to unannounced follow-up testing for at least 12 but no more than 60 months as recommended by the SAP. Follow-up testing is separate from, and in addition to, random testing.

2. COSTS

The cost of the Drug and Alcohol Program can be divided into the four following distinct categories:

- The overhead cost incurred by the FTA in running and administering the program;
- The cost of the tests themselves;
- Employee productivity costs associated with taking safety sensitive employees away from their primary job functions for testing; and
- Overhead and personnel costs that each transit agency or state incurs in running the program.

2.1 FTA Costs

The cost to the FTA in FY2000 was $2.2 million, which covered administration fees, administrator salaries, material costs, and contractor fees. This study assumes that this cost is steady from year-to-year, as the responsibilities, scope, and size of the program have not changed in any significant way over its lifetime. Thus, the cost for each year from 1995 to 1999 can be estimated at $2.2 million, and the cumulative total for the period is $11 million.

2.2 Potential Test Costs

The cost of the drug and alcohol tests was estimated through the use of a simple sampling technique. For this assessment, transit agencies are divided into three distinct categories based on size. Section 5307 agencies that are located in urbanized areas of over 200,000 people are considered large; Section 5307 agencies that are located in urbanized areas of between 50,000 and 200,000 people are considered small; and Section 5311 entities are considered rural. From each of these categories, representative agencies were polled to get their average cost for a test. This average cost was then multiplied by the total number of drug and alcohol tests performed per year nationally in each category, and these three totals yielded the weighted grand total spent on drug and alcohol tests.

The Kansas Department of Transportation (KDOT) provided the information for the rural category. KDOT will act as the model for the total national program costs at this time because the other representative agencies did not provide figures before publication. However, this assessment will be considered a living document and will mature with additional annual testing data and benchmarks. KDOT handles the Drug and Alcohol Program for all of the transit agencies in Kansas and a contracted consortium administers all of the tests. The average monthly statement from the consortium for drug and alcohol tests is $6,712, so $80,544 is spent annually on drug and alcohol tests. There were 2,464 safety-sensitive employees under the auspices of KDOT in 1999 (including turnover). The consortium conducted 1,210 drug and alcohol tests over the course of the year. Therefore, the average cost of the test itself for the rural category is $66.56. In 1999, there were a total of 25,097 drug tests and 5,319 alcohol tests conducted by rural

agencies. Thus, the total cost per year of the tests themselves for the rural agencies was approximately $2.025 million, and the total cost for the period from 1995 to 1999 was approximately $10.12 million.

In 1999, rural entities accounted for approximately 10.5 percent of the total number of drug and alcohol tests that were given in the transit industry. If the cost to the rural entities can be considered representative of the industry as a whole, then, using a weighted cost of $66.56 per test, the actual 1999 national testing cost was approximately $19.27 million.

2.3 Potential Loss of Productivity

In terms of productivity costs, KDOT estimated that it took approximately 1 hour on average for an employee to take their test, from notification to return (i.e., they were away from duty for 1 hour). This time period is not unusual, as many rural state Drug and Alcohol Program Managers (DAPM) require their consortiums to use mobile collection units in order to minimize the time an employee is away from duty. KDOT also estimated that the safety-sensitive employees made somewhere between the minimum wage of $5.15 and $7.00 per hour. As KDOT was unsure of the exact distribution, it was assumed that the average employee made the median wage of $6.075 per hour. Thus, the average productivity loss per test is $6.075 in the rural category.

In 1999, there were 13,515 random and 50 reasonable suspicion drug tests in rural agencies. Since drug and alcohol tests were essentially always taken at the same time, and since there were many more drug tests taken than alcohol tests, it is reasonable to assume that the number of times that a random or reasonable suspicion drug test was taken can be used as the approximate total number of times that employees missed work for testing. Thus, the total productivity loss per year using this data is approximately $0.08 million. The total productivity loss for the 5-year period from 1995 to 1999 is approximately $0.41 million (due to rounding).

As mentioned before, rural entities accounted for approximately 10.5 percent of the total number of drug and alcohol tests that were given in the transit industry. Using $6.075 as the productivity loss for each random and reasonable suspicion drug test, the 1999 national productivity cost of the program was $732,882.

2.4 Transit Agency Administrative Costs

As with the FTA, each agency has administrative and personnel costs associated with running the Drug and Alcohol Program. In order to estimate these costs, the same agencies that provided the testing costs were asked to provide their own agency costs. After these costs were collected, they were used to estimate the cost for each agency in that category, and then these estimates were used to calculate the total cost.

For the rural category, KDOT reported that it had an employee salary cost of $35,000 per year for administration of the FTA Drug and Alcohol testing. According to the 1999 Bureau of Labor Statistic (BLS) figures, salary is considered 70.6 percent of the cost of a

state or local government employee, while benefits make up the other 29.4 percent.[1] Therefore it can be assumed that the total annual administrative and personnel cost of the Drug and Alcohol Program for KDOT is $49,575, and that this is what can be expected at a typical rural state program. KDOT's 1210 drug and alcohol tests in 1999 represented 3.98 percent of the total number of drug and alcohol tests (30,416) conducted by rural entities that year. In 1999, administrating the FTA program costs KDOT $40.97 per test. Thus, it can be estimated that the total administrative and personnel cost for rural entities in 1999 was approximately $1.25 million and the cost for the period from 1995 to 1999 was approximately $6.23 million.

Since rural entities accounted for approximately 10.5 percent of the total number of drug and alcohol tests that were given in the transit industry, the national administrative and personnel cost for all transit entities in 1999 was approximately $11.86 million and the cost for the period from 1995 to 1999 was approximately $59.32 million. Figure 2.1 describes all of the various cost components of the FTA Drug and Alcohol Program.

Table 2-1. FTA Drug and Alcohol Testing Program Cost Model

	1995	1996	1997	1998	1999
FTA Total Cost per Year - FY2000	**$2,200,000**	**$2,200,000**	**$2,200,000**	**$2,200,000**	**$2,200,000**
Total Tests	188,278	275,148	284,241	265,294	289,555
Total Random and Reasonable Suspicion Drug Tests	81,378	109,517	108,099	112,498	120,639
Cost per Test - from 1999 Rural	$66.56	$66.56	$66.56	$66.56	$66.56
Actual Cost of Tests	**$12,531,784**	**$18,313,851**	**$18,919,081**	**$17,657,969**	**$19,272,781**
Safety Sensitive Employee Productivity Cost (per test)	$6.08	$6.08	$6.08	$6.08	$6.08
Total National Productivity Cost to Agencies	**$494,371**	**$665,316**	**$656,701**	**$683,425**	**$732,882**
Cost of Drug & Alcohol Program Personnel at Transit Agencies (per Test)	$40.97	$40.97	$40.97	$40.97	$40.97
Total National Administrative Cost to Agencies	**$7,713,750**	**$11,272,814**	**$11,645,354**	**$10,869,095**	**$11,863,068**
Total Cost	**$22,939,905**	**$32,451,980**	**$33,421,136**	**$31,410,489**	**$34,068,731**

2.5 Total Drug and Alcohol Program Cost

The annual total cost of the Rural Drug and Alcohol Program at the agency level, is approximately $3.357 million; the approximate total cost for the period from 1995 to 1999 was approximately $16.7 million. As mentioned, this covers administration and personnel costs at the agency level, the costs of the tests, and the loss in productivity as a result of an employee leaving safety-sensitive duty for testing. As the rural entities accounted for approximately 10.5 percent of the total number of drug and alcohol tests that were given in the transit industry, the D&A program cost the entire transit industry approximately $31.87 million in 1999, and approximately $143.3 million from 1995 to 1999. In addition, the FTA expended $2.2 million per year administrating the program, so a total of approximately $34.07 million was spent in 1999 and a total of approximately $154.3 million was spent from 1995 to 1999. Figure 2-1 illustrates the total costs of the Drug and Alcohol Program from 1995 to 1999. It also demonstrates the percentage that each type of cost contributes to the total cost in each year.

[1] United States Department of Labor, BLS Employer Costs for Employee Compensation, March 2000.

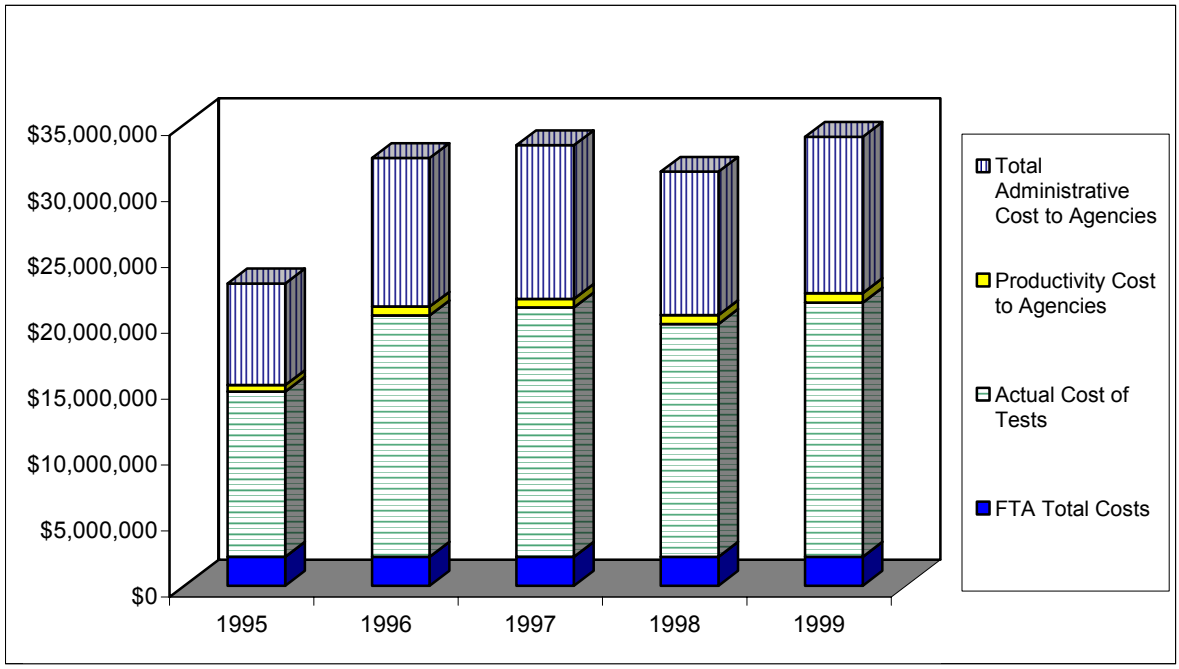

Figure 2-1. Total Costs by Type and Year

3. BENEFITS

3.1 Elimination or Mitigation of Drug and Alcohol Using Employees

The major benefit of the Drug and Alcohol Program is that it eliminates the economic inefficiencies of substance abuse and represents a savings to society as a whole, and the transit industry in particular. Substance abuse has an adverse affect upon people other than the abuser. The elimination or reduction of drugs and alcohol also provides an external benefit.

The cost of drug and alcohol abuse in both the national economy in general and the transit industry in particular, is immense. The National Institute on Drug Abuse (NIDA) has found that the national economic cost of drug and alcohol was $245 billion per year in the United States in 1992. Indexing that cost with the Gross Domestic Product (GDP) change over the period of this study, the economic cost of drug and alcohol abuse yields a total of $361 billion by 1999. The Bureau of Economic Analysis has estimated that the transit industry represents approximately 0.18 percent of the GDP of the U.S. Since there is no reason to believe that the transit industry is over or underrepresented in the costs associated with drug and alcohol abusing employees, the total annual impact of transit drug and alcohol abuse can be estimated at approximately $660 million (0.18 percent of $361.5 billion) in 1999.

This assessment makes the assumption that the total annual economic cost of transit industry drug and alcohol abuse rose in the late 1990s, as both the GDP rose and the percentage of transit industry's contribution to the U.S. GDP rose from 0.17 percent to 0.18 percent. Thus, the total annual cost of transit drug and alcohol abuse rose from $482 million in 1995 to $660 million in 1999 as seen in Table 3-1.

Table 3-1. Impact of Drug and Alcohol Abuse on Transit

	1995	1996	1997	1998	1999
Gross Domestic Product (GDP)	$7,400,500,000,000	$7,813,200,000,000	$8,300,800,000,000	$8,759,900,000,000	$9,299,200,000,000
Transit as a Percent of the Total U.S. Economy	0.168%	0.172%	0.178%	0.183%	0.183%
Transit Gross Product	$12,400,000,000	$13,400,000,000	$14,800,000,000	$16,000,000,000	$16,989,638,400
Percent GDP Change		5.58%	6.24%	5.53%	6.16%
Annual Economic Cost of U.S. Drug & Alcohol Abuse	$287,732,807,925	$303,778,660,210	$322,736,638,339	$340,586,531,200	$361,554,614,886
Annual U.S. Total Societal Economic Cost of Drug & Alcohol Abuse (Transit Portion)	**$482,114,292**	**$520,994,477**	**$575,426,736**	**$622,082,957**	**$660,560,281**

The Drug and Alcohol Program, however, does not contain all transit employees. Instead, it looks to identify and stop drug and alcohol abusing safety-sensitive transit employees. In 1999, safety-sensitive employees constituted 76.4 percent of the total population of transit employees (see Figure 3-1). Thus, the total annual economic savings opportunity presented by the FTA Drug and Alcohol Program can be estimated at $504.6 million (76.4 percent of $660 million). This savings opportunity figure represents

the ceiling for annual savings in 1999. It would be met if all drug and alcohol abuse was mitigated amongst transit safety-sensitive employees in 1999.

According to the Substance Abuse and Mental Health Services Administration (SAMSHA), 10.8 percent of transportation and material moving employees are heavy alcohol or drug abusers. The U.S. Department of Labor's national estimate of 10 percent for employee drug and alcohol abuse provides context for the SAMSHA figure. Consequently, the SAMSHA rate of 10.8 percent is appropriate in calculating the number of drug and alcohol abusing transit employees. Using this figure, the assumption will be made that 10.8 percent of safety-sensitive employees are substance abusers (see Figure 3-2).

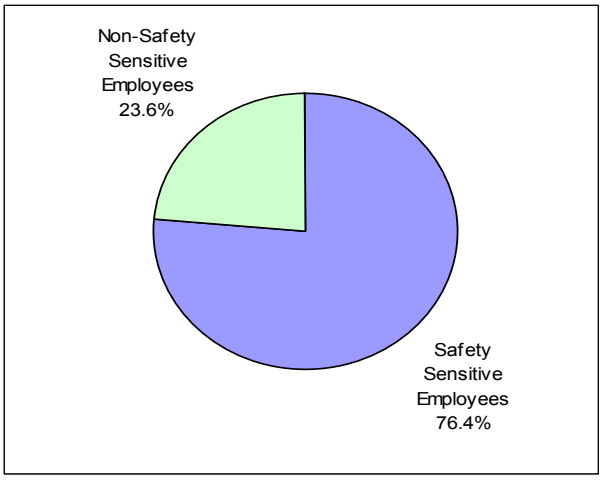

Figure 3-1. Percent of Safety-Sensitive Employees in Transit Industry

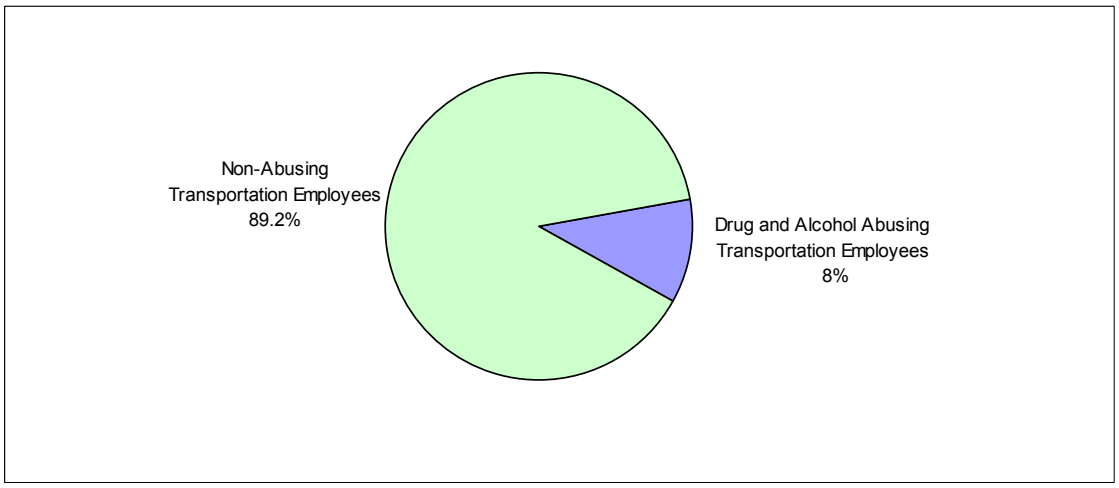

Figure 3-2. Percent of Transportation and Material Moving Employees that are Alcohol and Drug Abusers

Thus, out of approximately 238,641 (DAMIS) safety-sensitive transit employees in 1999, there were an estimated 25,773 substance abusers[2]. This was an increase from 1998 and a continuation of the trend from the years 1995 through 1998, when it will be assumed that the number of substance abusers increased proportionally with the overall increase in transit employment from 22,950 to 24,267. As previously mentioned, these substance abusers in transit safety-sensitive positions incurred a total economic cost of $504.6 million in 1999. Thus, in 1999, each safety-sensitive substance abuser represented about

[2] FTA Drug and Alcohol Testing Results 1999 Annual Report

$19,575 in total societal costs. Table 3-2 illustrates the various transit and substance abuse industry measures used in formulating the economic assessment.

Table 3-2. Annual Economic Impact of Each Drug and Alcohol Abusing Transit Employee

	1995	1996	1997	1998	1999
Total Transit Safety-Sensitive Employees	212,496	213,657	214,401	224,696	238,641
Total Transit Employees	275,000	276,494	291,998	298,086	312,458
Percent of Safety-Sensitive Transit Employees	77.3%	77.3%	73.4%	75.4%	76.4%
Percent of Drug Use and/or Alcohol Misuse Among Transportation Workers	10.80%	10.80%	10.80%	10.80%	10.80%
Current Drug Using and/or Alcohol Misusing Safety-Sensitive Transit Workers (Extrapolated using 10.8%)	22,950	23,075	23,155	24,267	25,773
Average Annual Economic Impact of Each Drug Using and/or Alcohol Misusing Transit Employee	$16,233	$17,447	$18,247	$19,323	$19,575

It is easy to envision many of the different methods by which this cost of $19,575 is incurred. For one, substance abuse brings with it both medical consequences and negative productivity effects such as impaired productivity, incarceration, crime careers, and the premature death. Further, there are the societal impacts of abuse such as crime acts and social welfare administration that is related to crime or being released from work. Lastly, there are the obvious physical calamities, such as vehicle crashes and fires, which drug and alcohol abuse can either contribute toward or directly cause. Thus, it is these types of costs that add up to the $19,575 per substance abuser in a safety-sensitive position as previously calculated. If transit drug and alcohol abuse is eliminated, then these annual economic costs per employee will no longer be incurred. Therefore, each employee that the FTA Drug and Alcohol Program eliminated or rehabilitated represented a total societal economic savings of approximately $19,575 per year in 1999.

From 1995 to 1999, the FTA Drug and Alcohol Program has mitigated over 19,000 substance abusers through positive tests, refusals or program-influenced user abstinence. That is, the program has prevented over 19,000 substance-abusing employees from performing safety-sensitive duties because they have been either terminated, influenced, or rehabilitated.

For the purpose of this study, it will be assumed that employees mitigated through positive tests or refusals would have remained in the industry for the entire period of the study. Thus, employees mitigated by each test type are included cumulatively for each successive year. In the future, any employees mitigated over five years previously will be dropped from a particular years total in this economic model. The assumption is that users would eventually have been mitigated through deficient job performance even in the absence of the program.

The exception to the cumulative tally method is employees that abstain due to the deterrent effect of the program. They are not tallied cumulatively as they are not eliminated through termination or rehabilitation. Thus, they are tallied only in the year in which they are deterred due to the program.

In looking at the savings benefit for a year it is necessary to look at the total drug and alcohol using employees mitigated for the entire period between 1995 and that particular year for positive tests or refusals. In other words, a drug using and alcohol misusing employee mitigated in 1996, would still be using/misusing in each successive year in the absence of the FTA Drug and Alcohol Program. This assessment assumes that the using/misusing employee from 1996 would still be using and, in turn, impacting the transit industry and society with an annual economic cost in 1997, 1998, and 1999. The number of employees mitigated by positive tests or refusals between 1995 and 1999 was 17,483, and those abstaining due to the deterrent effect of the program was 1,926. **Therefore, the total number of using/misusing employees mitigated by the program *in 1999* was 19,409 and the total societal economic savings per employee in 1999 was $19,575. Thus, the total savings derived from mitigated employees for 1999 was $380 million** (does not include Second Chance Program benefits). Figure 3-3 shows this economic benefit for each year from 1995 to 1999.

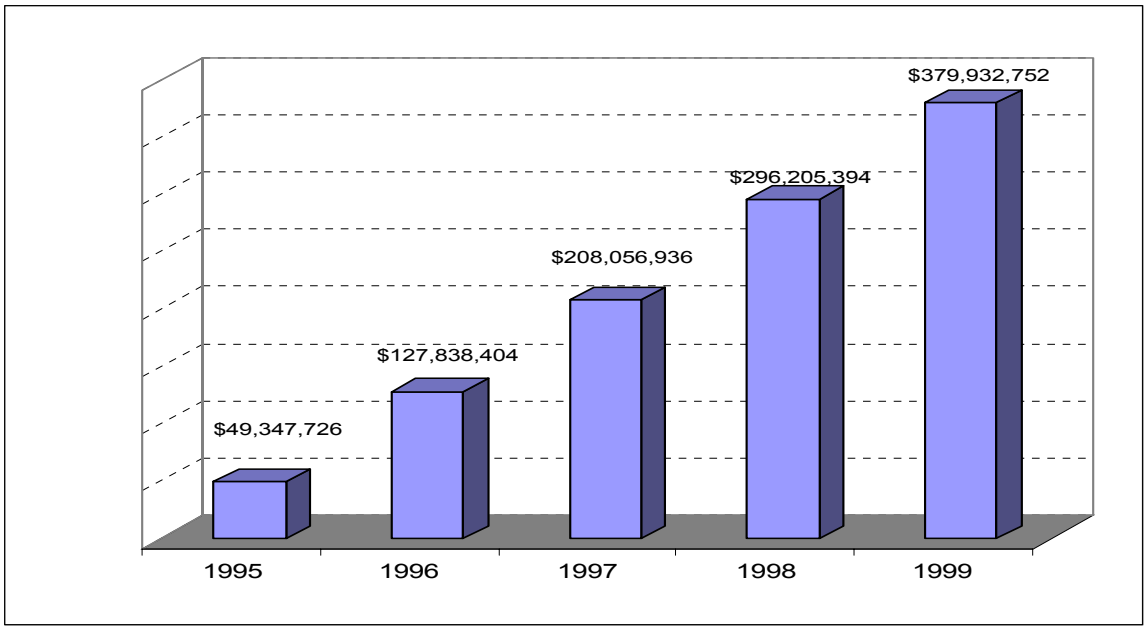

Figure 3-3. Cost Avoidance by Test-mitigated Employees by Year

3.2 Pre-Employment Testing

The number of employees mitigated is based primarily on the different test types of the FTA Drug and Alcohol Program. All prospective safety-sensitive employees are required to take a pre-employment drug and alcohol test. Employee candidates with a positive test are prevented from performing safety sensitive duties. For the period from 1995 through 1999, this accounted for 36.6 percent (7,102 out of 19,409) of the mitigated employees. This percentage rose steadily throughout the period indicating that pre-employment testing has maintained its effectiveness throughout the life of the program. In addition, the percent of positive pre-employment tests of unique applicants has ranged between 3 percent and 2.5 percent over the period of this study. This consistency suggests that the overall drug and alcohol proclivity of the potential available workforce has not changed

significantly. **In 1999, the 7102 potential drug and alcohol abusing employees that were avoided through the use of pre-employment testing would have had a total societal cost of $19,575 each, for a total of $139 million**. Table 3-3 illustrates the various figures used to calculate the economic benefits received from pre-employment testing.

Table 3-3. Annual Economic Benefit - Pre-Employment Testing

	1995	1996	1997	1998	1999
Pre-employment Drug tests - Yields Unique Safety-Sensitive Applicants	26,379	49,392	52,925	59,613	73,951
Pre-employment Drug & Alcohol tests	36,013	56,460	59,601	71,371	115,309
Unique Applicants with a Drug or Alcohol Pre-employment Positive	791	1,394	1,429	1,649	1,839
Pre-employment Positive Rate	3.00%	2.82%	2.70%	2.77%	2.49%
Eliminated from Employment Consideration by Positive Pre-employment Test (Cumulative 1995-1999)	791	2,185	3,614	5,263	7,102
Annual Societal Economic Cost Avoided by Transit Industry due to Eliminating Users from Employment Consideration as a Result of Positive Pre-employment Tests (Using Cumulative Figure)	**$12,840,148**	**$38,121,949**	**$65,943,888**	**$101,698,920**	**$139,020,140**

3.3 Random Testing

In addition to the pre-employment tests, the FTA Drug and Alcohol Regulations require that 50 percent of the industry's safety-sensitive employees submit to a random drug test and 10 percent submit to a random alcohol screening each year. Employees with positive tests are prevented from performing safety-sensitive duties and are mitigated, either through termination or rehabilitation. For the period from 1995 to 1999, random test positives accounted for 36 percent (6,979 out of 19,409) of the employees removed from service. However, unlike the pre-employment test case, there has been a clear downward trend in this percentage over the period. Taking each year's testing individually, random positives accounted for 48.4 percent of the mitigated employees in 1995, it was down to 30.1 percent in 1997, and 20.4 percent in 1999. Thus, the program has been successful in both discovering and dissuading substance abuse within the industry. However, adulterants and substituted sample techniques and technologies certainly account for a portion of this downtrend. **In 1999, the 6,979 drug using and alcohol misusing employees that have been mitigated through random testing over the 1995-1999 period would have incurred a cost of $19,575 each, for a total of $137 million.** Table 3-4 illustrates the various figures used to calculate the economic benefits received from random testing.

Table 3-4. Annual Economic Benefit - Random Testing

	Baseline Rate	1996	1997	1998	1999
Percent of Random Test Positive (Drug)	1.73%	1.50%	1.21%	1.07%	1.00%
Random Test Positives (Drug & Alcohol) - Users Eliminated or Mitigated from Transit Workforce	1472	1721	1380	1250	1156
Random Test Positives (Drug & Alcohol) - Users Eliminated or Mitigated from Workforce (Cumulative 1995-1999)	1472	3193	4573	5823	6979
Random Drug Test Positives - Users Eliminated or Mitigated from Workforce	1390	1620	1295	1196	1117
Total Alcohol Screens	47,816	62,618	62,161	41,206	41,358
Random Alcohol Screen Positives - Eliminated or Mitigated in Workforce	82	101	85	54	39
Percent of Random Screen Positive (Alcohol)	0.17%	0.16%	0.14%	0.13%	0.09%
Annual Societal Economic Cost Avoided by Transit Industry due to Eliminating or Mitigating Users as a Result of Positive Random Tests (Using Cumulative Figure)	**$23,894,688**	**$55,708,642**	**$83,442,557**	**$112,520,009**	**$136,612,441**

3.4 Reasonable Suspicion Testing

Reasonable Suspicion tests are conducted when an employer suspects that an employee has used a prohibited drug or has misused alcohol as defined in the regulations. Reasonable suspicion determinations are made by trained supervisors and must be based on specific, contemporaneous, articulated observations concerning the appearance, behavior, speech, or body odor of the safety-sensitive employee.

For the period from 1995 to 1999, reasonable suspicion test positives accounted for 4.1 percent (805 out of 19,409) of the employees removed from service or deterred. The number of reasonable suspicion tests and positive results have been remarkably steady. As expected, reasonable suspicion testing has the highest percent positive result rate of all the testing categories. The reasonable suspicion positive result rate for drugs and/or alcohol has only varied from 7.8 percent to 8.8 percent over the 1995-1999 period. Thus, reasonable suspicion testing has been consistently effective in discovering substance abuse within the industry. **In 1999, the 805 drug using and alcohol misusing employees that have been mitigated through reasonable suspicion testing over the 1995-1999 period would have incurred a cost of $19,575 each, for a total of $15.8 million.** Table 3-4 illustrates the various figures used to calculate the economic benefits received from reasonable suspicion testing.

Table 3-5. Annual Economic Benefit – Reasonable Suspicion Testing

	1995	1996	1997	1998	1999
Reasonable Suspicion Test Positives (Drug & Alcohol) - Users Eliminated or Mitigated from Transit Workforce	147	167	169	173	149
Reasonable Suspicion Test Positives (Drug & Alcohol) - Users Eliminated or Mitigated from Workforce (Cumulative 1995-1999)	147	314	483	656	805
Reasonable Suspicion Tests (Drug & Alcohol)	1879	2229	1976	1974	1691
Reasonable Suspicion Tests (Drug & Alcohol) - Percent Positive	7.82%	7.49%	8.55%	8.76%	8.81%
Annual Societal Economic Cost Avoided by Transit Industry due to Eliminating or Mitigating Users as a Result of Positive Reasonable Suspicion Tests (Using Cumulative Figure)	**$2,386,222**	**$5,478,394**	**$8,813,198**	**$12,676,134**	**$15,757,704**

3.5 Refusals

A further way in which substance abusers in safety-sensitive positions have been mitigated by the Drug and Alcohol Program has been through the dismissal of those employees that refused tests. There are two different categories for refusals in the Drug & Alcohol Management Information System (DAMIS). The first category includes only those employees who refuse to take a random test, while the other category includes employees who refuse to take any other type of test (i.e., a pre-employment test, a post-accident test, a return-to-duty test, a follow-up test, or a reasonable suspicion test). In either case, the refusing employee is removed from duty immediately and prevented from performing their safety-sensitive function.

For the period from 1995 to 1999 cumulative, refusals accounted for 7.3 percent (1,427 out of 19,409) of the employees removed from service due to substance abuse. This is obviously a much smaller total than the random positives, which seems to indicate that

most substance abusers hope to test negative rather than simply refusing to test. It is also skewed upwards a bit by the 1995 high when refusals represented of 14.4 percent percent of using/misusing employees eliminated or mitigated by the program. This appears to have been a result of unfamiliarity and distrust of the then new program or the MIS forms and definitions. Taking each year's tests individually, the refusal rate for 1996 through 1999 has been fairly steady and has shown no distinct trend. It has been as low as 3.4 percent in 1997 and as high as 6 percent in 1999. It appears that a lesson was learned in the first year that refusals would unquestioningly result in dismissal.

When the refusals are separated into the two categories discussed above, it becomes clear that random refusals are the more prevalent type. In general, refusals of random tests constitute approximately two-thirds of the total number of refusals (ranging from 60.3 percent in 1996 to 69.5 percent in 1998). However, the major exception is 1995, in which random refusals constituted only 13.5 percent of the total. While the abnormally large number of other refusals in 1995 may have been due to unfamiliarity or distrust on the part of the employees, it is more likely that it was due to the collectors misunderstanding the definition of what constitutes a refusal. Consequently, in the period 1996-1999, the rates fell from the 1995 high and then remained fairly steady. **In 1999, the 1,427 drug using and alcohol misusing employees that have been mitigated by refusing to take a test over the 1995-1999 period would have incurred a cost of $19,575 each, for a total of $28 million.** Table 3-5 illustrates the various figures used to calculate the economic benefits received from test refusals.

Table 3-6. Annual Economic Benefit – Refusals

	1995	1996	1997	1998	1999
Random Test Refusals (Alcohol)	36	33	36	35	61
Random Test Refusals (Drug)	23	110	69	143	164
Non-random Test Refusals (Drug)	355	48	33	54	89
Non-random Test Refusals (Alcohol)	24	46	17	24	27
Total Refusals (Alcohol)	60	79	53	59	88
Total Refusals (Drug)	378	158	102	197	253
Total Refusals (All Cumulative 1995-1999)	438	675	830	1086	1427
Annual Societal Economic Cost Avoided by Transit Industry due to Eliminating Users as a Result Drug or Alcohol Test Refusals	**$7,109,968**	**$11,776,803**	**$15,144,833**	**$20,985,185**	**$27,933,222**

3.6 Post-Accident Testing

Another manner in which substance-abusing transit employees were mitigated was through post-accident drug and alcohol testing. After any accident where there is loss of human life, or any non-fatal accident that meets FTA-defined conditions as stated in Section 1.4, a post-accident test is required, unless the covered employee's performance can be completely discounted as a causative or contributing factor. After an accident that meets the FTA post-accident threshold, any safety-sensitive employees operating the vehicle must be tested, as well as any other safety-sensitive personnel whose performance may have contributed to the accident. The tests should be administered as soon as possible, and must be taken no later than 8 hours after the accident for alcohol and 32 hours for drugs. If there is a positive test, then the employee will be immediately removed from duty.

For the period from 1995 to1999 cumulative, post-accident test positives accounted for 6 percent (1,170 out of 19,409) of the employees removed from service. In addition, the number of employees mitigated through post-accident positives remained steady throughout the time period. Taking each year's tests individually, post-accident positives represented between 6.0 and 6.3 percent of test-mitigated and deterred employees.

Although the number of accidents meeting the testing threshold increased, the post-accident positive rate decreased steadily throughout most of the period, from 3.11 percent in 1995, to 2.4 percent in 1997, to 1.69 percent in 1998. It increased in 1999 to 1.72 percent but the overall rate is clearly trending downward. This indicates that there were fewer drivers operating while under the influence of either drugs or alcohol in 1999 than in 1995 and that the FTA Drug and Alcohol Program has clearly reduced the percent of safety-sensitive employees operating under the influence. In addition, it shows that the random and pre-employment testing has been effective, as more users have been mitigated before they could contribute to an accident. **In 1999, the 1,170 drug using and alcohol misusing employees that have been mitigated through post-accident testing over the 1995-1999 period would have incurred a cost of $19,575 each, for a total of $23 million**. Table 3-6 illustrates the various figures used to calculate the economic benefits received from post-accident testing.

Table 3-7. Annual Economic Benefit - Post-Accident Testing

	1995	1996	1997	1998	1999
Total Accidents that Met the FTA Drug and Alcohol Testing Threshold	6,783	12,254	13,876	13,968	15502
Accidents with Positive Drug Test	147	239	249	199	227
Accidents with Positive Alcohol Test	45	16	17	15	16
Accidents with a Positive Post-Accident Drug or Alcohol Test (Cumulative 1995-1999)	192	447	713	927	1170
Annual Societal Economic Cost Avoided by Transit Industry due to Eliminating or Mitigating Users as a Result of Positive Post-Accident Tests (Using Cumulative Figure)	**$3,116,698**	**$7,798,861**	**$13,009,959**	**$17,912,768**	**$22,902,501**

3.7 Deterrent Effect

The last method in which substance abusers have been mitigated is through simple persuasion. In other words, some workers have abstained from drug and alcohol use due to the deterrent effect of the FTA Program itself. Thus, there have been some workers who have decided to abstain from substance abuse in direct response to the institution of the FTA Drug and Alcohol Program. The best way to measure this is to use the random positive rate in 1995 (1.73 percent) as a baseline. Then, for each subsequent year, the random positive rate should be subtracted from the baseline rate. This rate change can then be multiplied by the total number of safety-sensitive transit employees for each respective year to calculate the number of employees who abstained from using drugs or alcohol due to the Drug and Alcohol Program in that year. For example, the rate in 1997 was 1.21 percent, which was 0.52 percent less than the 1995 baseline rate of 1.73 percent. The rate drop was then multiplied by the 214,401 safety-sensitive transit employees in 1997. Thus, using the 1995 rate as a baseline it can be inferred that 1,115 employees abstained from drug use in 1997 because of the Drug and Alcohol Program. Figure 3-4 illustrates the deterrent effect of the program during the 1995-1999 period.

Table 3-8. Employees Deterred by Random Testing – Random Rate, Resulting Number and Economic Benefit

Year	Random Positive Rate	Employees Abstaining from D&A Use	Economic Benefit
1995	Baseline 1.73	N/A	N/A
1996	1.5	513	$8,953,754
1997	1.21	1190	$21,702,500
1998	1.07	1574	$30,412,379
1999	1.0	1926	$37,706,749

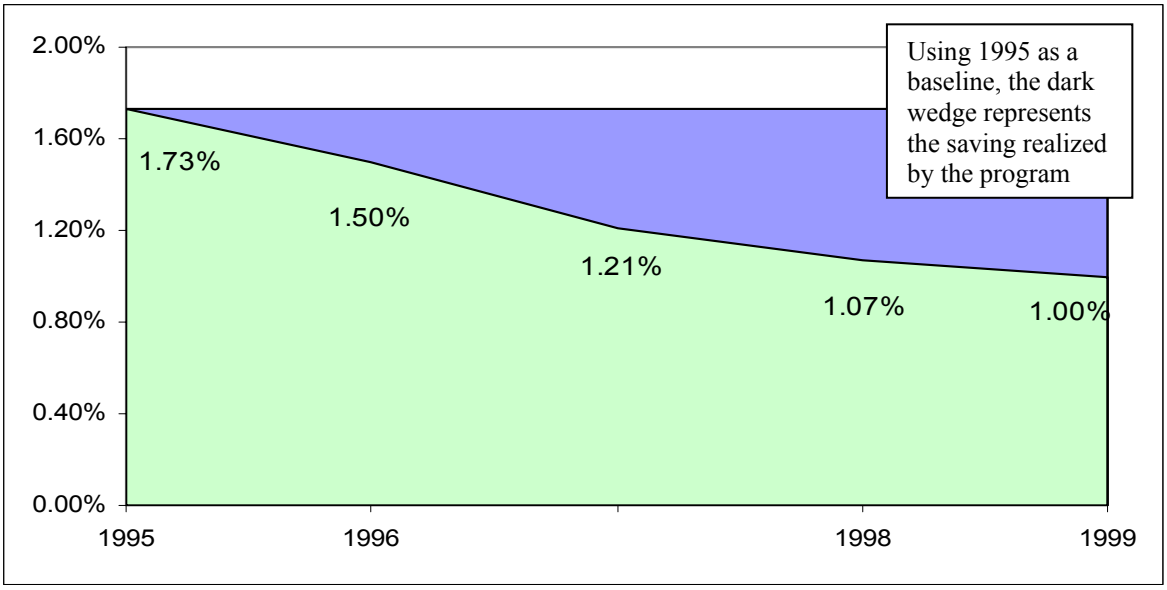

Figure 3-4. Deterrent Effect of FTA Drug and Alcohol Program – 1995 Baseline Random Rate against the 1995-1999 Random Rate Trend

It must be kept in mind that abstaining employees are not calculated cumulatively as in the test-mitigated employees. These employees are not terminated or rehabilitated, so it must be assumed that much of the pool of deterred or abstaining employees remains the same from year to year.

The deterrent figures can be seen as conservative because of the use of 1995 as the baseline. 1994 would have been more appropriate, because no FTA program existed, but obviously no figures exist for the time period prior to the onset of the FTA Testing Program. Another weakness of this measure is the fact that no employee can be counted as having abstained in 1995, because it was the baseline year.

In contrast, the number of employees calculated by this method could be seen as an overestimation because the drop in the number of random positives may be due to the mitigation of employees through prior pre-employment testing as well as through abstention. That is, the employees who replaced the employees that were dismissed due

to a random or post-accident positive would be expected to have a lower rate of substance abuse because the new employees had to pass the pre-employment test, whereas the original employees did not.

The above points are assumptions that pull the deterrent effect in opposite directions. However, much of the purpose of this assessment is to set benchmarks and make some reasonable assumptions in order to allow potential measures to progress. Given the information available, this is the best method of estimation; however, the results should be looked at as being a bit optimistic. With that caveat in mind, for the period from 1995-1999 cumulative, 9.9 percent (1,926 out of 19,409) of the mitigated employees chose to stop using drugs and misusing alcohol because of the FTA Drug and Alcohol Program. This indicates that the Program has been very successful at compelling employees to stop abusing drugs and alcohol. The fact that this number increased in total over the period from 1996 to 1999 also demonstrates that employees were not returning to drug and alcohol abuse at any significant rate. Even if these totals are a bit of an overestimation, they still indicate that a large number of safety-sensitive transit employees have decided to stop past substance abuse. In addition, this trend suggests that newer employees have not chosen to start abusing drugs and alcohol after passing their pre-employment test. **Table 3-8 demonstrates that in 1999, the 1,926 drug and alcohol using employees that were deterred from drug use and alcohol misuse due to the testing would have incurred a cost of $19,575 each, for a total of $37.7 million.**

Table 3-9. Annual Economic Benefit - Deterrent Effect

	Baseline Rates	1996	1997	1998	1999
Percent of Random Test Positive (Drug)	1.73%	1.50%	1.21%	1.07%	1.00%
Percent of Random Screen Positive (Alcohol)	0.17%	0.16%	0.14%	0.13%	0.09%
Employees Abstaining from Using Drugs due to the Program (Current % Positive Subtracted from Baseline % Positive)	/A	491	1115	1483	1742
Annual Societal Economic Cost Avoided by Transit Industry due to Workers Abstaining because of FTA Random Drug Tests	A	$8,573,707	$20,343,073	$28,656,441	$34,100,832
Employees Abstaining from Misusing Alcohol due to the Program (Current % Positive Subtracted from Baseline % Positive)	/A	22	75	91	184
Annual Societal Economic Cost Avoided by Transit Industry due to Workers Abstaining because of Random Alcohol Screens	N/A	$380,048	$1,359,427	$1,755,938	$3,605,913

3.8 Conclusion

The five methods of mitigation have all contributed, albeit unequally, towards the total cost avoidance of approximately $393 million for the 1995-1999 period. However, the cumulative effects of the program cannot simply be carried forward indefinitely. As stated earlier, it is logical assumption of this assessment that substance abusers would be terminated within 5 years even without the FTA Drug and Alcohol Program due to the effects of the abuse on their productivity. Thus, it is logical to only carry forward the

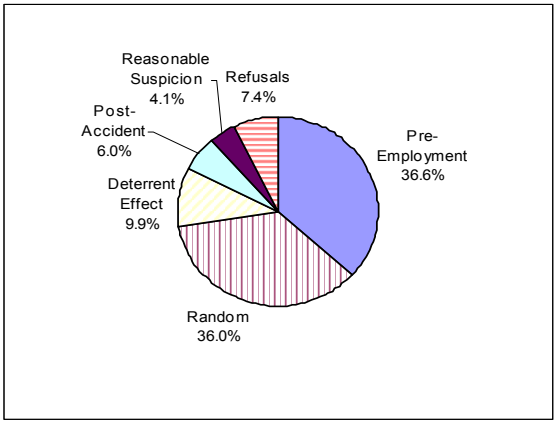

Figure 3-5. Percent of Transit Employees Mitigated by Form in 1999

savings from substance abuser mitigations for 5 years. Therefore, the 2000 calculation will only look at the savings for the period from 1996 to 2000, and the 1995 results will drop off the cumulative total of employees eliminated or mitigated. This is important to remember for future analyses, which will be able to measure both the effectiveness of the Drug and Alcohol Program for any 5-year period, and compare with any other 5-year period. **In 1999, the 19,409 drug using and alcohol misusing employees that have been mitigated over the 1995-1999 period would have incurred a cost of $19,575 each, for a total of $393 million.**

Figure 3-5 shows the percentage of transit employees that were mitigated in 1999 by type of mitigation. This graph clearly demonstrates that pre-employment, random and post accident testing as well as deterrence and refusals are major contributors to reducing drug and alcohol abuse in the transit industry. Figure 3-6 illustrates the total economic benefit of test-mitigated employees and the level that each type of test or deterrence contributes to the total economic benefit for each year from 1995 to 1999.

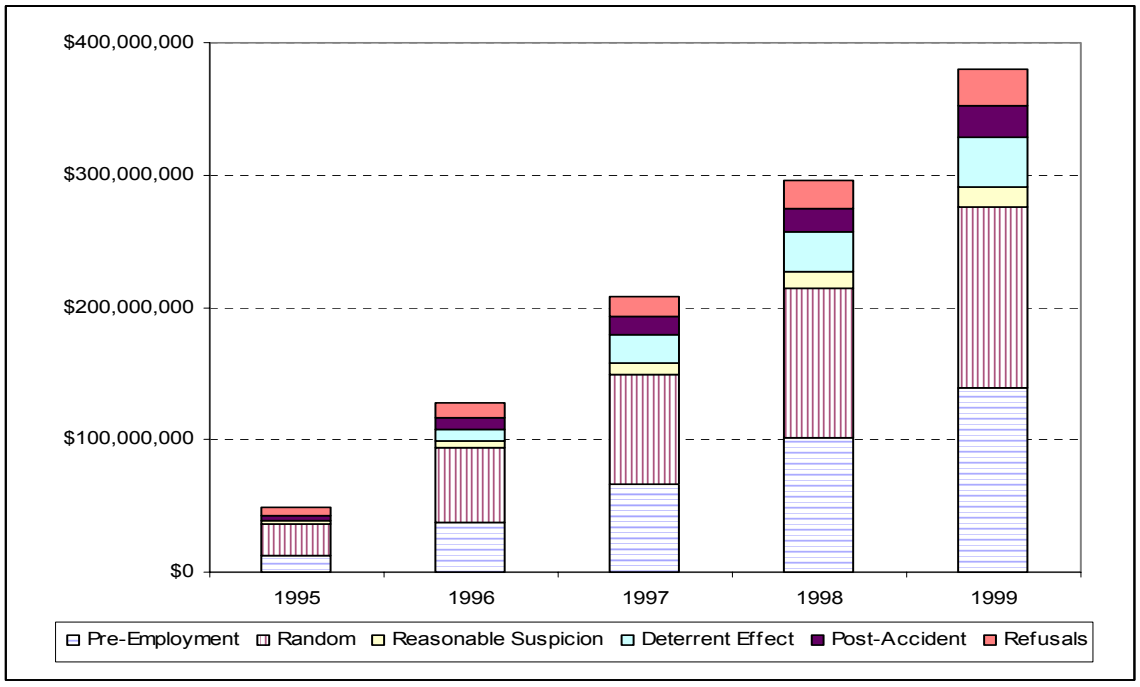

Figure 3-6. Total Economic Benefits by Type and Year

3.9 Safety Benefits

Although the economic benefits of the FTA Drug and Alcohol Program are extremely significant, there is also a considerable safety impact. DAMIS data from post-accident testing indicates that the percentage of accidents that were drug and alcohol related fell from 3.1 percent in 1995 to 1.7 percent in 1999. This is a very significant improvement, especially in such a small timeframe. The key to reducing fatalities and injuries is reducing the passenger exposure to accidents. Since accidents can cause injuries and fatalities are a function of accidents, the study infers that the FTA Drug and Alcohol Program has reduced the number of injuries and fatalities.

There was no way of measuring the drug and alcohol related accident rate before the program existed as this type of data was not gathered and analyzed. Consequently, the best method to measure the possible accidents and their related injuries and fatalities is to compare every year of the program with a 1995 baseline rate. As Figure 4-7 illustrates, if the rate accident rate had remained at 3.1 percent, 596 more accidents would have resulted from 1996-1999. DAMIS has shown an overall rate of .0077 fatalities per accident**,** meeting the drug and alcohol testing threshold in the 1995-1999 period. **The 596 accidents would have been expected to have caused 4.59 fatalities from 1996-1999 that were avoided**. Further, since DAMIS does not collect injuries statistics, the National Transit Database (NTD) data was utilized. The NTD data collected over the same period showed an overall rate of .879 injuries per collision; **therefore, the 596 accidents avoided would have been expected to have caused 524 injuries from 1996-1999**.

Table 3-10. Safety Benefit of FTA Drug and Alcohol Program

	1995	1996	1997	1998	1999
Overall Post Accident Postive Rate	3.11%	2.29%	2.11%	1.69%	1.72%
Fatalities resulting from Accidents with Positive Drug Test	3	1	5	0	0
Accidents with Positive Alcohol Test resulting in fatalities	0	0	0	0	0
Actual Accidents with Positive Drug or Alcohol Test	192	255	266	214	243
Accidents with Positive test if Baseline Rate (1995) remained		347	393	395	439
Accident increase if Baseline rate had remained		92	127	181	196
Fatalities Avoided (.0077 per accident)		0.71	0.98	1.40	1.51
Injuries Avoided (.879 per accident)		81	111	159	172

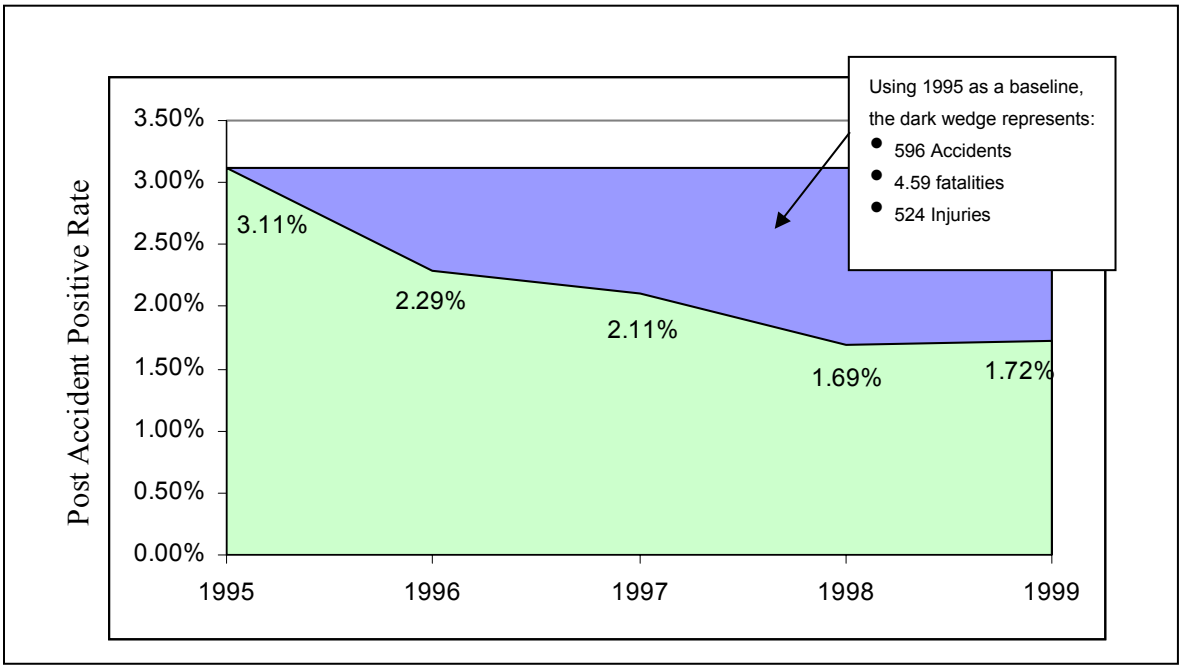

Figure 3-7. Safety Benefit –
1995 Baseline Post-Accident Rate against 1995-1999 Post-Accident Rate Trend

4. AUDITS

4.1 Introduction

The FTA Drug and Alcohol Program has facilitated a regulatory compliance audit program since 1997. The purpose of these audits is to provide technical assistance and to help transit agencies correct deficiencies in the administration and mechanics of their programs. Essentially, they are both grading and teaching tools, and their ultimate aim is to improve the program throughout the nation so as to eliminate the negative effects of substance abuse on transit.

Theoretically, there should be an increase in the random positive rate immediately after an audit because of improvements both in the randomness of test timing and in the testing facility procedures. In other words, random testing should become more random and the program as a whole should become more efficient in the aftermath of an audit. However, after this initial spike, the rate should decrease as the system is brought into compliance and substance abusers are mitigated. This expected trend is demonstrated in Figure 4-1.

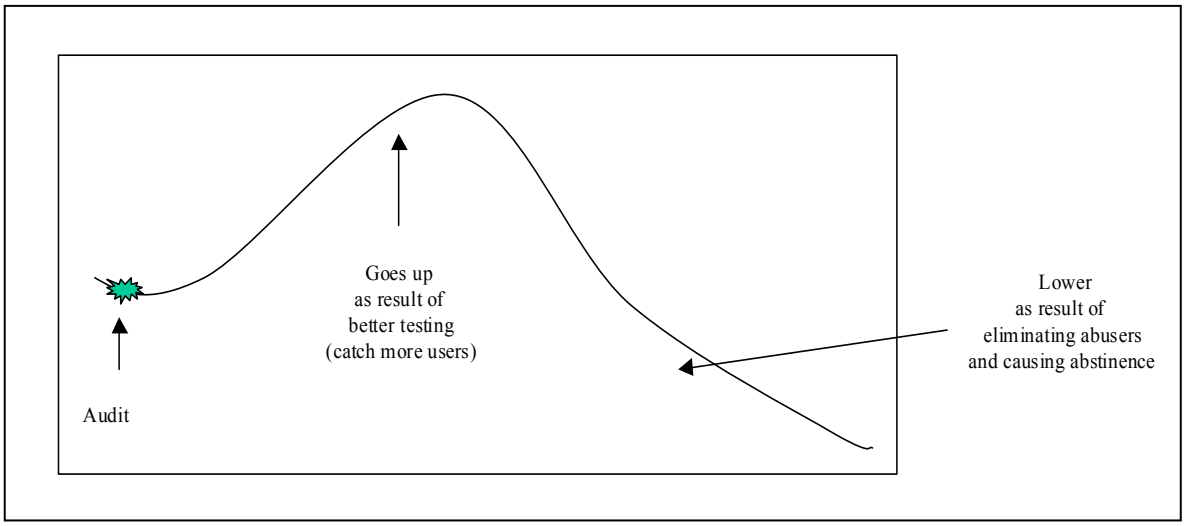

Figure 4-1. Theoretical Concept of Audit Effect

Although the initial bump upwards might be interpreted as a contrary indicator, in reality it is an indication that the program is working, as it is becoming more effective in eliminating and rehabilitating drug and alcohol users.

To check the validity of this hypothesis, random positive data from 14 large systems were analyzed. The systems analyzed were Massachusetts Bay Transportation Authority (MBTA), Metropolitan Transit Authority (MTA)-NYC, Maryland MTA, Greater Cleveland Regional Transit Authority (RTA), Dallas Area Rapid Transit (DART), LA County MTA, Chicago Transit Authority, Metro Atlanta Regional Transit Authority, Washington Metropolitan Area Transit Authority, South Eastern Pennsylvania Transit

Authority, Houston MTA, Jacksonville Transportation Authority, Detroit Department of Transportation, and San Francisco Municipal Railroad (MUNI). For each of these systems, the random positive rates for 1995 to 2000 and the audit year were collected. Detroit DOT no rate was reported for 1995; however, because that audit that was conducted in 1999, this missing data would not have any real impact on a study of the effect of the audits, so it was retained.

4.2 Methodology

The data was arranged around the audit date. The year in which the audit was conducted became year zero, with the years before and after the audit numbered accordingly. For example, the audit of DART was held in 1998, so 1996 is Year –2, 1998 is year 0, and 2000 is Year 2 for that system. After this classification system was assigned to each agency, the average random positive rates for each of these "years" could be determined. This process was carried out for both all of the agencies and for different subgroups, which were organized by the year of their audit. Table 4-1 lists the sample size of the subgroups.

Table 4-1. Number of Agencies Audited by Year and Subgroup

Subgroup	Number of Agencies
2000 Audits	2
1999 Audits	6
1998 Audits	3
1997 Audits	3
1999 and 2000 Audits	8
1998 and 1999 Audits	9
1997 and 1998 Audits	6
1998, 1999 and 2000 Audits	11
1997, 1998 and 1999 Audits	12

Both the data for all of the audits and the data for each of these subgroups suggested that the hypothesis of an initial spike, followed by a decline was valid. The average random rates are illustrated in Figure 4-2.

- 1.71 percent for Year –2
- 1.21 percent for Year –1
- 1.05 percent for Year 0
- 1.31 percent for Year 1
- 0.86 percent for Year 2

Thus, there was an increase of 0.26 percentage points in the year immediately after the audit, followed by a decline of 0.45 points in the next year, which meant that there had been an overall decline of 0.19 points.

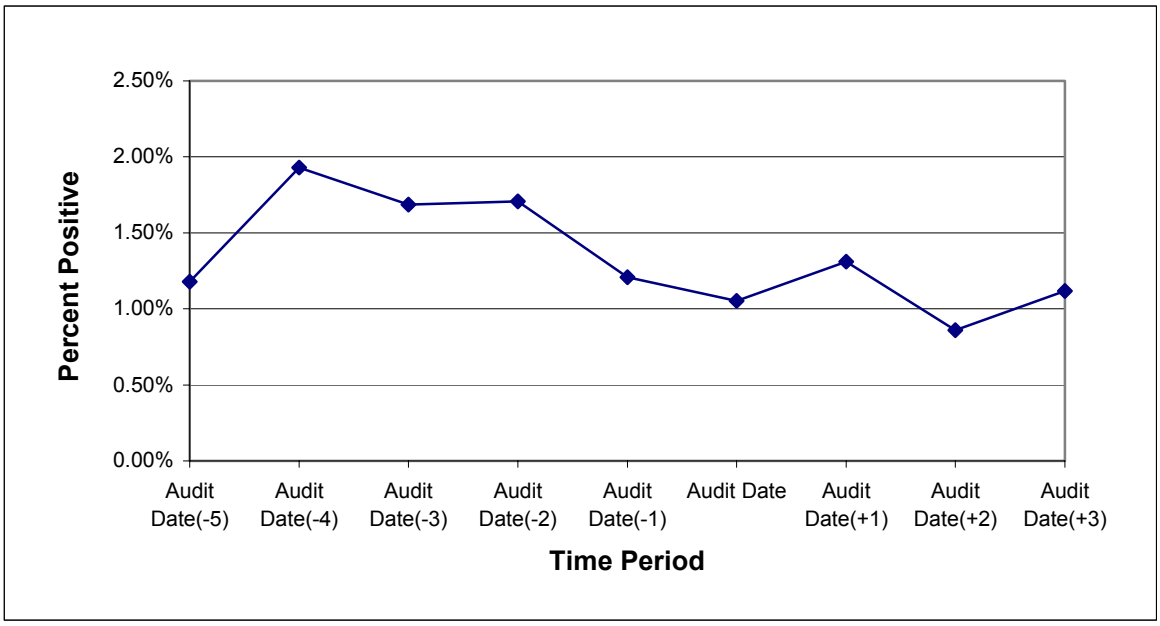

Figure 4-2. Average Rates for all Audits

This same pattern was seen in both the 1997 and 1998 audit subgroups, which indicates that it is a consistent phenomenon across years. For the 1998 audits, there was an increase of 0.25 percentage points, followed by a decrease of 0.31 points. The 1997 audits were even more extreme, with an increase of 0.34 points followed by a decline of 1.20 points. The audits from 1999 obviously do not have a Year 2 in this data, but there was an increase of 0.04 points from Year 0 to Year 1, so it appears they will hold to form. The obvious audit effect of the earlier subgroups is not as demonstrative in later subgroups. This is probably due to the fact that the FTA Drug and Alcohol Program has been institutionalized through audits, seminars, and various other methods of dissemination.

All of the other subcategories had this same initial bump, followed by a decline. Seven of the total groupings had data for Year 2, and of these, five showed a decline from Year 0 to Year 2. Figure 4-3 illustrates the reoccurrence of this general trend in several of the different subgroups. The two subgroups that did not conform were the 1998 and 1999 audits and the 1998, 1999, and 2000 audits. However, the former only rose 0.03 percentage points from Year 0 to Year 2, and the latter only rose 0.13 points for that period. Neither of these are large increases and both will likely fall below the Year 0 level within the next two years.

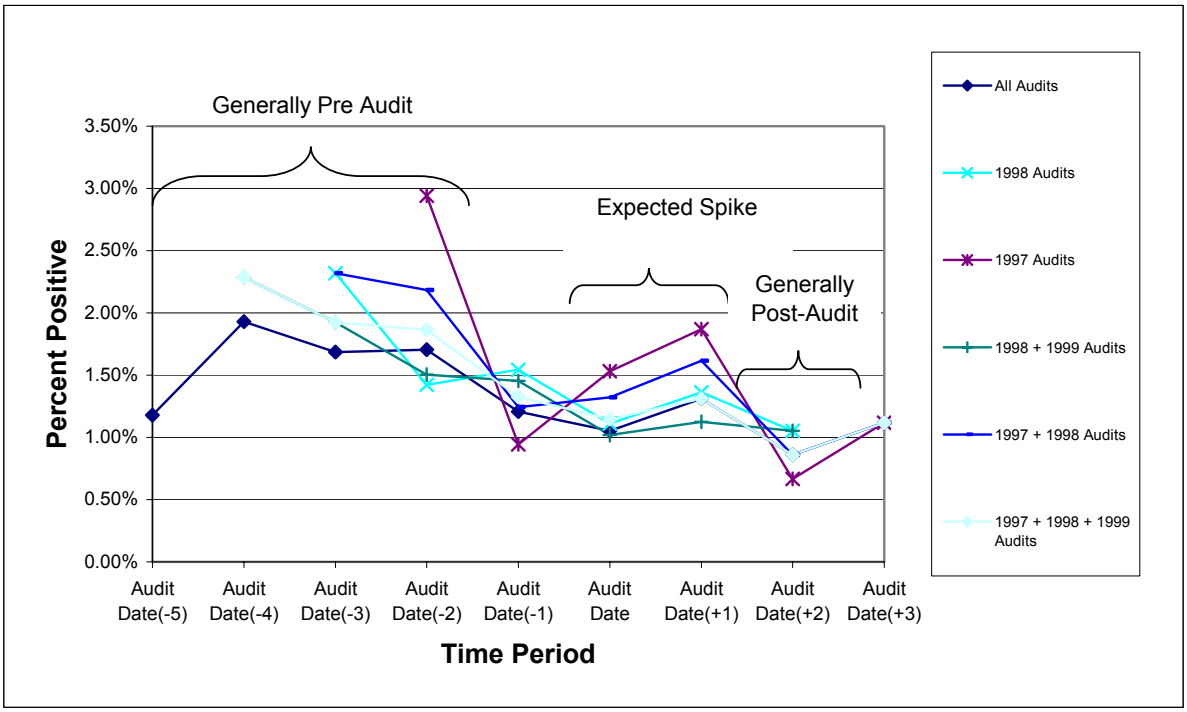

Figure 4-3. Audit Positives

This pattern of increased efficiency followed by a decline in the random positive rate is seen in the experiences of several individual agencies as well. A good example of this is Los Angeles, where an audit was performed in 1997. The random positive rates there were as follows:

- 0.69 percent in 1997
- 0.91 percent in 1998
- 0.57 percent in 1999

A further example outside of the subgroup sample is Miami Valley, audited in 1997. There, the rates were:

- 1.11 percent in 1997
- 1.82 percent in 1998
- 1.74 percent in 1999

Another example of an agency outside of the subgroup was Gainesville, audited in 1997 as well. The random positives rates in Gainesville were:

- 0.00 percent in 1997
- 2.27 percent in 1998
- 1.82 percent in 1999

The 1997 level indicates that the program had some deficiencies prior to the audit, as it is very unrealistic that no random positives would emerge. The rise in 1998 and the drop in 1999, however, showed that the program had been improved and was discouraging and eliminating substance abusers.

4.3 Conclusion

The main benefit of the audits is that the agencies become better at spreading testing across the entire testing period, all hours of operation, and all the days of the week. This leads to a decrease in the level of substance abuse among safety-sensitive workers in transit. However, it is not yet possible to quantify these benefits, because not enough time has passed since the audits began. More audits need to be conducted and more data analyzed before a true cost-savings can be determined. The costs of the audits are currently attainable, so once the benefits can be reasonably quantified, a true cost-benefit analysis can take place.

Since the Drug and Alcohol Audit Program started in 1997, there have been 133 audits encompassing 356 transit entities. Thus, on average, there have been 27 audits per year. Since the FTA has spent $1.4 million per year on audits, it can be estimated that the average audit bears a cost of $51,852. In other words, if an audit causes 2.65 more substance abusers to be mitigated (at $19,575 per user) in a post 5-year period, it will have paid for itself in terms of economic savings to the transit industry and society, in general. It should be noted that this figure could be arrived at by mitigating one substance-abusing employee over 2.65 years or any similar calculation. However, until the number of mitigated employees becomes quantifiable, it can only be roughly estimated how much money the audits save.

5. SECOND CHANCE PROGRAMS

5.1 Introduction

Some of the large transit agencies have employed second chance programs, which are designed to rehabilitate substance-abusing employees. Although there are obvious costs involved with the program, there are also many benefits, which clearly outweigh the costs. Rehabilitation removes the need for hiring and training new employees. In addition, it can help people repair their lives and contribute to society once again. In a similar vein, the rehabilitation of known substance abusers can reduce the overall level of substance abuse and the associated costs to society. Additionally, as all FTA regulated agencies receive public funding, it is both a benefit to society and appropriate for those agencies to rehabilitate employees rather than to transfer the burden back onto society at large.

Rehabilitation plans have been effective throughout the United States. For example, in 1995 the Ohio Department of Alcohol and Drug Addiction Services conducted a follow-up survey of 668 substance abuse treatment alumni one year after they had completed their program. The findings were very positive, as absenteeism had decreased by 89 percent, tardiness had decreased by 92 percent, and on-the-job injuries had decreased by 57 percent.[3] In addition, a study by a doctor at Brown University, cited by the New York State Office of Alcoholism and Substance Abuse Services in *The Costs and Consequences of Addiction and the Benefits of Prevention and Treatment*, declared that substance abuse treatment was "the most cost effective and socially palliative of all medical treatments. In fact, every dollar spent on treatment saves $11.54 in other medical and social costs."[4] Thus, substance abuse treatment for violators of the FTA Drug and Alcohol Program should bring net benefits to both society and the transit industry.

5.2 Return-to-Duty and Follow-Up Testing

Between 1995 and 1999, 14,361 substance abusers returned to duty either after or while undergoing rehabilitation. This number climbed from 3,056 in 1995 to 3,705 in 1997, but fell to around 2,000 in 1998 and 1999. This coincides with the program. As the number of positive tests was falling throughout the period, so there were fewer candidates to return to duty by 1998. Of the 14,361 candidates to return to duty, only 311 failed the return-to-duty test, so the great majority of these employees (97.8 percent) were clean immediately following or during rehabilitation.

Once the employees had passed the return-to-duty test, they were then tested randomly a minimum of six other times within a year. From 1995 to 1999, 88,739 follow-up tests were conducted, of which there were 1,100 failures. This means that of all the employees

[3] "Cost Effectiveness System to Measure Drug and Alcohol Treatment Outcomes," Comprehensive Assessment Treatment Outcomes Registry (CATOR) / New Standards, Inc. conducted for the Ohio Department of Alcohol and Drug Addiction Services, Columbus, Ohio, 1995.
[4] Davis C. Lewis, M.D., "The Need for Substance Abuse Treatment," Brown University, Feb. 1994.

who returned to duty after rehabilitation, 1,411, or 9.83 percent, failed another drug and/or alcohol test and thus brought upon the transit industry the same costs as any other substance abuser. However, second chance programs returned 12,950 rehabilitated employees to duty and thus spared their agencies the cost of hiring and training new workers.

5.3 Training Costs Saved

To calculate the amount saved through the avoidance of training costs, it is necessary to calculate the cost of training. The cost of training will vary across safety-sensitive positions, as the skills and knowledge necessary to perform a job are different. There are eight different transit safety-sensitive occupations listed in the Bureau of Labor Statistics (BLS): bus driver, subway and light rail operator, vehicle operations/non-revenue, track, switch and facility repair, bus mechanic, rail car repair, first line supervisors, and transit police.[5] The average salary for each of these positions was obtained from the BLS and the number of workers in each position was obtained from the National Transit Database. Since there were different numbers of these workers, a weighted average was necessary to obtain the average salary for a safety-sensitive employee. The average salary for each position ranged between $24,620 for vehicle operations/non-revenue, and $41,560 for transit police. The weighted average was $28,970.32. This was mainly because vehicle operations/non-revenue made up over 50 percent of the workforce, and bus drivers, with an average salary of $27,250, were the next largest category at 15.60 percent of the workforce.

The U.S. Department of Labor estimated that it costs a transit agency, or any company, one-third of a new hire's annual salary to replace an employee.[6] Thus, the training cost for replacing a safety-sensitive employee is one-third of the weighted average salary of a safety-sensitive employee, or $9,656.77. Therefore, the amount saved through the avoidance of training costs can be calculated for each year by multiplying the cost of training a replacement employee by the number of employees who return to duty and do not fail a drug test in each year. For example, in 1997 there were 3,705 employees who returned to duty, and 343 total positive tests (either the return-to-duty positive or a follow-up positive). Thus, the total saved by the transit industry through the avoidance of training costs in 1997 was approximately $32.5 million. When this calculation was performed for each year from 1995 to 1999, it approximately $125.1 million was saved in training costs.

5.4 Second Chance Program Costs

Of course, the second chance programs are not without their costs. The first of these comes from the fact that not all employees who return to duty will remain clean. If a substance abuser is working in a safety-sensitive capacity, then the same costs described in the Table 3.2 (Annual Economic Impact of Each Drug and Alcohol Abusing Transit

[5] Bureau of Labor Statistics (BLS), Employer Cost for Employee Compensation (ECEC). 2000.
[6] Joan Brannick, "Decreasing the Staggering Costs of Turnover in Your Organization" Brannick Consulting, www.florida-speakers.com/turnover-costs.htm.

Employee) apply. However, since return-to-duty employees have to take at least six follow-up tests in the following year, it can be assumed that the longest that they could be expected to remain a user in a safety-sensitive position is two months. Thus, the maximum cost of employing a return-to-duty substance abuser would be the cost of employing that abuser for two months. The yearly cost, then, of return-to-duty substance abusers is found by multiplying the number of positive return-to-duty and follow-up tests in a year by one-sixth of the average annual impact of each substance abuser for that year (which was discussed in the Section 3.1). This process likely results in an overestimation of the cost, as most substance abusers probably do not use drugs or alcohol for the entire two months before they are caught. However, it is better to overestimate the cost than to underestimate it, and it is not really feasible to calculate the average length of time that the employee was using before testing positive. For the entire period between 1995 and 1999, this cost totaled $4.3 million.

Another cost of the program is the cost of the additional testing of the return-to-duty employees. As mentioned, they must be tested at least six times a year as part of a second chance program. Since the second chance programs are almost entirely within the domain of the larger, urban agencies, an average test cost of $70 will be assumed for this calculation. Since there were 14,361 return-to-duty tests and 88,739 follow-up tests between 1995 and 1999, the total cost of the tests can be estimated at $7.2 million.

The last cost that must be factored in is evaluation and treatment. The second chance programs utilize Substance Abuse Professionals (SAPs) to rehabilitate their workers and these programs are not without cost. A 2-year study by the California Department of Alcohol and Drug Programs (CALDATA) in 1992 found that the average cost of treatment for substance abusers was $1,393. However, this included the cost of follow-up testing, which has already been covered in the costs here.[7] Since the average worker has 6.18 follow-up tests per year, and the average cost per test is $70, approximately $433 of this $1,393 can be assigned to testing. This fixes the SAP cost per employee at $960. Since all return-to-duty employees are subject to the SAP cost, regardless of whether they then fail their return-to-duty test, the total SAP cost for 1995 to 1999 is the product of 14,361 and $960, or approximately $13.8 million.

Table 5-1. Second Chance Programs – Economic Cost and Benefit Model

	1995	1996	1997	1998	1999
Return-to-Duty Tests (Both Drugs & Alcohol)	3056	3654	3705	1860	2086
Follow-up Tests (Both Drugs & Alcohol)	5759	18287	22383	21955	20355
Positives - Failed Return-to-Duty Tests (Both Drugs & Alcohol)	68	79	76	37	51
Positives - Failed Follow-up Tests (Both Drugs & Alcohol)	130	266	267	232	205
Percent Positives per Return-to-Duty Employee 1995-1999	6.48%	9.44%	9.26%	14.46%	12.27%
Follow-up tests per RTD employee 1995-1999	1.88	5.00	6.04	11.80	9.76
Average Transit Salary - 2000	$28,970.32				
Savings through the Avoidance of Training Costs	$27,599,063	$31,954,268	$32,466,078	$15,363,929	$17,671,898
Societal Economic Cost of Employing a Drug User or Alcohol Misuser (2 months or 1/6 of Average Annual Economic Impact of Each Drug & Alcohol Using Transit Employee)	$535,683	$1,003,209	$1,043,108	$866,331	$835,191
Cost of Additional Testing - Return-to-Duty and Follow-up (assume $70/test because of Urban focus)	$617,050	$1,535,870	$1,826,160	$1,667,050	$1,570,870
Substance Abuse Professional (SAP) Cost (Assume $960 per Return-to-Duty	$2,933,760	$3,507,840	$3,556,800	$1,785,600	$2,002,560
Net (Savings minus Costs) - Second Chance Programs	**$23,512,570**	**$25,907,349**	**$26,040,010**	**$11,044,948**	**$13,263,277**

[7] The National Clearinghouse for Alcohol and Drug Information, "Program Costs and Financing", www.health.org/survey/23i.htm.

5.5 Conclusion

When these three disparate costs are summed, the final cost figure for second chance programs from the period of 1995 to 1999 is approximately $25.3 million. As was mentioned above, the total cost benefit of the Second Chance Programs (SCPs) for the period was $125.1 million, so the net benefit was $99.8 million. This is a very good return on the costs involved, as the gross benefits of the program are nearly five times the total cost. The year-to-year difference between the gross benefits and the total costs can be seen in Figure 5-1.

Both this high level of cost savings and the fairly low relapse rate of 9.83 percent seem to indicate that the second chance programs have been highly beneficial for both the transit industry in particular, and society in general. The transit industry should be encouraged to initiate or continue SCPs, as they have clearly been a key part of the FTA Drug and Alcohol Program and one of its central strengths.

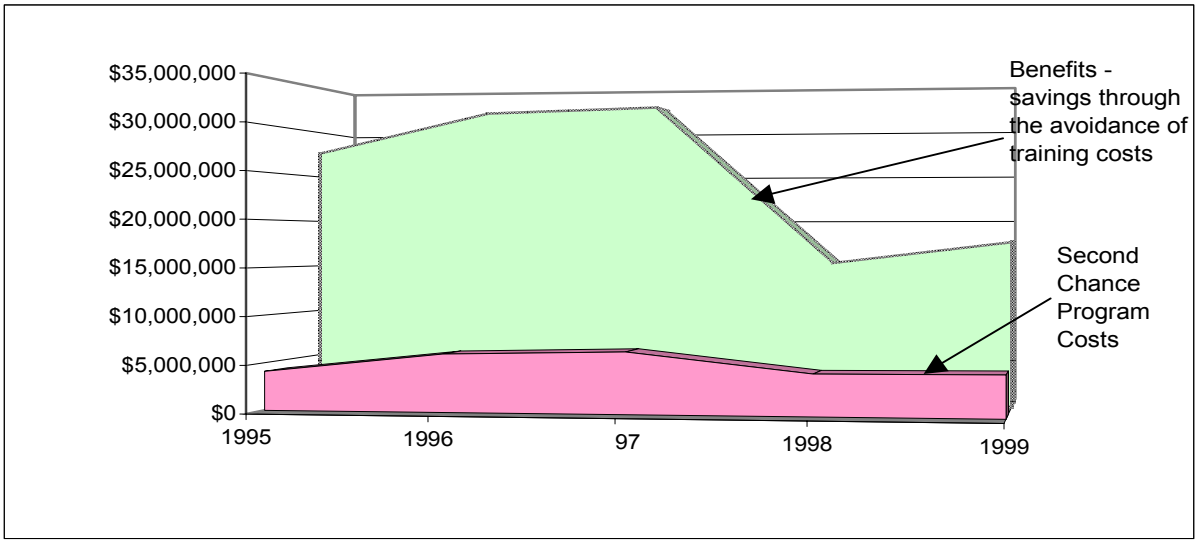

Figure 5-1. National Economic Benefit of Transit Second Chance Programs

6. CONCLUSION

Prior to the implementation of the regulations, the FTA evaluated the industry-wide costs and benefits associated with the Prevention of Prohibited Drug Use in Transit Operations and the Prevention of Alcohol Misuse in Transit Operations rules.[8] The projected costs of the first 10 years of the FTA Drug and Alcohol Testing Program were estimated to be $414 million. The projected benefits were estimated to be $1.393 billion. Thus, the Impact analyses estimated a net economic benefit of $979 million over the first 10 years of the regulations.

The actual economic impact of the program over the first 5 years, as determined by this assessment, has shown costs of $154 million and benefits of $1.161 billion. Thus, **the net economic benefit (benefits minus costs) shown by the FTA Drug and Alcohol Testing Program in the first 5 years stands at $1.007 billion.** It would seem that costs are running somewhat below and that benefits are almost double what was originally projected in the regulatory impact analyses. It must be noted that while the impact analyses calculated transit industry-wide benefits, this assessment calculates total societal economic benefits. The total societal economic benefits include transit in particular in regards to myriad productivity factors and physical calamity but not exclusively in regards crime and social welfare costs.

Table 6-1. Total Annual Economic Benefits and Costs

	1995	1996	1997	1998	1999	Totals
Total Abusers Mitigated - Cumulative by Year	3,040	7,327	11,402	15,329	19,409	**19,409**
Second Change Program Benefit	**$23,512,570**	**$25,907,349**	**$26,040,010**	**$11,044,948**	**$13,263,277**	**$99,768,154**
Mitigated Benefit	**$49,347,726**	**$127,838,404**	**$208,056,936**	**$296,205,394**	**$379,932,752**	**$1,061,381,211**
Total Economic Benefit	**$72,860,296**	**$153,745,753**	**$234,096,946**	**$307,250,341**	**$393,196,029**	**$1,161,149,365**
Total Costs	**$22,939,905**	**$32,451,980**	**$33,421,136**	**$31,410,489**	**$34,068,731**	**$154,292,241**
Benefit Minus Costs	**$49,920,391**	**$121,293,773**	**$200,675,809**	**$275,839,852**	**$359,127,298**	**$1,006,857,124**

In addition to the economic benefits, the program has allowed the transit industry to avoid 596 accidents and thus saved 5 lives and avoided 524 injuries.

Overall, drug use and alcohol misuse are clearly trending downward. The program has consistently and measurably continued to mitigate abusers through termination and rehabilitation as well as deterring further potential drug use and alcohol misuse. The mitigation, rehabilitation and deterrence of actual and potential drug and alcohol abusing transit safety sensitive employees has generated tremendous economic and public safety benefits over the first 5 years of the FTA program. Further, over the same period, drug and alcohol testing has become an accepted part of employment in this country. USDOT and FTA drug and alcohol regulations in particular have been a prime mover in that

[8] Regulatory Impact Analysis of Regulation on Prevention of Prohibited Drug Use in Transit Operations 49 CFR Part 653, 1-12-94, FTA USDOT and Regulatory Impact Analysis of Regulation on Prevention of Alcohol Misuse in Transit Operations 49 CFR Part 653, 1-12-94, FTA USDOT

public acceptance and in regards to drug and alcohol testing having become validated and defensible in arbitration while maintaining an appropriate respect for individual constitutional rights.

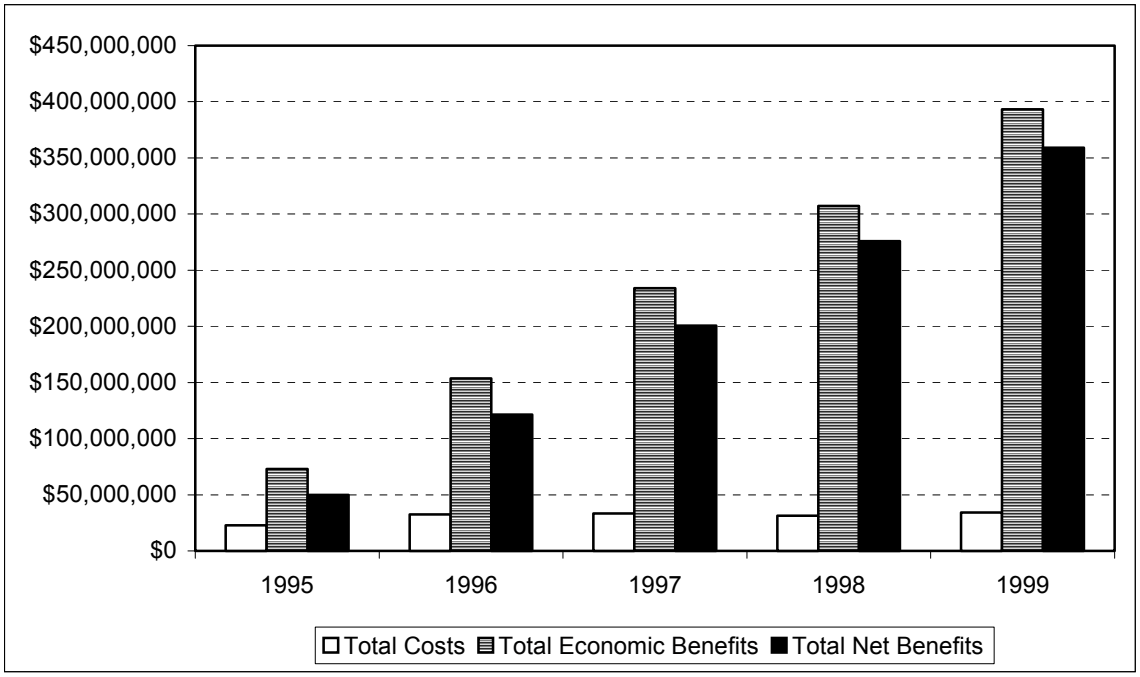

Figure 6-1. Total Drug and Alcohol Program Costs, Benefits, and Net Benefits by Year

7. DESCRIPTION OF DATA MATRIX

7.1 Impact of Drug and Alcohol Abuse on Transit (see Table 3-1)

1. Gross Domestic Product (GDP)—U.S. Department of Commerce, Bureau of Economic Analysis.
2. Transit as Percent of Total U.S. Economy—Calculated by dividing Transit Gross Product (3) by Gross Domestic Product.
3. Transit Gross Product—U.S. Department of Commerce, Bureau of Economic Analysis.
4. Percent of GDP change—Based on 1995 baseline, the change in GDP by year.
5. Annual Economic Cost of drug and alcohol abuse in the U.S. indexed by GDP percent change (4)—National Institute on Drug Abuse, www.nida.hih.gov/EconomicCosts/Table_1.html.
6. Annual Potential Societal Economic Cost of Drug & Alcohol abuse in Transit—Calculated by multiplying Total cost of D&A abuse in U.S. (4) by percent of Transit in total U.S. economy (3).

7.2 FTA Drug and Alcohol Testing Program Costs (see Table 2-1)

7. FTA Total Cost per year—Amount granted to Volpe Center by FTA Office of Safety and Security.
8. Total tests—Number of tests per year.
9. Total Random and Reasonable Suspicion Drug Tests—Yields unique employees leaving work for testing with the exception of follow-ups that are covered in second chance section.
10. Cost of Tests—Based on State of Kansas DOT's cost of conducting a test in 1999.
11. Actual Cost of Tests—Calculated by multiplying total tests (8) by cost of tests (10).
12. Safety sensitive employee productivity cost per test—Based on KDOT's estimate of loss of productivity in 1999 (see section 2.3).
13. Total National productivity cost to agencies—Calculated by multiplying Total Random and Reasonable Suspicion Drug Tests (9) by Safety Sensitive Employee productivity cost per test (12).
14. Cost of Drug & Alcohol Program Personnel at Transit Agencies—Based on KDOT's estimated of personnel costs in 1999.
15. Total National administrative cost to agencies—Calculated by multiplying Total Tests (8) by Cost of D&A Program Personnel at Transit Agencies (14).
16. Total cost of D&A Program for transit industry—Calculated by adding the Total FTA Costs per year (7), total costs of tests (10), total national productivity cost to agencies (13) and total national administrative cost to agencies.

7.3 Pre-Employment Testing (see Table 3-3)

17. Pre-employment Drug tests—Number of test that yields unique safety-sensitive applicants.
18. Pre-employment drug and alcohol tests—Total number of both drug and alcohol tests conducted.
19. Unique applicants with a drug and alcohol pre-employment positive—DAMIS Annual Reports 1995-1999.
20. Pre-employment positive rate—Calculated by Drug or Alcohol Pre-employment Positive Tests(19) by pre-employment drug tests (17).
21. Eliminated from Consideration by D&A Program Positive Pre-Employment Test—DAMIS Annual Report, Cumulative of row 19 (1995-1999).
22. Annual Societal Economic Cost Avoided by Transit Industry due to Eliminating Users from Employment Consideration as a Result of Positive Pre-employment Tests—Calculated by multiplying Pre-employment positive tests cumulative (19) by Average Annual Economic Impact of Each Drug Using and/or Alcohol Misusing Transit Employee (28).

7.4 Annual Economic Impact of Each Drug & Alcohol Using Employee (see Table 3-2)

23. Total Transit Safety Sensitive Employees—DAMIS Annual Reports (1995-1999)
24. Total Transit Employees—FTA Administrator Gordon Linton; Before the subcommittee on surface transportation, Committee on Transportation and Infrastructure, United States House Of Representatives - Tuesday, June 18, 1996. 275,000 figure for 1996 was indexed with percentage growth in passengers (from National Transit Database) in the 1997-1999 period.
25. Percent of Transit Employees that are safety sensitive—Calculated by dividing Total Safety Sensitive Employees (22) by Total Transit Employees (23)
26. Current Percent of Illicit Drug and/or heavy alcohol use among transportation workers—SAMHSA, Office of Applied Studies (1997).
27. Current Illicit Drug and/or Alcohol using safety sensitive transit workers—Calculated by multiplying Total transit safety-sensitive employees (23) by Percent of Illicit Drug and/or heavy alcohol use among transportation workers (25)
28. Average Annual Economic Impact of each drug and alcohol using transit employee—Calculated by multiplying annual potential societal costs of drug and alcohol abuse (6) by percent of transit employees that are safety sensitive (25) and the total divided by current illicit drug and/or alcohol using safety sensitive employees (27).

7.5 Random Testing (see Table 3-4)

29. Percent of Random Test Positive (Drug)— DAMIS Annual Report (1995-1999).
30. Positives - Eliminated or Mitigated in Workforce (Both Drug & Alcohol)—DAMIS Annual Reports (1995-1999).

31. Random Test Positives - Eliminated or Mitigated in Workforce (Both D &A) Cumulative 95-99—Addition of years. (i.e. 1997 total=1995+1996+1997).
32. Positives - (Drug) Eliminated or Mitigated in Workforce— DAMIS Annual Reports (1995-1999).
33. Total Alcohol screening tests—DAMIS Annual Reports (1995-1999)
34. Positives - (Alcohol) Eliminated or Mitigated in Workforce— DAMIS Annual Reports (1995-1999)
35. Percent positive (alcohol) — DAMIS Annual Reports (1995-1999).
36. Annual Cost Avoided by Transit Industry due to Eliminating Workers as a Result of D&A Program Positive Random Tests (Cumulative)—Calculated by multiplying Random Positives - Total Eliminated or Mitigated in Workforce (31) by Average Annual Economic Impact of each drug and alcohol using transit employee (28).

7.6 Reasonable Suspicion Testing (see Table 3-5)

37. Reasonable Suspicion Test Positives (Drug & Alcohol) - Users Eliminated or Mitigated from Transit Workforce—DAMIS Annual Reports (1995-1999).
38. Reasonable Suspicion Test Positives (Drug & Alcohol) - Users Eliminated or Mitigated from Workforce (Cumulative 1995-1999)—DAMIS Annual Reports (1995-1999).
39. Reasonable Suspicion Tests (Drug & Alcohol)—DAMIS Annual Reports
40. Reasonable Suspicion Tests (Drug & Alcohol) Percent Positive – Divide Positives (37) by Tests (39)—DAMIS Annual Reports.
41. Annual Societal Economic Cost Avoided by Transit Industry due to Eliminating or Mitigating Users as a Result of Positive Reasonable Suspicion Tests (Using Cumulative Figure) —Calculated by multiplying Reasonable Suspicion Positives (38) by Average Annual Economic Impact of each drug and alcohol using transit employee (28).

7.7 Deterrent Effect (see Table 3-9)

42. Percent of Random Drug Test Positives—Calculated by dividing random test positives by total random tests.
43. Percent of Random Alcohol Screen Positives—Calculated by dividing random alcohol screen positives by total alcohol tests.
44. Employees abstaining from using drugs due to the program (current percent positive subtracted from baseline)—Calculated by the difference between the baseline (42 1995 column) and annual rate in percent positive drug (42, 1996-1999 columns) multiplied by total number of transit safety sensitive employees (23).
45. Annual Cost Avoided by Transit Industry due to Workers abstaining due to D&A Program Random Tests—Calculated by multiplying Employees abstaining from using drugs due to the program (44) by Average Annual Economic Impact of Each Drug & Alcohol Using Transit Employee (28).

46. Employees abstaining from using alcohol due to the program (current percent positive subtracted from 1995 baseline)—Calculated by subtracting annual alcohol positive rate from 1995 baseline (43), multiplying the rate change by safety sensitive employees (23).
47. Annual Societal Economic Cost Avoided by Transit Industry due to Workers eliminated due to refusal of D&A Program Random Alcohol Tests—Calculated by multiplying Employees abstaining from using alcohol due to the program (46) by Average Annual $ Impact of Each D&A Using Transit Employee (28).

7.8 Post-Accident Testing (see Table 3-7)

48. Total Drug & Alcohol Accidents meeting the FTA post-accident testing threshold— DAMIS Annual Reports (1995-1999).
49. Accidents with Positive Drug Test—DAMIS Annual Reports (1995-1999).
50. Accidents with Positive Alcohol Test—DAMIS Annual Reports (1995-1999).
51. Accidents with a positive post-accident (both cumulative 95-99)—Addition of positive drug and alcohol each year (49+50) cumulative.
52. Annual Societal Economic Cost Avoided by Transit Industry due to Eliminating or Mitigating Users as a Result of Positive Post-Accident Tests (Using Cumulative Figure)—Calculated by adding the totals of positive drug and alcohol post-accident tests (51) each year and multiplying by average annual economic impact of each drug and alcohol using transit employee (28).

7.9 Safety Benefit (see Table 3-10)

53. Overall Post-Accident Positive Rate—DAMIS Annual Reports (1995-1999).
54. Fatalities Resulting from Accidents with Positive Drug Test—DAMIS Annual Reports (1995-1999).
55. Fatalities Resulting from Accidents with Positive Alcohol Test—DAMIS Annual Reports (1995-1999).
56. Accidents with a Positive Drug or Alcohol Test—DAMIS Annual Reports (1995-1999).
57. Accidents with Positive test if Baseline Rate (1995) remained—Calculated by multiplying Accidents with a Positive Post-Accident (56) by difference between annual rate and baseline (53).
58. Accident Increase had Baseline Rate Remained Constant—Calculated as the difference between Accidents with Positive test if Baseline Rate (1995) remained (57) and actual Accidents with a Positive Post Accident (56).
59. Total Fatalities Avoided—Using fatality per accident rate of .0077 (from National Transit Database Form 405 1995-1999) multiplied by Accident Increase (58).
60. Total Injuries Avoided—Using injury per accident rate of .879 (from National Transit Database Form 405, 1995-1999) multiplied by Accident Increase (58).

7.10 Refusals (see Table 3-6)

61. Random Test Refusals (Alcohol)—DAMIS Annual Report (1995-1999).
62. Random Test Refusals (Drug)—DAMIS Annual Report (1995-1999).

63. Non-random Test Refusals (Drug)— DAMIS Annual Report (1995-1999).
64. Non-random Test Refusals (Alcohol)—DAMIS Annual Report (1995-1999).
65. Total Refusals (Alcohol)—DAMIS Annual Report (1995-1999).
66. Total Refusals (Drug)—DAMIS Annual Report (1995-1999).
67. Total Refusals (All Cumulative 1995-1999)—Calculated by adding total refusals (Alcohol) (65) with total refusals (Drug) (66).
68. Annual Societal Economic Cost Avoided by Transit Industry due to Eliminating Users as a Result of Drug or Alcohol Test Refusals—Calculated by multiplying the cumulative total of refusals by Average Annual $ Impact of Each D&A Using Transit Employee (28).

7.11 Second Chance Programs, Return-to-Duty and Follow-up (see Table 5-1)

69. Return-to-Duty Tests (Both Drugs & Alcohol)—DAMIS Annual Report (1995-1999).
70. Follow-up Tests (Both Drugs & Alcohol)—DAMIS Annual Report (1995-1999)
71. Positives - Failed Return-to-Duty Tests (Both Drugs & Alcohol)— DAMIS Annual Report (1995-1999).
72. Positives - Failed Follow-up Tests (Both Drugs & Alcohol)—DAMIS Annual Report (1995-1999).
73. Percent Positives per Return-to-Duty Employee 1995-1999— DAMIS Annual Report (1995-1999) – Calculated by sum of 71&72, divided by Return-to-Duty Tests (69).
74. Follow-up Tests per RTD Employee 1995-1999—DAMIS Annual Report (1995-1999) – Calculated by diving (70) by (69)
75. Average Transit Salary - 2000—BLS, Employer Cost for Employee Compensation (2000).
76. Savings through the Avoidance of Training Costs—Total amount of return to duty tests (69) minus positive return to duty tests (71) and positive follow-up tests (72) multiplied by estimated cost of training new employee. {Based on BLS data, $9,656.77 – 1/3 of the average weighted transit worker salary CY2000 (U.S. Dept. of Labor), number of transit employees in each labor category (FTA NTD)}.
77. Cost of employing a drug and alcohol abuser—2 months or 1/6 of average annual economic impact of each drug and alcohol using transit employee (28) multiplied by the sum of positive RTD tests (71) and positive follow-up tests (72).
78. Cost of Additional - Testing Return-to-Duty and Follow-up—sum of (69) and (70) multiplied by $70. $70 per test is an assumption that is higher than rural actual cost per test average due to urban focus of SCPs.
79. SAP cost (assume $960 per RTD employee)—California DOT.
80. Net economic savings-second chance policies—(76-77-78-79).

7.12 Totals (see Table 6-1)

81. Total Abusers Mitigated—Addition of Eliminated from Consideration by D&A Program Positive Pre-employment Test (Cumulative 1995-1999) (21), Random

Test Positives - Eliminated or Mitigated in Workforce (Both Cumulative1995-1999) (31), Reasonable Suspicion Test Positives (38), Employees abstaining from using drugs due to the program (current percent pos subtracted from baseline) (44), Employees abstaining from using alcohol due to the program (current percent pos subtracted from baseline) (46), Accidents with a Positive Post Accident (Both Cumulative 1995-1999) (51) and Total Refusals (All Cumulative 1995-1999) (67).

82. Second Chance Program Benefit— Net economic savings-second chance policies (80).
83. Mitigated Benefit—Total benefit received after all employees have been calculated as mitigated (81) multiplied by (28).
84. Total Economic Benefit—Total of all sections involving economic benefits. Sum of (82) and (83)
85. Total Costs—Total Costs (16).
86. Benefit minus costs—Subtraction of Total Economic Benefit (84) with Total Costs (85).

Impact of Drug and Alcohol Abuse on Transit

		1995	1996	1997	1998	1999
1	Gross Domestic Product (GDP)	$7,400,500,000,000	$7,813,200,000,000	$8,300,800,000,000	$8,759,900,000,000	$9,299,200,000,000
2	Transit as a Percent of the Total U.S. Economy	0.168%	0.172%	0.178%	0.183%	0.183%
3	Transit Gross Product	$12,400,000,000	$13,400,000,000	$14,800,000,000	$16,000,000,000	$16,989,638,400
4	Percent GDP Change		5.58%	6.24%	5.53%	6.16%
5	Annual Economic Cost of U.S. Drug & Alcohol Abuse	$287,732,807,925	$303,778,660,210	$322,736,638,339	$340,586,531,200	$361,554,614,886
6	Annual U.S. Total Societal Economic Cost of Drug & Alcohol Abuse (Transit Portion)	**$482,114,292**	**$520,994,477**	**$575,426,736**	**$622,082,957**	**$660,560,281**

FTA Drug and Alcohol Testing Program

		1995	1996	1997	1998	1999
7	FTA Total Cost per Year - FY2000	**$2,200,000**	**$2,200,000**	**$2,200,000**	**$2,200,000**	**$2,200,000**
8	Total Tests	188,278	275,148	284,241	265,294	289,555
9	Total Random and Reasonable Suspicion Drug Tests	81,378	109,517	108,099	112,498	120,639
10	Cost per Test - from 1999 Rural	$66.56	$66.56	$66.56	$66.56	$66.56
11	Actual Cost of Tests	**$12,531,784**	**$18,313,851**	**$18,919,081**	**$17,657,969**	**$19,272,781**
12	Safety Sensitive Employee Productivity Cost (per test)	$6.08	$6.08	$6.08	$6.08	$6.08
13	Total National Productivity Cost to Agencies	**$494,371**	**$665,316**	**$656,701**	**$683,425**	**$732,882**
14	Cost of Drug & Alcohol Program Personnel at Transit Agencies (per Test)	$40.97	$40.97	$40.97	$40.97	$40.97
15	Total National Administrative Cost to Agencies	**$7,713,750**	**$11,272,814**	**$11,645,354**	**$10,869,095**	**$11,863,068**
16	Total Cost	**$22,939,905**	**$32,451,980**	**$33,421,136**	**$31,410,489**	**$34,068,731**

Pre-employment

		1995	1996	1997	1998	1999
17	Pre-employment Drug tests - Yields Unique Safety-Sensitive Applicants	26,379	49,392	52,925	59,613	73,951
18	Pre-employment Drug & Alcohol tests	36,013	56,460	59,601	71,371	115,309
19	Unique Applicants with a Drug or Alcohol Pre-employment Positive	791	1,394	1,429	1,649	1,839
20	Pre-employment Positive Rate	3.00%	2.82%	2.70%	2.77%	2.49%
21	Eliminated from Employment Consideration by Positive Pre-employment Test (Cumulative 1995-1999)	791	2,185	3,614	5,263	7,102
22	Annual Societal Economic Cost Avoided by Transit Industry due to Eliminating Users from Employment Consideration as a Result of Positive Pre-employment Tests (Using Cumulative Figure)	**$12,840,148**	**$38,121,949**	**$65,943,888**	**$101,698,920**	**$139,020,140**

Annual Economic Impact of Each Drug and Alcohol Using Employee

		1995	1996	1997	1998	1999
23	Total Transit Safety-Sensitive Employees	212,496	213,657	214,401	224,696	238,641
24	Total Transit Employees	275,000	276,494	291,998	298,086	312,458
25	Percent of Safety-Sensitive Transit Employees	77.3%	77.3%	73.4%	75.4%	76.4%
26	Percent of Drug Use and/or Alcohol Misuse Among Transportation Workers	10.80%	10.80%	10.80%	10.80%	10.80%
27	Current Drug Using and/or Alcohol Misusing Safety-Sensitive Transit Workers (Extrapolated using 10.8%)	22,950	23,075	23,155	24,267	25,773
28	Average Annual Economic Impact of Each Drug Using and/or Alcohol Misusing Transit Employee	$16,233	$17,447	$18,247	$19,323	$19,575

Random

		Baseline Rate	1996	1997	1998	1999
29	Percent of Random Test Positive (Drug)	1.73%	1.50%	1.21%	1.07%	1.00%
30	Random Test Positives (Drug & Alcohol) - Users Eliminated or Mitigated from Transit Workforce	1472	1721	1380	1250	1156
31	Random Test Positives (Drug & Alcohol) - Users Eliminated or Mitigated from Workforce (Cumulative 1995-1999)	1472	3193	4573	5823	6979
32	Random Drug Test Positives - Users Eliminated or Mitigated from Workforce	1390	1620	1295	1196	1117
33	Total Alcohol Screens	47,816	62,618	62,161	41,206	41,358
34	Random Alcohol Screen Positives - Eliminated or Mitigated in Workforce	82	101	85	54	39
35	Percent of Random Screen Positive (Alcohol)	0.17%	0.16%	0.14%	0.13%	0.09%
36	Annual Societal Economic Cost Avoided by Transit Industry due to Eliminating or Mitigating Users as a Result of Positive Random Tests (Using Cumulative Figure)	**$23,894,688**	**$55,708,642**	**$83,442,557**	**$112,520,009**	**$136,612,441**

Reasonable Suspicion

		1995	1996	1997	1998	1999
37	Reasonable Suspicion Test Positives (Drug & Alcohol) - Users Eliminated or Mitigated from Transit Workforce	147	167	169	173	149
38	Reasonable Suspicion Test Positives (Drug & Alcohol) - Users Eliminated or Mitigated from Workforce (Cumulative 1995-1999)	147	314	483	656	805
39	Reasonable Suspicion Tests (Drug & Alcohol)	1879	2229	1976	1974	1691
40	Reasonable Suspicion Tests (Drug & Alcohol) - Percent Positive	7.82%	7.49%	8.55%	8.76%	8.81%
41	Annual Societal Economic Cost Avoided by Transit Industry due to Eliminating or Mitigating Users as a Result of Positive Reasonable Suspicion Tests (Using Cumulative Figure)	**$2,386,222**	**$5,478,394**	**$8,813,198**	**$12,676,134**	**$15,757,704**

Deterrent Effect

		Baseline Rates	1996	1997	1998	1999
42	Percent of Random Test Positive (Drug)	1.73%	1.50%	1.21%	1.07%	1.00%
43	Percent of Random Screen Positive (Alcohol)	0.17%	0.16%	0.14%	0.13%	0.09%
44	Employees Abstaining from Using Drugs due to the Program (Current % Positive Subtracted from Baseline %Positive)	N/A	491	1115	1483	1742
45	Annual Societal Economic Cost Avoided by Transit Industry due to Workers Abstaining because of FTA Random Drug Tests	N/A	**$8,573,707**	**$20,343,073**	**$28,656,441**	**$34,100,832**
46	Employees Abstaining from Misusing Alcohol due to the Program (Current %Positive Subtracted from Baseline %Positive)	N/A	22	75	91	184
47	Annual Societal Economic Cost Avoided by Transit Industry due to Workers Abstaining because of Random Alcohol Screens	N/A	**$380,048**	**$1,359,427**	**$1,755,938**	**$3,605,913**

Post-Accident

		1995	1996	1997	1998	1999
48	Total Accidents that Met the FTA Drug and Alcohol Testing Threshold	6,783	12,254	13,876	13,968	15502
49	Accidents with Positive Drug Test	147	239	249	199	227
50	Accidents with Positive Alcohol Test	45	16	17	15	16
51	Accidents with a Positive Post-Accident Drug or Alcohol Test (Cumulative 1995-1999)	192	447	713	927	1170
52	Annual Societal Economic Cost Avoided by Transit Industry due to Eliminating or Mitigating Users as a Result of Positive Post-Accident Tests (Using Cumulative Figure)	**$3,116,698**	**$7,798,861**	**$13,009,959**	**$17,912,768**	**$22,902,501**

Safety Benefit

		Baseline Rate	1996	1997	1998	1999
53	Overall Post-Accident Postive Rate	3.11%	2.29%	2.11%	1.69%	1.72%
54	Fatalities Resulting from Accidents with Positive Drug Test	3	1	5	0	0
55	Fatalities Resulting from Accidents with Positive Alcohol Test	0	0	0	0	0
56	Accidents with Positive Drug or Alcohol Test	192	255	266	214	243
57	Expected Post-Accident Positive Tests if Baseline Rate Remained (Current %Post-Accident Positive Subtracted from Baseline %Post-Accident Positive)		347	393	395	439
58	Drug and Alcohol Related Accident Increase had Baseline Rate Remained Constant		92	127	181	196
59	Total Fatalities Avoided (Using 0.0077 per Accident)		0.71	0.98	1.40	1.51
60	Total Injuries Avoided (Using 0.879 per Accident)		81	111	159	172

Refusals

		1995	1996	1997	1998	1999
61	Random Test Refusals (Alcohol)	36	33	36	35	61
62	Random Test Refusals (Drug)	23	110	69	143	164
63	Non-random Test Refusals (Drug)	355	48	33	54	89
64	Non-random Test Refusals (Alcohol)	24	46	17	24	27
65	Total Refusals (Alcohol)	60	79	53	59	88
66	Total Refusals (Drug)	378	158	102	197	253
67	Total Refusals (All Cumulative 1995-1999)	438	675	830	1086	1427
68	Annual Societal Economic Cost Avoided by Transit Industry due to Eliminating Users as a Result Drug or Alcohol Test Refusals	**$7,109,968**	**$11,776,803**	**$15,144,833**	**$20,985,185**	**$27,933,222**

Second Chance Programs
Return to Duty and Follow-up

		1995	1996	1997	1998	1999
69	Return-to-Duty Tests (Both Drugs & Alcohol)	3056	3654	3705	1860	2086
70	Follow-up Tests (Both Drugs & Alcohol)	5759	18287	22383	21955	20355
71	Positives - Failed Return-to-Duty Tests (Both Drugs & Alcohol)	68	79	76	37	51
72	Positives - Failed Follow-up Tests (Both Drugs & Alcohol)	130	266	267	232	205
73	Percent Positives per Return-to-Duty Employee 1995-1999	6.48%	9.44%	9.26%	14.46%	12.27%
74	Follow-up tests per RTD employee 1995-1999	1.88	5.00	6.04	11.80	9.76
75	Average Transit Salary - 2000	$28,970.32				
76	Savings through the Avoidance of Training Costs	$27,599,063	$31,954,268	$32,466,078	$15,363,929	$17,671,898
77	Societal Economic Cost of Employing a Drug User or Alcohol Misuser (2 months or 1/6 of Average Annual Economic Impact of Each Drug & Alcohol Using Transit Employee)	$535,683	$1,003,209	$1,043,108	$866,331	$835,191
78	Cost of Additional Testing - Return-to-Duty and Follow-up (assume $70/test because of Urban focus)	$617,050	$1,535,870	$1,826,160	$1,667,050	$1,570,870
79	Substance Abuse Professional (SAP) Cost (Assume $960 per Return-to-	$2,933,760	$3,507,840	$3,556,800	$1,785,600	$2,002,560
80	Net (Savings minus Costs) - Second Chance Programs	**$23,512,570**	**$25,907,349**	**$26,040,010**	**$11,044,948**	**$13,263,277**

Totals

		1995	1996	1997	1998	1999	Totals
81	Total Abusers Mitigated - Cumulative by Year	3,040	7,327	11,402	15,329	19,409	**19,409**
82	Second Change Program Benefit	**$23,512,570**	**$25,907,349**	**$26,040,010**	**$11,044,948**	**$13,263,277**	**$99,768,154**
83	Mitigated Benefit	**$49,347,726**	**$127,838,404**	**$208,056,936**	**$296,205,394**	**$379,932,752**	**$1,061,381,211**
84	Total Economic Benefit	**$72,860,296**	**$153,745,753**	**$234,096,946**	**$307,250,341**	**$393,196,029**	**$1,161,149,365**
85	Total Costs	**$22,939,905**	**$32,451,980**	**$33,421,136**	**$31,410,489**	**$34,068,731**	**$154,292,241**
86	Benefit Minus Costs	**$49,920,391**	**$121,293,773**	**$200,675,809**	**$275,839,852**	**$359,127,298**	**$1,006,857,124**