Social effects

The social problems arising from alcoholism can be massive and are caused in part due to the serious pathological changes induced in the brain from prolonged alcohol misuse and partly because of the intoxicating effects of alcohol.[17][22] Alcohol abuse is also associated with increased risks of commiting criminal offences including child abuse, domestic violence, rapes, burglaries and assaults.[36] Being drunk or hung over during work hours can result in loss of employment, which can lead to financial problems including the loss of living quarters. Drinking at inappropriate times, and behavior caused by reduced judgment, can lead to legal consequences, such as criminal charges for drunk driving or public disorder, or civil penalties for tortious behavior. An alcoholic's behavior and mental impairment while drunk can profoundly impact surrounding family and friends, possibly leading to marital conflict and divorce, or contributing to domestic violence. This can contribute to lasting damage to the emotional development of the alcoholic's children, even after they reach adulthood. The alcoholic could suffer from loss of respect from others who may see the problem as self-inflicted and easily avoided.

Within the medical and scientific communities, there is broad consensus regarding alcoholism as a disease state. For example, the American Medical Association considers alcohol a drug and states that "drug addiction is a chronic, relapsing brain disease characterized by compulsive drug seeking and use despite often devastating consequences. It results from a complex interplay of biological vulnerability, environmental exposure, and developmental factors (e.g., stage of brain maturity)."

Drug abuse

Further information: Drug abuse

Unemployment, underemployment, and distance from rural areas are where most drug abuse occurs. Some results of drug abuse are stealing, killing, theft, assault, prostitution, poor grades in school, and poor conduct at work. Some poverty is cause by people who have abused drugs and have spent all of their money buying them. When they have no other way to support their addiction, they result to other measures to obtain them. The urge for the drugs began to take over their lives. People lose there their families, friends and homes leaving them alone and in poverty.

Neurobehavior Disinhibition in Childhood Predicts Substance Use Disorder in Young Adulthood

The development of substance use disorder (SUD) was prospectively investigated in 66 boys having fathers with SUD and 104 boys having fathers with no adult psychiatric disorder. Evaluations were conducted to determine the context in which neurobehavior disinhibition in relation to parental SUD, parental neglect of the child and child's social maladjustment culminated in a DSM-III-R diagnosis of SUD. A neurobehavior disinhibition latent trait

reflecting prefrontal cortex disturbance was derived using indicators of behavior undercontrol, affect dysregulation and executive cognitive functioning in the boys when they were 10-12 and again at 16 years of age. The data were analyzed to determine whether the score on the neurobehavior disinhibition construct mediates the association between father's and mother's SUD and son's SUD. Several key results emerged. First, SUD in the mother and father predicted neurobehavior disinhibition in the son. Second, the neurobehavior disinhibition score of the sons at ages 10-12 predicted SUD at age 19. Third, neurobehavior disinhibition, in conjunction with social maladjustment and drug use frequency, mediated the association between paternal and maternal SUD and son's SUD. Fourth, neurobehavior disinhibition was unrelated to neglect of the child by either the father or mother; however, paternal but not maternal neglect at age 10-12 predicted SUD at age 19. These findings suggest that prefrontal cortex dysfunction contributes to SUD liability. Tarter R.E., Kirisci L., Habeych M., Reynolds M. and Vanyukov M. Neurobehavior Disinhibition in Childhood Predisposes Boys to Substance Use Disorder by Young Adulthood: Direct and Mediated Etiologic Pathways. Drug and Alcohol Dependence, 73, pp. 121-132, 2004.

Testing the Effectiveness of a Public Health Approach to Treating Substance-Abusing Women on Welfare
Jonathan Morgenstern, Ph.D.

Substance abuse (SA) among disadvantaged, parenting women has long been identified as a major public health problem. However, as States move to implement welfare reform, efforts to effectively address this problem take on greater urgency. This report describes preliminary findings from a study currently in progress to test the effectiveness of a public health approach to intervening with this population. The report will (1) describe the study rationale, design, and interventions, (2) compare baseline characteristics of substance-abusing women on welfare with a nonaffected comparison group, and (3) report on SA treatment entry and retention data for an initial cohort of participants. A standardized battery was administered to women (N=220) recruited in a welfare setting who either met current DSM-IV substance-dependence criteria or did not meet criteria for a substance use disorder in the prior 5 years. Substance-dependent women had significantly greater employment, mental health, family, medical, and housing problems, suggesting they would experience substantially greater barriers to employability. Substance-dependent women were then randomly assigned to receive a referral either to SA treatment or to an intensive case management intervention (ICM). Women assigned to ICM had significantly higher rates of SA treatment entry and attendance. Overall, women who received a referral only to SA treatment had low rates of treatment attendance. Findings are discussed in the context of the current interface between substance abuse and welfare-to-work services.

National Institute on Drug Abuse

Frequently Asked Questions About Drug Testing in Schools

What is drug testing?

Some schools, hospitals, or places of employment conduct drug testing. There are a number of ways this can be done, including: pre-employment testing, random testing, reasonable suspicion/cause testing, post-accident testing, return to duty testing, and follow-up testing. This usually involves collecting urine samples to test for drugs such as marijuana, cocaine, amphetamines, PCP, and opiates.

Following models established in the workplace, some schools have initiated random drug testing and/or reasonable suspicion/cause testing. During random testing schools select, using a random process (like flipping a coin), one or more individuals from the student population to undergo drug testing. Currently, random drug testing can only be conducted among students who participate in competitive extracurricular activities. Reasonable suspicion/cause testing involves a school requiring a student to provide a urine specimen when there is sufficient evidence to suggest that the student may have used an illicit substance. Typically, this involves the direct observations made by school officials that a student has used or possesses illicit substances, exhibits physical symptoms of being under the influence, and has patterns of abnormal or erratic behavior.

Why do some schools want to conduct random drug tests?

Schools that have adopted random student drug testing are hoping to decrease drug abuse among students via two routes. First, schools that conduct testing hope that random testing will serve as a deterrent, and give students a reason to resist peer pressure to take drugs. Secondly, drug testing can identify adolescents who have started using drugs so that interventions can occur early, or identify adolescents who already have drug problems, so they can be referred for treatment. Drug abuse not only interferes with a student's ability to learn, but it can also disrupt the teaching environment, affecting other students as well.

Is student drug testing a stand-alone solution, or do schools need other programs to prevent and reduce drug use?

Drug testing should never be undertaken as a stand-alone response to a drug problem. If testing is done, it should be a component of broader prevention, intervention and treatment programs, with the common goal of reducing students' drug use.

If a student tests positive for drugs, should that student face disciplinary consequences?

The primary purpose of drug testing is not to punish students who use drugs but to prevent drug abuse and to help students already using become drug-free. The results of a positive drug test should be used to intervene with students who do not yet have drug problems, through counseling and follow-up testing. For students that are diagnosed with addiction, parents and a school administrator can refer them to effective drug treatment programs, to begin the recovery process.

Why test teenagers at all?

Teens are especially vulnerable to drug abuse, when the brain and body are still developing. Most teens do not use drugs, but for those who do, it can lead to a wide range of adverse effects on the brain, the body, behavior and health.

Short term: Even a single use of an intoxicating drug can affect a person's judgment and decisonmaking—resulting in accidents, poor performance in a school or sports activity, unplanned risky behavior, and the risk of overdosing.

Long term: Repeated drug abuse can lead to serious problems, such as poor academic outcomes, mood changes (depending on the drug: depression, anxiety, paranoia, psychosis), and social or family problems caused or worsened by drugs.

Repeated drug use can also lead to the disease of ***addiction***. Studies show that the earlier a teen begins using drugs, the more likely he or she will develop a substance abuse problem or addiction. Conversely, if teens stay away from drugs while in high school, they are less likely to develop a substance abuse problem later in life.

How many students actually use drugs?

Drug use among high schools students has dropped significantly since 2001. In December, the 2007 Monitoring the Future study of 8th, 10th, and 12th graders showed that drug use had declined by 24 percent since 2001.

Despite this marked decline, much remains to be done. Almost 50 percent of 12th graders say that they've used drugs at least once in their lifetime, and 18 percent report using marijuana in the last month. Prescription drug abuse is high—with nearly 1 in 10 high school seniors reporting non-medical use of the prescription painkiller Vicodin in the past year.

What testing methods are available?

There are several testing methods available that use urine, hair, oral fluids, and sweat (patch). These methods vary in cost, reliability, drugs detected, and detection period. Schools can determine their needs and choose the method that best suits their requirements, as long as the testing kits are from a reliable source.

Which drugs can be tested for?

Various testing methods normally test for a "panel" of drugs. Typically, a drug panel tests for marijuana, cocaine, opioids, amphetamines, and PCP. If a school has a particular problem with other drugs, such as MDMA, GHB, or steroids, they can include testing for these drugs as well.

What about alcohol?

Alcohol is a drug, and its use is a serious problem among young people. However, alcohol does not remain in the blood long enough for most tests to detect recent use. Breathalyzers and oral fluid tests can detect current use. Adolescents with substance abuse problems are often polydrug users (they use more than one drug) so identifying a problem with an illicit or prescription drug may also suggest an alcohol problem.

How accurate are drug tests? Is there a possibility a test could give a false positive?

Tests are very accurate but not 100 percent accurate. Usually samples are divided so if an initial test is positive a confirmation test can be conducted. Federal guidelines are in place to ensure accuracy and fairness in drug testing programs.

Can students "beat" the tests?

Many drug-using students are aware of techniques that supposedly detoxify their systems or mask their drug use. Popular magazines and Internet sites give advice on how to dilute urine samples, and there are even companies that sell clean urine or products designed to distort test results. A number of techniques and products are focused on urine tests for marijuana, but masking products increasingly are becoming available for tests of hair, oral fluids, and multiple drugs.

Most of these products do not work, are very costly, are easily identified in the testing process and need to be on hand constantly, because of the very nature of random testing. Moreover, even if the specific drug is successfully masked, the product itself can be detected, in which case the student using it would become an obvious candidate for additional screening and attention. In fact, some testing programs label a test "positive" if a masking product is detected.

Is random drug testing of students legal?

In June 2002, the U.S. Supreme Court broadened the authority of public schools to test students for illegal drugs. Voting 5 to 4 in *Pottawatomie County v. Earls*, the court ruled to allow random drug tests for all middle and high school students participating in competitive extracurricular activities. The ruling greatly expanded the scope of school drug testing, which previously had been allowed only for student athletes.

Just because the U.S. Supreme Court said student drug testing for adolescents in competitive extracurricular activities is constitutional, does that mean it is legal in my city or state?

A school or school district that is interested in adopting a student drug testing program should seek legal expertise so that it complies with all federal, state, and local laws. Individual state constitutions may dictate different legal thresholds for allowing student drug testing. Communities interested in starting student drug testing programs should become familiar with the law in their respective states to ensure proper compliance.

What has research determined about the utility of random drug tests in schools?

There is not very much research in this area, and the early research shows mixed results. A study published in 2007 (Goldberg et al, *J. Adolesc Health*, 41: 421-29, 2007) found that student athletes who participated in randomized drug testing had overall rates of drug use similar to students who did not take part in the program, and in fact some indicators of future drug abuse increased among those participating in the drug testing program. Because of the limited number of studies on this topic more research is warranted.

Created September 2007

Explore Cost Benefits

Most interested parties agree that they seek to help patients become less destructive and more productive members of society. In our society, an individual's contribution often is measured in monetary terms -which is why transforming measures of effectiveness into measures of monetary benefits is so important, and why cost-benefit analysis can be so useful for decisionmakers.

According to research by Ball and Ross (1991) and Gerstein et al. (1994), substance abuse treatment can be expected to both save money and produce new income. In California, various drug treatments were estimated to save between $245 million and $1,284 million after subtracting the cost of treatment from cost savings and income generated in a single year in the early 1990s (Gerstein et al. 1994, p. 82). Of course, every treatment program differs in how much (and how quickly) this return on investment occurs, which is one reason to measure the benefits as well as the costs of individual programs.

Typical Benefits of Substance Abuse Treatment

New Income

Real income may be generated by substance abuse treatment due to increased productivity and employment of patients. This does not always occur, however. Researchers have found that employment prospects may not be as positive for former substance abusers as might be hoped (cf. Gerstein et al. 1994). This may be due to the stigma of being a former substance abuser as well as difficulties posed by criminal records. Also, the behavior patterns sometimes acquired in drug abuse lifestyles may need to change radically to meet expectations of potential employers (such as getting to work on time every day and following directives).

Cost Savings

Another benefit of substance abuse treatment is cost savings to society or taxpayers. These cost savings include -

- Funds that otherwise would have been spent in the illicit economy for drugs.
- Criminal justice services not required.
- Social and health services no longer required.

These cost-savings benefits are real and can be quite substantial. Substance abuse researchers (Langenbucher et al. 1993) have found profound reductions in a number of costly events after treatment, including the following decreases:

- Patients involved in driving while intoxicated/driving under the influence arrests decreased from 18 percent (pretreatment) to 3 percent (posttreatment).
- Patients involved in accidents decreased from 14 to 1 percent.
- Patients' families who sought counseling decreased from 31 to 5 percent.
- Patients' children who missed school decreased from 5 to 1 percent.
- Patients' spouses who missed work decreased from 10 to 1 percent.

Although different jurisdictions and different methods of assessment may provide different figures, the level of criminal activity patients exhibit can be expected to decrease by roughly two-thirds (Gerstein et al. 1994). Not every program produces a two-thirds reduction, however, so it is essential to measure how much criminal activity changes for each patient.

The reduction in criminal activity following substance abuse treatment may not produce a corresponding reduction in actual costs to society. Although costs to citizens drop in direct proportion to reductions in criminal acts perpetrated on those citizens, public expenses for criminal justice services may not decline in a similar manner. Typically, police, courts, and other components of the criminal justice system are on limited and fixed budgets, while the need for criminal justice services greatly surpasses the ability to deliver those services. For this reason, the impact of substance abuse treatment on criminal behaviors may not result in an actual reduction in criminal justice expenditures. Instead, criminal justice resources saved because of a reduction in crimes committed by former substance abusers may be diverted to other criminal justice services. The entire budget for criminal services probably will still be spent.

Similar problems may occur when cost savings benefits are measured for reduced health, mental health, and future drug treatment services. Because resources in these services typically are very limited, the actual reduction in expenditures may not be as much as might be expected from the reduction in patient use of services.

Nevertheless, transforming effectiveness findings into estimated cost savings still may have considerable value for a program evaluation. In particular, cost savings estimates can show the magnitude of criminal justice and treatment resources that are now available to help other drug abusers who previously could not be helped because of budget restrictions.

Crime-Related Cost Savings

Other research provides evidence for numerous cost savings that result from drug abuse treatment. For example, Rajkumar and French (1996) found that although total costs of crime averaged $47,971 per patient in the year prior to treatment, that figure dropped to an average of $28,657 per patient in the year following treatment. That drop of $19,314 was far more than the cost of treatment, making cost savings in terms of crime alone worth the cost of treatment: $2,828 for methadone maintenance, $8,920 for residential treatment, and $2,908 for outpatient treatment (Rajkumar and French 1996).

Employment- Related Cost Savings

French and associates (1990) found that drug treatment improved the employment and earning potential of drug abusers. Although only 31 percent of drug abusers were employed at the start of treatment, almost 45 percent were employed after treatment. There was a similar increase in the number of patients seeking work (from 9 to 13 percent). And, employed patients earned more after treatment. French and colleagues (1990) found that average personal earnings for employed patients rose from $6,158 during the year before treatment to $7,120 during the year after treatment.

The legality of employment and income also can be positively affected by drug treatment. French and Zarkin (1992) found that increasing time spent in methadone treatment by just 10 percent increases legal earnings by 1.5 percent and decreases illegal earnings by 3.2 percent. A 10-percent increase in time spent in residential programs increases legal earnings 2.4 percent and decreases illegal earnings 4.1 percent.

Health Service- Related Cost Savings

French and colleagues (1996) estimated the cost savings if one case of the following health problems could be avoided:

- $1,100 for avoiding a case of severe venereal disease
- $74,513 for avoiding a case of severe hypertension
- $96,005 for avoiding a case of severe tuberculosis
- $114,796 for avoiding a case of AIDS

Caveats on Benefit Assumptions and Calculations

Reductions in each of the above events are notable in their own right, as well as in terms of monetary savings to the individual and society. For your program, the average cost of each event can be requested from those providing criminal justice, health, or social services locally. It also may be possible to glean this cost information directly from records of expenditures of public funds. The cost savings benefit then can be calculated for each patient as the reduction directly experienced in these events.

Some important changes may be impossible to monetize. For example, patients who interrupted their education decreased from 12 to 4 percent. Although this is a substantial decrease, it is impossible to determine the monetary value of this reduction. Other changes may not occur during the time period used to collect outcome data. For example, patients' financial problems may continue to occur for years after treatment because of the length of time necessary to compensate victims and pay off accumulated debt.

Increased Expenditures From Outcomes

Substance abuse treatment can temporarily increase patients' use of social services, including welfare support, disability payments, and health services. Patients may become well enough to seek help for health problems and to seek financial support from licit as opposed to illicit sources.

According to the CALDATA study (Gerstein et al. 1994), enrollment and payments received from various social services (other than health services) increased 17 to 50 percent during treatment. Being in treatment also may increase eligibility to receive a variety of social support services.

These increases in expenditures need to be included in treatment outcome reports. They should not be excluded simply because they do not seem like benefits. They are monetary outcomes and must be considered. They will likely be canceled out by the cost savings and income generated after treatment.

A case in point: In the CALDATA study, the costs of health services decreased between 1-year periods prior and subsequent to treatment from a mean $3,227 to a mean $2,469 per person. Also, in a study reported by Holder and Hallan (1986), private health insurance costs dropped from approximately $100 per month per patient in the 2 years preceding treatment to less than $14 per month per patient in the fifth year following treatment (which is when most health sequelae of substance abuse should have subsided).

Cost savings and other benefits may vary considerably depending on the type of treatment. In the CALDATA study, residential treatment was associated with a 58-percent reduction in costs to taxpayers, whereas methadone discharge was associated with a 17-percent reduction in costs to taxpayers. Also, longer treatment generally corresponded to greater cost savings, although not for methadone maintenance.

Transform Effectiveness Findings Into Benefits

Effectiveness findings often can be transformed into benefit findings by multiplying effectiveness data by a cost value. For example, to estimate cost savings after treatment, the change in the number of thefts before versus after treatment can be multiplied by the average cost of drug- related thefts in terms of property loss, victim losses, and criminal justice expenses. Statistical analysis of data collected in an experimental design is the best way to determine whether these cost savings are significant and can be ascribed to treatment. Other research designs, including correlational methods, provide guidance and useful estimates. The transformation procedure for figuring benefits from effectiveness findings remains relatively straightforward.

The exact cost value used to transform effectiveness findings into benefit findings is ascertained by surveying local criminal justice and social and health service agencies. Ideally, you would find the cost of each criminal act, the cost of each health service used, and so on, for each patient individually. If you cannot get that information, you may be able to use estimates of average costs per patient for these effectiveness variables.

For example, suppose you know that the number of theft convictions for a patient dropped from three in the year preceding treatment to one in the year following treatment. Suppose, too, that the estimated cost of a theft totaled $1,200 after adding costs of arrest, holding, and conviction to the cost to citizens of lost property and mental anguish. The total savings that could be attributed to treatment would be the cost of thefts during a period prior to treatment, minus the cost of thefts during a similar period following treatment. For this patient, that would be:

(3 x $1,200) - (1 x $1,200) = $3,600 - $1,200 = $2,400 in cost savings.

It would be more accurate to find the actual cost of each theft. It is conceivable that the one theft following treatment was quite minor compared to the thefts preceding treatment. On the other hand, that one theft after treatment could have cost more than all the thefts before treatment.

There also may be too much variation between jurisdictions (and over years) to allow a set cost for social services, health services, criminal justice services, and other cost items to be established for all drug treatment programs throughout the country for all time.

When cost savings and benefits involve health services, welfare, and other services for which cost data are available for individual patients, the cost for each patient needs to be contrasted for different periods of treatment. These services can vary greatly between patients; an estimate of the average health care cost per patient could result in over- or underestimation of cost-savings benefits.

Table 24 lists examples of the types of costs and potential cost savings that can be included in the survey. It is not meant to be complete. Note also that room for a range of estimates is provided, in recognition of the variability in costs of these services between patients and over time for the same patient. Costs of the specific criminal behaviors of individual patients then can be contrasted for the periods -

- Before versus after treatment.
- Before versus during treatment.
- During versus after treatment.

These costs can be examined separately for each category of potential cost savings or actual income produced and then summed across all categories to find the total benefit.

Table 24. Types of Costs and Potential Cost Savings

	Effectiveness measure	Effectiveness-benefit transformation	Benefit measures
Possible Cost Savings	Criminal acts not performed	Thefts at $___ / misdemeanor $___/ felony Assaults at $____	Savings to potential victims due to income loss avoided, property not damaged or lost, and health and mental health services not needed
	Drugs not purchased	Opiates at $___ to $___/day Cocaine and crack at $___ to $___/day Other at $___ to $___/day	Money not spent on drug purchases
	Criminal justice services not used	Arrests at $___/ arrest Jail at $___/day Prosecution at $__/ day	Expense of criminal justice services avoided
	Drug treatment no longer needed	$__ per patient per day for the mixture of treatments provided	Cost of drug treatment no longer needed
	Welfare payments not provided	$__ per patient per day in welfare payments	Amount of welfare payments not provided
	Disability payments not made	$__ per patient per day in disability payments	Size of disability payments not made
	Health services not used	Sum health care cost use for 6 - 12 months before treatment and 6 - 12 months after treatment	Cost of health services not used
Possible Benefits Produced	Employment (licit)		Income earned from licit sources
	Entrepreneurship (licit)		New income (profit) from enterprise
	Income taxes paid on licit income		Amount of Federal, State, and local taxes paid on licit income
	Increased productivity in an existing job		Increased profit for employer, company, and sole proprietorship

Net Benefit

Cost-benefit analysis answers the question of whether the outcomes of a program are worth the costs by -

- Measuring outcomes in the same units -dollars, usually -as costs.
- Seeing whether the value of outcomes exceeds the value of costs (by subtracting total costs from total benefits, which is called the net benefit).

To calculate the total benefit per patient for a program, simply add up the benefit figures for each of the specific measures. Similarly, to calculate the total cost per patient for a program, add up the cost figures for each procedure. Then you can calculate the net benefit (total benefits minus total costs) for the patient. Add these up for all patients to find the net benefit for the treatment program.

To make cost-benefit analysis more specific, list the specific costs of achieving the benefits on each measure. Instead of adding up benefits for all measures for one patient, and then summing or averaging across patients, add up or average for all patients the benefits attained by a program for one measure.

Present-Value Benefits

Immediate positive outcomes are more valuable than delayed positive outcomes. Nonmonetary outcomes rarely are adjusted for the amount they are delayed, but monetary benefits often are. If costs and benefits are to be compared, monetary benefits delayed by more than a year from the time that costs occur can be adjusted for their delayed value.

The adjustment divides benefits by the sum of 1 plus a discount rate (often 0.08, 0.10, or 0.14). The discount rate closely resembles the interest rate that could be earned if the money spent on treatment were invested in another activity (such as a money market fund). Benefits delayed by 2 years are adjusted by dividing them by the result of multiplying the sum 1 + (discount rate) by itself once (squared). Benefits delayed by 3 years are adjusted by dividing them by the result of multiplying the sum 1 + (discount rate) by itself and then by itself again, and so on.

The result of applying net present value to delayed benefits can be striking. Consider, for example, a stream of cost-savings benefits of $10,000 that occur at the end of the year for each of 3 years and a discount rate of 0.10. It is tempting simply to sum the benefits for a total of $30,000. The net present value of the first end-of-the-year return is, however, $10,000 ÷ (1 +.10) = $10,000 ÷ 1.10 = $9.091 following the calculation guidelines given above.

The net present value of the second year's cost-savings benefit is $10,000 ÷ [(1 + .10) x (1 +.10)] = $10,000 ÷ [1.10 x 1.10] = $10,000 ÷ 1.21 = $8,264. The net present value of the third year's cost-saving benefit is $10,000 ÷ [(1 + .10) x (1 + .10) x (1 + .10)] = $10,000 ÷ [1.10 x 1.10 x 1.10] = $10,000 ÷ 1.331 = $7,513. The total of these net-present-value benefits is far less than $30,000. It is only $24,868.

The resulting present-value benefits reflect the declining value of benefits that take longer to occur. The difficulties of making this adjustment are minor, although two to three discount rates (say, 0.08, 0.10, and 0.14) should be used. The resulting benefit adjustments provide a quantitative advantage of alternative procedures (and alternative treatment programs) that produce benefits more rapidly.

Time to Return on Investment

Net benefit is the result of subtracting costs from benefits. Present valuing benefits reduces the value of benefits. Using present-value benefits gives an appropriate advantage to programs that achieve their benefits sooner. Present valuing benefits still, however, gives an advantage (appropriately) to programs that take longer but achieve better benefits than programs that produce quick but small benefits.

Time to return on investment is the time at which investment equals monetary outcomes. The time it takes benefits to begin to exceed costs for substance abuse treatment is of concern to funders and other interest groups. Each patient can be monitored for the time actually elapsed before the monetary value of the outcomes achieved equals the monetary value of the resources used. The average time to return on investment then can be computed for all patients.

One way to do this is to keep each patient's figurative "bill" on a lined piece of paper or on a spreadsheet, such as the one shown in table 25. "Investment" is the cost of treatment services delivered. "Return on Investment" is the monetary or monetized benefit resulting from treatment services. "Cumulative Investment" is the running total of all treatment and other service costs. "Cumulative Return on Investment" is the continuous total of all benefits (monetary and monetized) resulting from treatment. "Net Benefit" is the result of subtracting the Cumulative Investment from the Cumulative Return on Investment. An advantage of keeping these data on a computer spreadsheet is that the cumulative total and the net benefit can be automatically updated by the computer each time you enter new cost (investment) or benefit data.

Table 25 could be completed just from the perspective of the present treatment program, or from the perspective of past as well as present treatments, or for society as a whole. In the "Return on Investment" column, one could add the patient's debt to society -restitution owed victims or the cost of criminal justice services. The balance unpaid from previous treatment programs also could be added here.

Table 25. Sample Cumulative Costs and Benefits and Net Benefit

Time	Investment	Return on investment	Cumulative investment	Cumulative return on investment	Net benefit
Date	Cost of treatment services delivered	Benefit to society, patient, or other individual	Running total of all treatment costs	Running total of all benefits of treatment	Cumulative return minus cumulative investment
1/3 start	$376 (screening)		$376	0	-$376
1/5	$145 (session)	$21 (drug-free day)	$521	$21	-$500
1/6		$21 (drug-free day)	$521	$42	-$479
1/8	$95 (group)	$21 (drug-free day)	$616	$63	-$458
1/8	$145 (session)		$761	$63	-$698
1/9		$124 (income for employed day)	$761	$187	-$574
1/9		$21 (drug-free day)	$761	$208	-$553

Total investment in treatment expenses can be compared to the total monetary value of outcomes achieved for a cohort of patients (say, the first 100 patients entering the clinic following the first year of startup and operation).

Time to return on investment can be contrasted for different groups of patients, such as those receiving different procedures or exhibiting different processes. The cost-benefit of different procedures also can be compared by contrasting time to return on investment for patients treated by the different procedures.

Just as calculations of time to return on investment should include present-value benefits, more delayed costs also should be adjusted for present value. The latter procedure quantifies the judgment that programs that delay some costs are preferred over programs that require all expenditures up front.

Potential Problems With Cost-Benefit Analysis

Erroneous Assumptions of Linearity

The strength of cost-benefit analysis also is its weakness or, more accurately, its problem. Because ratios can be calculated very readily (since costs and outcomes are in the same monetary units in most cost-benefit analyses), funders may make all the erroneous assumptions noted earlier that are encouraged by cost-outcome ratios .

Net benefit and time to return on investment forms of cost-benefit analysis encourage similar, and similarly erroneous, assumptions. For example, funders may incorrectly assume that because the benefit for an investment of $100,000 in a substance abuse treatment program is $50,000, doubling the investment to $200,000 will double the benefit to $100,000.

The common pattern of diminishing returns on investment would diminish this anticipated benefit to less than double. It also is possible that increasing the initial investment so much would allow entirely different (and much more effective and beneficial) treatment procedures to be used.

Some funders also may believe that increasing the investment in treatment might yield a quicker return on investment, which might not occur given limitations on how rapidly current treatment technology can modify the behaviors, life skills, and lifestyles associated with substance abuse.

Overemphasis on Monetary and Monetized Outcomes

The major problem with all forms of cost-benefit analysis is that monetary outcomes are the only outcomes considered. Most service providers, many patients, and some other interested parties believe that the most important outcomes of substance abuse treatment can hardly be quantified, much less monetized (translated into monetary outcomes). To note that some nonmonetary outcomes, such as reduced crime, can be monetized does not eliminate, but only reduces, this problem. Many providers are unwilling to consider placing a monetary value on the outcomes of their services. These providers often resent attempts by persons outside the treatment program to monetize their outcomes.

Critics also note that cost-benefit analysis has been used to justify a number of decisions that proved to be not only erroneous but disastrously so. For example, cost-benefit analyses conducted by State mental health hospitals in the 1980s apparently were used to justify sudden deinstitutionalization without preparation of the patient or the community. This removal of many mental patients from hospitals and placement into communities that were not prepared to provide necessary services exacerbated homelessness and amounted to abandonment of some patients.

This unwise decision does not necessarily mean that cost-benefit analysis is itself unwise. Problems arise when only one perspective is considered; it is important to adopt multiple perspectives in cost-outcome analyses. For example, in the deinstitutionalization analysis, only the perspective of the State mental hospital was considered.

Resources for Cost-Benefit Analysis

Several good books discuss the value of using cost-benefit analysis to evaluate programs (Nas 1996; Thompson 1980). A classic cost-benefit analysis performed in mental health (deinstitutionalization of schizophrenic patients) is provided by Weisbrod (1983). The much-discussed CALDATA study (Gerstein et al. 1994) also deserves your attention, as it is directly related to substance abuse treatment.