

NEDS ANALYTIC SUMMARY

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Highlights

- The most recent national study estimated that health care costs related to alcohol and substance use/abuse reached \$18.8 billion in 1992.
- This analysis shows that for the NTIES sample, substance abuse treatment reduced emergency room visits and hospital stays, thus reducing costs for the population treated in publicly funded programs.



Economic Impact of Substance Abuse Treatment on Health Care Costs



NEDS Analytic Summary Series

The Center for Substance Abuse Treatment (CSAT) works to improve the lives of those affected by alcohol and other substance abuse, and, through treatment, to reduce the ill effects of substance abuse on individuals, families, communities, and society at large. Thus, one important CSAT mission is to expand the knowledge about effective substance abuse treatment and recovery services. In support of these efforts, CSAT established the National Evaluation Data Services (NEDS) contract to provide a wide array of secondary data analysis products to the substance abuse treatment field.

Specifically, the NEDS project is focused upon providing CSAT with an analytic capability to use existing data to address policy- and practice-relevant topics as well as future research and evaluation activities. NEDS has developed several product lines designed to provide analytic findings to substance abuse treatment policy makers, service providers, services researchers and evaluators in a format that is most useful to the end user.

The Analytic Summary is one of the NEDS product lines. The purpose of the Analytic Summary is to provide a brief summary of each technical report produced by NEDS written in non-technical language. Readers who find the Analytic Summary results of interest can contact the original NEDS technical report authors for more detailed information. Through this process, the NEDS Analytic Summaries provide information to the substance abuse treatment field and promote linkages among different areas in the field.

This Analytic Summary

This particular NEDS Analytic Summary is based on the NEDS Technical Report titled *The Costs and Benefits of Substance Abuse Treatment: Findings from the National Treatment Improvement Evaluation Study* (Koenig, L., Denmead, G., Nguyen, R., Harrison, M., & Harwood, H.J., 1999). For a more thorough discussion of the analysis and findings, please obtain a copy of the complete Technical Report. Information for doing so is provided on the last page of this summary.

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Economic Impact of Substance Abuse Treatment on Health Care Costs

Analytic Importance

One important function of CSAT is to expand the knowledge about the impact of substance abuse treatment on those affected by substance abuse. In sponsoring secondary analyses, CSAT is attempting to gain useful insight into the fundamental question: *What is the economic impact of alcohol and substance abuse treatment on clients and society at large?*

Substance abuse is a significant factor contributing to health care costs. In 1992, costs of treatment for health problems attributed to alcohol and substance abuse was \$18.8 billion. Included in these health care costs are the costs due to HIV, liver disease, selected cancers, and injuries due to accidents. In addition to the large amount of resources spent on substance abuse-related health care services, a significant amount is also spent on substance abuse treatment.

Analytic Purpose

The purpose of this analysis was to assess the impact of alcohol and substance abuse treatment on substance abusers' health care costs. Using data from the National Treatment Improvement Evaluation Study (NTIES), we addressed the following questions:

- How does the health care utilization of clients in the year before treatment differ from their utilization after treatment?
- How do the health care costs of clients in the year prior to treatment differ from that after treatment?

Analytic Approach

Data sources. Client-level data for this secondary analysis were derived from the NTIES data set. Specifically, we analyzed data from the intake questionnaire that gathers baseline data and the post-treatment discharge questionnaire that gathers follow-up data. To allow for comparison across modality of care, the data were grouped into the following categories:

- Short-term hospital
- Short-term residential
- Long-term residential
- Outpatient Methadone
- Non-methadone Outpatient.

Analytic sample. For this analysis, we relied on the sample of subjects for whom there was both intake and follow-up data. In our analysis of health care costs, we excluded any clients who were still in treatment at the time of the follow-up interview with the exception of clients receiving methadone. We had a sample of 5,264 clients with adequate data.

Pre/post-treatment comparisons.

Three types of health care utilization outcomes were available to assess in the pre- to post-treatment comparisons:

- Number and length of hospital inpatient admissions for physical illnesses, conditions, or injuries
- Number of medical visits to a physician's office or a clinic
- Number of visits to an emergency room (ER).

The pre-treatment information regarding health care utilization used in this analysis reflects utilization in the 12

Data from the NTIES sample shows the following total impact of substance abuse treatment on health care costs for the 5,246 clients who participated:

- The approximate dollar savings from reduced hospital and ER encounters was \$1.68 million.
- The approximate increase in costs for ambulatory medical visits was \$232,000.
- The net savings for these medical costs was approximately \$1.45 million.



Economic Impact of Substance Abuse Treatment on Health Care Costs (cont.)

■ Health Care utilization outcomes that were assessed in this analysis include:

- Hospital inpatient admissions
- Office/clinic visits
- Emergency room visits.

■ The percent of clients reporting health care utilization declined after treatment across all types of services.

months prior to treatment admission. Health care utilization data from the post-treatment questionnaire reflect the period from the last day of treatment to the day of the follow-up interview, which averaged about one year. Post-treatment utilization values were “annualized” by dividing a client’s response by the length of his/her post-treatment period and multiplying by 365 days.

Estimates of health care expenditures were obtained by multiplying the number of visits (hospital, medical, and ER) by the average cost per visit. National average values were obtained from published sources for costs per unit for each type of service (e.g., hospital days, E.R. visits). The costs were standardized to reflect 1994 dollars.

Statistical analyses. The comparisons of pre- and post-treatment health care costs employed t-tests to determine the statistical significance of the differences. These tests describe the extent to which differences of this specific magnitude could have occurred by chance. The difference scores were constructed as a percent change using the following formula: (Pre—Post)/Pre.

Findings

Underlying Changes in Health Care Utilization

Changes in health care expenditures are driven by changes in utilization following treatment. Two possible factors may account for a change in average number of encounters (i.e., utilization) between the pre- and post-treatment periods:

- Change in the number of clients receiving services
- Change in the number of encounters for clients with at least one encounter.

The average number of hospital and ER encounters for the NTIES population declined significantly from 1.5 to 1.2 nights, and 1.1 to 0.8 visits, respectively (see Exhibit 1). The number of ambulatory medical visits, on the other hand, increased from 2.6 to 3.0 visits for an average client.

The approximate dollar savings from the reduced hospital and ER encounters for the NTIES sample was \$1.68 mil-

Exhibit 1 Average Annualized Health Care Utilization Rates and Encounters						
	Hospital Nights		Office/Clinic Visits		Emergency Room Visits	
	Pre	Post	Pre	Post	Pre	Post
Average number of encounters (whole population)	1.5	1.2	2.6	3.0	1.1	0.8
Percent of clients reporting any use	20%	13%	49%	43%	34%	22%
Average number of nights/encounters (sub-population with any use)	7.5	9.7	5.3	7.1	3.2	3.7



Economic Impact of Substance Abuse Treatment on Health Care Costs (cont.)

lion. The approximate increase in costs for the ambulatory medical visits among the NTIES sample was \$232,000. The net savings for these medical costs was approximately \$1.45 million.

The percent of clients reporting health care utilization declined after treatment across all types of services. Hospital admissions rates decreased from 20% to 13%, medical visits from 49% to 43%, and ER visits from 34% to 22%. The drop in each of the utilization rates is statistically significant at the .01 level.

For clients reporting at least one encounter, the average number of encounters increased after treatment across all types of services. It is difficult to discern exactly why this pattern is observed. One possible explanation is that it reflects the need for continuing care after treatment. It may also suggest that truly ill clients may have been receiving lower levels of health care than was needed prior to treatment. The care received while in treatment may have helped identify client illnesses previously unrecognized or untreated and/or provided clients with appropriate referrals and assistance to obtain the necessary health care services. Nevertheless, the increase in the aver-

age number of encounters for clients with at least one encounter indicates that the overall reduction in hospital nights and ER visits mostly reflect that fewer clients stayed in a hospital or visited an ER at all.

Aggregate Changes in Health Care Costs

Overall, average annual costs for all three types of health care utilization fell by about 15 percent after treatment, from \$1,864 to \$1,589 (see Exhibit 2). Average post-treatment hospital utilization costs fell by 18 percent, from \$1,375 to \$1,127. Meanwhile, average office/clinic visit costs increased by almost 19 percent in the post-treatment period, reflecting the increase in average visits per client, while the average ER costs fell by roughly 29 percent. It should be noted, however, that office/clinic visits are less costly than ER visits.

The annual reduction in health care costs is about \$276 (in 1994 dollars) per client receiving treatment. The reduction in hospital costs account for \$248 and ER visits for \$72 per client per year. However, offsetting these reductions is an increase in annual per capita average cost of medical visits of \$44.

- The proportion of clients who used both hospitals and ER services declined by about a third, although those who used these services at all used more services per client.
- Overall, average annual costs for all three types of health care utilization fell by about 15 percent after treatment, resulting in a savings of approximately \$1.45 million.



Exhibit 2 Average Health Care Costs				
Type of Service Utilized	Pre-Treatment	Post-Treatment	Dollar Change	Percent Change
Hospital Stays	\$ 1,375	\$ 1,127	-248	-18%*
Office/Clinic Visits	\$ 237	\$ 281	44	19%*
ER Visits	\$ 253	\$ 181	-72	-29%*
Total	\$ 1,865	1,589	-276	-15%*

Note: Health Care Costs were annualized and in 1994 dollars
* Indicates significance at the 0.01 percent level

Economic Impact of Substance Abuse Treatment on Health Care Costs (cont.)

Changes in Costs by Treatment Modality

The average health care costs per client before and after treatment were examined for each of the treatment modalities. On average, clients in short-term hospital treatment programs and outpatient methadone programs experienced the smallest reductions in health care costs (at least within the year after leaving treatment) (see Exhibit 3).

Meanwhile, clients in long-term residential treatment programs, followed by clients in short-term residential treatment programs and ambulatory outpatient programs, experienced the largest reductions in average total health care costs.

Average hospital costs per client fell for all treatment modalities except for short-term hospitals. The pattern of increased average expenditures for

office/clinic visits is observed across all treatment modalities. The rise in average costs per client for office/clinic visits was highest for respondents who received outpatient methadone treatment. Average ER costs per client declined for all treatment modalities.

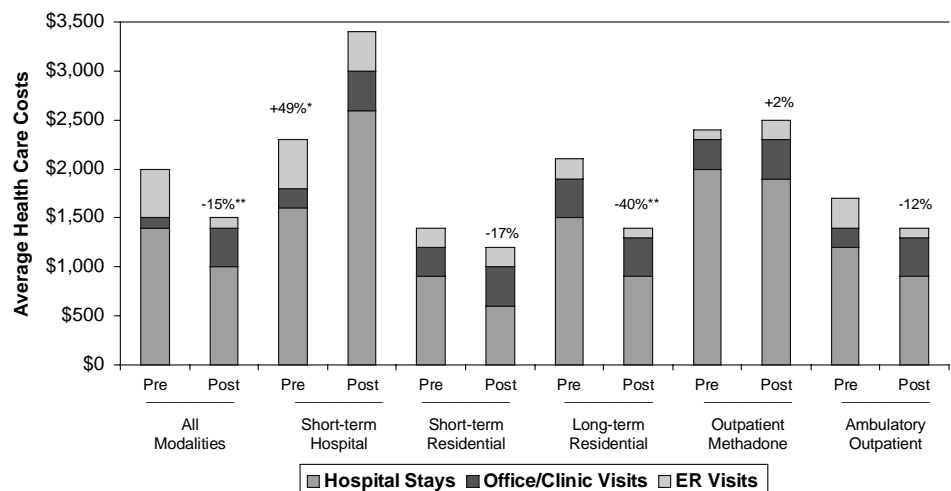
Changes in Costs by Client Characteristics

Exhibit 4 shows average health care costs analyzed according to client characteristics. Highlights of the findings are briefly described below.

Gender. Women, on average, incurred more expenses for all types of health care. Yet, the estimated percentage reduction in health care costs following treatment was similar for both men (15%) and women (15%). The changes in health care costs for men and women were significant at the .05 level.

- The largest reductions in average total health care costs were seen in:
 - Long-term residential programs (40%)
 - Short-term residential programs (17%)
 - Ambulatory outpatient programs (12%).
- For all treatment modalities, costs associated with office/clinic visits increased.

Exhibit 3
Comparing Health Care Costs Before and After Treatment



* Indicates significance at the 0.10 percent level ** Indicates significance at the .05 level



Economic Impact of Substance Abuse Treatment on Health Care Costs (cont.)

Exhibit 4 Average Health Care Costs by Client Characteristics			
Population (observations)	Before Treatment	After Treatment	% Change
GENDER			
Male (3,795)	\$1,634	\$1,395	-15%**
Female (1,469)	\$2,457	\$2,090	-15%**
RACE/ETHNICITY			
African-American (2,909)	\$1,806	\$1,455	-19%**
White, Non-Hispanic (1,406)	\$2,311	\$1,916	-17%**
Hispanic (768)	\$1,378	\$1,559	13%
EDUCATION			
No high school degree (2,467)	\$1,792	\$1,577	-12%*
GED (827)	\$1,847	\$1,753	-5%
High school degree (986)	\$1,587	\$1,133	-29%**
Some college (984)	\$2,335	\$1,936	-17%*
AGE			
Less than 21 years old (677)	\$1,408	\$1,038	-26%*
21 – 30 years old (1,725)	\$1,742	\$1,254	-28%**
31 – 40 years old (2,041)	\$1,871	\$1,867	-.2%
40+ years old (821)	\$2,480	\$2,056	-17%*

Note: ** indicates significance at the .05 level, * indicates significance at the .10 level

Race/ethnicity. The average pre-versus post-treatment health care costs for different ethnic and racial groups varied depending on the type of health care. For African Americans and whites, there were statistically significant decreases in health care costs; average costs for hospital stay and ER visits fell, while the costs associated with office/clinic visits rose due to increased utilization of these services. For Hispanic clients, however, only average costs associated with ER visits fell; the average cost associated with hospital stays and office/clinic visits increased.

Education. Clients with a high school diploma seemed to have the lowest total health care costs and their inpatient and ER costs seemed to decrease the most after treatment (significant at the .01 level).

Age. Clients aged 30 or younger had the sharpest declines in total health care costs. The impact of age on health care costs varied by type of service. Savings from reduced stays in hospitals were greatest for those respondents less than 21 years old, while savings for reduced visits to ERs were greatest for those between 31 to 40 years old.

Changes in Costs by Treatment Characteristics

Results of average health care costs analyzed according to treatment characteristics are displayed in Exhibit 5. Highlights of the findings are presented below.

Type of substance abused. Among clients treated for drug addictions (miscellaneous drugs, marijuana, crack/cocaine, and heroin), average

The average costs associated with office/clinic visits seem to have increased in proportion to the length of time a client was in treatment.



Economic Impact of Substance Abuse Treatment on Health Care Costs (cont.)

The reductions in overall health care costs suggest that:

- Health care is one area where substance abuse treatment creates benefits that help offset the cost of treatment.
- Future research should explore the effects of treatment on health care utilization over a longer period of time.



Exhibit 5 Average Health Care Costs by Treatment Characteristics			
Population (observations)	Before Treatment	After Treatment	% Change
TYPE OF SUBSTANCE ABUSE			
Crack/Cocaine (1,176)	\$1,869	\$1,606	-14%
Heroin (435)	\$2,121	\$1,630	-23%
Alcohol (849)	\$1,692	\$1,802	7%
Multiple drug addiction (2,469)	\$1,966	\$1,560	-21%**
LENGTH OF TREATMENT			
1 month or less (1,547)	\$2,071	\$1,955	-6%
1 – 2 months (1,470)	\$1,758	\$1,364	-22%**
3 – 4 months (963)	\$1,650	\$1,277	-23%**
5 – 6 months (334)	\$1,477	\$1,499	2%
6+ months (950)	\$2,045	\$1,684	-18%

Notes: ** Indicates significance at the .05 level. * Indicates significance at the .10 level.

health care costs decreased for hospital stays and ER visits, but increased for office/clinic visits. For clients in treatment for alcohol addiction, cost associated with hospital and office/clinic visits increased but decreased for ER visits.

Time in treatment. The relationship between length of treatment and savings varied greatly. The average costs associated with office/clinic visits seem to have increased in proportion to the length of time a client was in treatment. There was no consistent pattern between length of treatment and hospital or ER costs.

Implications

This analysis demonstrates how substance abuse treatment reduced health care utilization and costs for the population treated in publicly funded programs. While this study provides valuable information on health care utilization and associated health care costs, the findings also raise other issues that are worth investigating further.

Implications for Research and Analysis

This research supports the finding of other studies that substance abuse treatment generally improves the health care status of patients and reduces their utilization of health care services. Further work is needed to learn how treatment providers can improve this effect, perhaps by integrating primary care services, or by improving referral linkages. It has also been proposed by some in the field that this beneficial impact can in turn improve the odds of clients recovering. It is important that the interrelated connections between the different types of health care services provided to clients be explored. Future research should explore the effects of treatment on health care utilization over a longer period of time was possible in this analysis. Within such a research effort, it is important to examine the following questions:

- Does an increase in client office/clinic visits reduce the hospital stays and ER visits?

Economic Impact of Substance Abuse Treatment on Health Care Costs (cont.)

- Is an increase in office/clinic visits associated with a healthier, more productive individual?

Implications for Policy-Makers

The reductions in overall health care costs suggest that health care is one area where substance abuse treatment creates benefits that help offset the cost of treatment. Such a finding is important from a policy standpoint, as it helps to justify public expenditures for treatment and reduces the cost of public expenditures for medical care.

By reducing the utilization of hospitals and emergency rooms by substance abusers (who are often unable to fully cover the cost of their care) substance abuse treatment frees up limited resources and may reduce some of the upward pressure on health care costs (including Medicare and Medicaid). In these respects, society in general benefits from the provision of substance abuse treatment. Other societal benefits include a reduction in the number of individuals injured by accidents caused by abusers while they are under the influence of alcohol or drugs.

Policy makers must bear in mind, however, that health care utilization is only one of many outcomes with potential cost-offsetting effects. There are also benefits from reductions in crime-related costs and welfare payments, and increases in client incomes that may offset the cost of treatment and must also be examined. Several studies indicate that the crime-related benefits of substance abuse treatment for medically indigent persons are even greater than the health care savings.

Implications for Treatment Providers/Clients

The results of this analysis should be encouraging for providers and clients. As can be seen in the data, substance abuse treatment programs are producing improved medical outcomes. The proportion of clients reporting any type of health care utilization declined after treatment, as did total annual health care costs per client.

Future Steps

While the findings of this analysis have answered many important questions, more needs to be learned about the effectiveness of substance abuse treatment in reducing health care costs.

- **Does substance abuse treatment increase the likelihood that clients receive appropriate primary/medical care?**

According to our findings, the average number of office/clinic visits increased after treatment for clients reporting at least one encounter. However, it is not entirely certain whether or not this reflects the need for continuing care after treatment or whether these clients may have been receiving lower levels of care than was needed prior to treatment.

- **How does the health status of clients affect substance abuse treatment?**

The improvement of clients' health status seems likely to increase the ability of clients to participate in and complete treatment.

This analysis shows that substance abuse treatment programs:

- Create health care benefits that help offset the cost of treatment
- Produce improved medical outcomes.



Economic Impact of Substance Abuse Treatment on Health Care Costs (cont.)

References

Koenig, L., Denmead, G., Nguyen, R., Harwood, R., & Harrison, M., *The Costs and Benefits of Substance Abuse Treatment: Findings from NTIES*. August 1999. Prepared under the NEDS contract.

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For more information, please contact the National Evaluation Data Services analysis team at (703) 385-3200, or visit the NEDS Web site.

**Find more on the web
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National Treatment Improvement Evaluation Study (NTIES)

This analysis was performed on data derived from the National Treatment Improvement Evaluation Study (NTIES). The NTIES was a national evaluation of the effectiveness of substance abuse treatment services delivered in comprehensive treatment demonstration programs supported by the Center for Substance Abuse Treatment (CSAT). The NTIES project

collected longitudinal data between FY 1992 and FY 1995 on a purposive sample of clients in treatment programs receiving demonstration grant funding from CSAT. Data are derived from client interviews conducted at three points in time: treatment intake, treatment exit, and 12 months after treatment exit.



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