

# NEDS ANALYTIC SUMMARY

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## Highlights

**Treatment outcomes varied by substance, modality, client attributes, and clinical aspects of the treatment facility. Nevertheless, improvement was noted in about 75 percent of users of each type of substance.**



## Treatment Outcomes for Different Types of Substance Abuse



### 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 Analytic Summary is based on the NEDS Technical Report titled *Treatment Outcomes for Different Types of Substance Abuse* (Gerstein, D., & Zhang, Z., 2001). 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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# Treatment Outcomes for Different Types of Substance Abuse

## **Analytic Importance**

One important function of CSAT is to expand the knowledge about, and the availability of, effective treatment and recovery services for those affected by alcohol and other substance abuse. In sponsoring these analyses of the data they have collected, CSAT is attempting to gain useful insight into the fundamental question: *What constitutes effective (and cost-effective) treatment, and for what populations?*

Since the 1960s, clinicians and researchers have wondered whether different strategies and/or treatment facilities might be necessary to treat users of one or more different types of substances. The appearance of crack-cocaine in the 1980s was accompanied by reports of a rapid and dramatic severity of dependence on the drug. There were concerns that crack-cocaine and other substances appearing on the market might be more difficult to treat than better known and even closely related substances such as powder cocaine. Substance abuse researchers and evaluators have questioned whether different substances call for different treatment approaches, as well as whether specific modalities yield better outcomes for treating certain drugs.

This analysis focuses on treatment outcomes for different types of substance use among clients who participated in the National Treatment Improvement Evaluation Study (NTIES), a large-scale treatment outcomes study conducted to evaluate the effectiveness of treatment services provided by CSAT-sponsored demonstration projects.

This analysis examines the types of substances used at admission to treatment, assesses the evidence supporting a

focus on the more frequently used substances in analyzing treatment outcomes, and develops a measure of improvement in substance use behavior for evaluating treatment outcomes for each substance.

The extent to which improvement occurs and the extent to which it can be related to differences among providers and clients is assessed. A variety of specific client and service attributes that might account for these respective variations in improvements in substance use are also considered.

## **Analytic Purpose**

The purpose of the analysis is to examine the different types of substance use among clients in NTIES and to assess improvements by type of substance use among clients in five treatment modalities: methadone outpatient (n=422), non-methadone outpatient (n=1,566), short-term residential (n=873), long-term residential (n=841), and correctional settings (n=709).

Three key analytic questions were addressed:

- Were there differences in outcomes for different substances?
- Did the outcomes for different substances vary by modality?
- What services and other characteristics of the clinical setting might account for variations in substance use outcomes?

## **Analytic Approach**

The analysis utilized data from the NTIES outcomes sample of 4,411 clients who were interviewed at intake, treatment exit, and 12 months after treatment exit. The average client in NTIES was

**This analysis addressed three questions:**

- **Do different substances yield differential outcomes following treatment?**
- **Do outcomes for different substances vary by modality?**
- **What service characteristics account for variations in substance use outcomes?**



## Treatment Outcomes for Different Types of Substance Abuse (cont.)

about 33 years old at admission; the majority were black; about 70 percent were male; and the most commonly used substances were alcohol, marijuana, crack cocaine, cocaine powder, and heroin.

The NTIES interviews asked about the use of 13 drugs, and more than 96 percent of the clients reported at least one of the following five substances as their "reason for treatment": alcohol, cocaine powder, crack cocaine, marijuana, and heroin (see Exhibit 1). The analysts tested the advisability of narrowing the focus to these five most commonly cited drugs, since only about 1 percent of the sample reported pre-treatment substance use that did not include any of the core substances.

In order to determine whether there was clustering of drug combinations rather than uncorrelated use patterns for each substance, a principal components analysis was performed on peak month use of all 13 substances in the 12 months before admission. This analysis revealed only modest correlations in use among different substances. The results suggested that there is a general tendency for frequent users of one substance to be frequent users of one or more other substances, except that frequent use of alcohol or of crack cocaine was not associated with frequent use of other substances. Further analysis on relationships among

the five core substances showed that use of cocaine powder had the strongest association with use of all other core substances, especially heroin.

These analyses indicated that it was reasonable to focus analytically on only the five core substances, and that use of each substance could be analyzed separately.

Another methodological decision was whether to include the entire NTIES outcomes sample of 4,411 clients, or only the subgroup of clients who actually used each substance prior to treatment, in assessing change in substance use behavior. Based on comparisons of the variances in improvement of treatment outcomes for the entire group and for the restricted subgroups of pre-treatment users of each substance, the decision was made to restrict the outcomes assessment to pre-treatment users only.

### Measures of Substance Use

Clients were asked about their frequency and pattern of substance use, including lifetime use, use in the 12 months prior to entering treatment, and use in the 12 months prior to the follow-up interview approximately one year after treatment exit. Substance use measures (as defined in the technical report) were:

**Analyses focused on five substances cited most often by 96 percent of clients:**

- Alcohol
- Cocaine powder
- Crack cocaine
- Marijuana
- Heroin.



Exhibit 1		
Substance Use Characteristics at Admission to Treatment (%)		
Substance	Reason for Treatment	Past Year Use
Alcohol [DRUNK IN PAST MONTH]	46	43
Cocaine Powder	32	39
Crack Cocaine	28	49
Marijuana/Hashish	20	54
Heroin	20	23

## Treatment Outcomes for Different Types of Substance Abuse (cont.)

- Primary drug(s)
- Lifetime use
- Past year and past month use
- Peak month use
- Past month days drunk.

### Other Client Attributes at Admission

Other client attributes at admission were included in the analytic models for explaining changes in substance use:

- **Reasons for coming to treatment.** Reasons included pressure from criminal justice agencies, pressure from family, and general personal reasons.
- **Source of referral to treatment.** Referral sources included criminal justice official, spouse, partner or family member and self referral.
- **Prior treatment.** Clients were classified as having no prior treatment, one prior treatment episode, or two or more prior treatment episodes.
- **Demographics.** Demographic factors included age, race, education, employment, and marital status.

### Client Engagement in Treatment

A series of measures of client engagement in treatment were included in the analysis:

- **Length of stay (LOS).** Number of months in treatment; above/below median LOS for modality
- **Treatment completion.** Completed treatment plan, left before completing treatment plan, or still in treatment

- **Treatment goals.** Client agreement with primary clinician on treatment goals; client adherence to agreement

- **Substance use during treatment.** Average number of days per month of substance use and of drunkenness at treatment exit (0 days, 1-10 days, 11-20 days, 21-30 days)

- **Services received.** Counseling, job skills training, attendance of 12-step meetings, meeting with primary clinician more than once a week; also the total number of service types received.

### Administrative and Clinical Elements of SDUs

Data on administrative and clinical elements of the service delivery units (SDUs)<sup>1</sup> were collected from program administrators and clinicians working at 69 SDUs participating in NTIES. SDU directors reported on program staffing, finances, and clinical arrangements (for example, whether case management services were utilized). A set of scales was derived from interviews with the clinicians, defining five dimensions of activities to which clinicians ascribed importance: medical services, contingency management, counseling to promote self-efficacy, counseling to promote behavior control, and substance-specific information.

### Developing a Measure of Improvement in Substance Use

Clients who reported no use of a specific substance in the 12 months before treatment were excluded from the assessment of improvement for each specific substance. The basis of the

The following factors were considered:

- **Substance use at admission to treatment**
- **Other client attributes (demographics, prior treatment)**
- **Client engagement in treatment**
- **Administrative and clinical elements of SDUs.**



<sup>1</sup>Service delivery unit (SDU) is defined by CSAT as a single site offering a single level of care. The classification of level of care is based on three parameters: facility type (e.g., hospital), intensity of care (e.g., 24-hour), and type of service (e.g., outpatient). An SDU could be a stand-alone treatment provider or it could be one component of a multi-tiered treatment organization.

## Treatment Outcomes for Different Types of Substance Abuse (cont.)

measure of improvement in substance use behavior was peak month use in the 12 months before treatment and in the 12 months before follow-up (and, for alcohol, days drunk in month prior to interview).

Various statistical models were tested for their ability to predict which pre-treatment users would improve or not improve. This effort utilized techniques such as ordinary least squares regression, logistic regression, hierarchical linear models, structural equation models, and various combinations of dependent and independent variables. The models incorporated information about pre-treatment characteristics of users, services received and other characteristics of the clinical setting, and behavior in treatment.

### Findings

#### Changes in Substance Use After Treatment

Relatively small proportions of users of each of the five core substances returned to the same peak level of use

after treatment as they reported before treatment. Overall, those who did not improve (i.e., same or higher use after treatment) comprised about one-sixth of the clients who reported cocaine powder use at intake and about one-third of clients who reported heroin use at intake, with other substance users somewhere in between.

**The largest proportion of clients showing improvement in substance use was among cocaine powder users.** Changes in the clients' use of alcohol, cocaine powder, crack cocaine, marijuana, and heroin were assessed based on pre-treatment use and use in the 12 months before the follow-up. As shown in Exhibit 2, a greater proportion of clients showed improvement in their use of cocaine powder, crack cocaine, and marijuana than was noted for alcohol (drunkenness) and heroin use. Nonetheless, reduction in peak month substance use was achieved by about three-quarters of clients who had reported use of any of the five core substances at admission to treatment.

**A larger proportion of clients reduced their use of cocaine powder, crack cocaine, and marijuana than of heroin or alcohol.**

**About three-quarters of clients reduced substance use between admission and follow-up 12 months after treatment exit.**



Exhibit 2					
Changes in Peak Month Use by Substance					
Change Score	Cocaine Powder (n=1,712) %	Crack Cocaine (n=2,184) %	Heroin (n=1,032) %	Marijuana (n=2,404) %	Alcohol (Drunkenness) (n=1,197) %
-3 (max. improvement)	17.4	24.1	29.1	19.3	6.1
-2	25.8	26.7	15.6	20.4	21.0
-1	40.1	28.3	24.5	37.4	46.1
0 (no change)	12.1	15.5	27.1	16.9	20.5
1	3.3	4.3	2.8	4.8	5.0
2 (negative direction)	1.3	1.1	0.9	1.1	1.2
Improvement	83.4	79.1	69.2	77.2	73.3
No improvement	16.6	20.9	30.8	22.8	26.7

## Treatment Outcomes for Different Types of Substance Abuse (cont.)

**The changes in substance use did not vary much across modalities.** Across modalities, outcomes were fairly uniform for the five substances, with the exception of the methadone modality. Compared to clients in other modalities, a smaller proportion of clients in the methadone modality showed improvement in their use of cocaine powder, crack cocaine, and heroin.

### Factors Associated with Treatment Outcomes Varied by Substance of Abuse

Several statistical models were used to test the extent to which specific client and provider variables accounted for improvement (or lack of improvement) in treatment outcomes. These models incorporated information about pre-treatment characteristics of users, services received and other characteristics of the clinical setting, and behavior during treatment. The statistical tests of these models verified that certain elements consistently and significantly correlated with variations in client improvement. However, none of the tested models of improvement in substance use outcomes accounted for a high proportion of the total variation in outcomes for any substance. There are clearly sources of variation in improvement that were not captured by the measures used in this analysis.

**Substance use during treatment was a common predictor of lack of improvement across all five drug types.** At treatment exit about 15 percent of clients reported using drugs during treatment. Other predictors of treatment outcomes varied by specific type of substance used.

**Predictors of post-treatment heroin use.** A number of factors were associated with heroin use after treatment.

- **Frequency of drug use during treatment.** Use of any drug during treatment was negatively associated with treatment outcomes
- **Length of stay in treatment.** Longer stays were associated with reduced heroin use following treatment
- **Treatment completion, and having a treatment plan.** In non-methadone modalities, completing treatment and having a treatment plan accepted by the client were associated with improvement in treatment outcomes for heroin use
- **Number of services received, methadone dosage, prior treatment.** In methadone modalities, clients who received a greater number of different types of services, whose dosage of methadone was sufficiently high, and who had prior treatment experiences (two or more) showed greater improvement in post-treatment heroin use than clients who did not have these characteristics.

Having an accepted treatment plan with a primary clinician, remaining in treatment for a minimally sufficient duration, and avoiding drug use during the treatment episode affirms the simple notion that treatment that works well for heroin users in the short term is associated with improvement in the longer term.

**Predictors of post-treatment crack cocaine use.** Three factors were linked to crack cocaine use in the 12 months following treatment exit:

**Substance use during treatment had a negative impact on outcomes for all five substances.**

**Longer length of stay in treatment was associated with improved outcomes for cocaine powder, marijuana, and heroin.**



**Clinical staffing had a greater impact on treatment of cocaine powder, marijuana, and alcohol users than on users of other substances.**



## Treatment Outcomes for Different Types of Substance Abuse (cont.)

- **Frequency of drug use during treatment.** Use of any drug during treatment was negatively associated with treatment outcomes
- **Length of stay.** Longer length of stay was generally associated with improved outcomes. However, there was some indication that beyond a certain point, longer than average stays may have worsened rather than improved outcomes for crack cocaine use.
- **Treatment completion.** Completion of treatment was associated with improved outcomes in crack cocaine use.

The predictors of treatment outcomes for users of crack cocaine were similar to the predictors for users of heroin. Understanding the relationship between length of stay in treatment and crack cocaine outcomes requires further study.

**Predictors of post-treatment cocaine powder use.** Predictors of cocaine powder use included:

- **Frequency of drug use during treatment.** Use of any drug during treatment was negatively associated with treatment outcomes
- **Length of stay.** Longer length of stay was associated with improved treatment outcomes
- **Provider (SDU-level) characteristics.** Clinical service factors that predicted improvement among cocaine powder users included treatment in facilities where clinicians exclusively treated substance abuse clients, where a greater percentage of the clinicians had worked for less than three years, and where case managers were utilized.

Provider characteristics related to clinical staffing appear to have had a greater impact in the treatment of cocaine powder users than in the treatment of other substance users.

**Predictors of post-treatment marijuana use.** Predictors of marijuana use in the 12 months following treatment included:

- **Treatment compliance.** Client compliance with the treatment plan was associated with improved outcomes in the use of marijuana.
- **Frequency of drug use during treatment.** Any drug use during treatment was associated with poorer outcomes among marijuana users.
- **Length of stay.** Clients who stayed longer in treatment showed greater improvement in marijuana use than did clients with shorter lengths of stay.
- **Client characteristics.** Clients who cited criminal justice pressure as a reason for treatment showed better treatment outcomes than other clients
- **Provider characteristics.** Greater improvements in post-treatment marijuana use were seen in treatment facilities where a greater proportion of clinicians held college degrees and where medical services and emphasis on self-efficacy were not prioritized by clinicians.

Marijuana use appears more responsive to treatment when the behavioral circumstances and consequences of drug use are emphasized.

## Treatment Outcomes for Different Types of Substance Abuse (cont.)

**Predictors of post-treatment alcohol use.** Clinical service characteristics were most commonly associated with alcohol use outcomes.

- **Frequency of drug use during treatment.** Any drug use during treatment had a weaker association with poorer alcohol use outcomes than other drug types after treatment, although such use was still negatively associated with outcomes.
- **Receipt of job training.** Clients who received job training showed greater improvement than clients who did not receive job training.
- **Number of services received.** Clients who received a greater number of services showed more improvement in their alcohol use in the 12 months after treatment than clients who received fewer services.
- **Provider characteristics.** Improvement in alcohol use was associated with treatment in facilities where case management services were utilized
- **Clinician factors.** Improvement in alcohol use was seen among clients who were treated in facilities with a higher percentage of clinical staff who were new and who treated only substance abuse clients.

The factors related to improved outcomes for alcohol use were configured differently from other core substances, but with somewhat greater similarity to marijuana and cocaine powder than to crack cocaine and heroin.

### **Implications**

Improvement among crack cocaine, heroin, powder cocaine, marijuana, and alcohol users was partly predicted by

drug use during treatment. Some of the specifically measured clinical factors also were predictors of improvement in powder cocaine, marijuana, and alcohol use. While the analyses do not add up to a simple picture, they do suggest that pre-treatment circumstances and clinical service attributes weigh differently in their impact on post-treatment substance use, depending on the drug. The analyses have a number of implications for substance abuse treatment research, policy, and practice.

### **Implications for Research**

Implications for research are to:

- **Analyze data on users of specific substances separately.** The analysis showed that different factors before, during, and after treatment for the five specific substances contributed to outcomes in use at follow-up. Another area for further study is the potential significance of "primary" drug as a subgroup differentiator.
- **Examine clinical elements within individual SDUs.** The analysis showed that for different drugs, some clinical elements had an effect on outcomes. More analysis is needed to further explore the clinician-client relationship and other clinician factors that may influence client outcomes.
- **Explore additional variables that might explain treatment outcomes.** As none of the models explained a significant percentage of variance, other variables should be investigated as predictors of outcomes for specific drugs and for modalities.

### **Implications for research:**

- **Analyze users of different substances separately**
- **Examine clinical elements within individual SDUs**
- **Explore other variables that might explain treatment outcomes.**

## Treatment Outcomes for Different Types of Substance Abuse (cont.)

- **Focus on the subgroup of cocaine/heroin users.** Further analysis is needed to understand the co-occurrence of cocaine and heroin use, and to assess differences between methadone and non-methadone treatment outcomes for heroin users.

### Implications for Policy

The major policy implication of this analysis of treatment outcomes among users of different substances is to promote substance abuse treatment as a clinical speciality. Clients using powder cocaine, marijuana, and alcohol had better outcomes in treatment facilities in which the staff worked exclusively with substance abuse clients.

To more effectively treat substance abuse, clinical resources such as case management services should be expanded in existing SDUs.

### Implications for Practice

Some implications of this analysis for substance abuse treatment practitioners include the following:

- **Strengthen "best practices" for heroin, as it is the hardest drug to treat effectively.** This analysis affirms the importance of implementing best practices for heroin treatment, which include cultivating agreement on and adherence to an explicit treatment plan, sustaining clinical contact with the client, and ensuring that the methadone dosage is at a sufficient level.
- **Continue to monitor and be responsive to substance use during treatment.** Clients who do not respond well during treatment are not likely to improve substance use behavior after treatment. Substance

use during treatment, which may be an indicator of problem severity, was a common factor predicting substance use at follow-up among clients using any of the five core substances.

- **Dedicate clinical staff, to the extent possible, to work exclusively with substance abuse clients.** Clients in treatment for use of three of the five substances included in this analysis had better outcomes in facilities where staff caseload was composed exclusively of substance users.

### Future Steps

The concern that substances such as crack cocaine would prove to be highly resistant to treatment approaches designed for users of heroin, alcohol, and marijuana was not borne out by these analyses. While there was some variation across substances and modalities, overall, more than 7 out of 10 clients improved their substance use behavior following treatment.

The results suggest that clinicians should continue to apply their training to clients using "new" or emerging substances with rapidly rising epidemiologic profiles.

In this analysis and in other assessments of treatment effectiveness, improvement among heroin users was less frequent than among other types of drugs. A resurgence of heroin use beyond current levels could present a greater challenge to the treatment system than other known substances. Future efforts should continue to build upon the longstanding best practices for heroin treatment.

**The major policy implication of this analysis is to promote substance abuse treatment as a clinical speciality.**

**Implications for practice include:**

- **Strengthen "best practices" for treatment of heroin users**
- **Continue to monitor and respond to substance use during treatment**
- **Dedicate staff to work exclusively with substance abuse clients.**

## Treatment Outcomes for Different Types of Substance Abuse (cont.)

Substance use during treatment was found to be a significant predictor of lack of improvement in post-treatment substance use, regardless of the primary substance of abuse. This finding suggests that pre-treatment problem severity may warrant further study.

Additional analyses could take into account pre-treatment levels of substance use and substance use during treatment in assessing the degree of improvement achieved following treatment.

Further attention should be given to clinician-generated information about training, tenure in place, conceptual frameworks, specific relationships between clients and clinicians, and other clinical factors that may ultimately affect treatment outcomes. Support should continue toward workforce development of professionals trained in the treatment of substance use disorders.

These findings suggest that CSAT's initiatives in the early 1990s to expand and enhance treatment by supporting new specialty SDUs and adding clinical resources, particularly case management, to existing SDUs may have led to improved treatment outcomes in the NTIES sites.

### Reference

- Gerstein, D., & Zhang, Z. (2001). *Treatment outcomes for different types of substance abuse*. Report prepared by National Opinion Research Center under Contract No. 270-97-7016 for the Center for Substance Abuse Treatment. Fairfax, VA: Caliber Associates.

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

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<http://neds.calib.com>**

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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 treatment services 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: at treatment intake, at treatment exit, and 12 months after treatment exit.

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