

NEDS

NATIONAL EVALUATION DATA SERVICES

TREATMENT OUTCOMES FOR DIFFERENT TYPES OF SUBSTANCE ABUSE

July 2001

CSAT
Center for Substance
Abuse Treatment
SAMHSA

**National Opinion
Research Center**

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TREATMENT OUTCOMES FOR DIFFERENT TYPES OF SUBSTANCE ABUSE

Prepared by

**Dean R. Gerstein, Ph.D.
Zhiwei Zhang, Ph.D.**

**National Opinion Research Center
at the University of Chicago
1350 Connecticut Avenue, NW, Suite 500
Washington, DC 20036**

July 2001

This document was supported by the Center for Substance Abuse Treatment, Department of Health and Human Services, Caliber/NEDS Contract No. 270-97-7016.

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FOREWORD

The Center for Substance Abuse Treatment (CSAT) works to improve the lives of those affected by alcohol and other substance use disorders, and, through treatment, to reduce the ill effects of substance use disorders on individuals, families, communities, and society at large. One important mission of CSAT is to expand the availability of effective treatment and recovery services. To aid in accomplishing that mission, CSAT continues to invest significant resources in the development and acquisition of high quality data about treatment services, clients, and outcomes. Sound scientific analysis of this data provides evidence upon which to base answers to questions about what kinds of treatment work best for what groups of clients, and about which treatment approaches are cost-effective methods for curbing addiction and addiction-related behaviors.

In support of these efforts, the Program Evaluation Branch (PEB) of CSAT established the National Evaluation Data Services (NEDS) contract to provide a wide array of data management and scientific support services across various programmatic and evaluation activities. NEDS is a pioneering effort for CSAT in that the Center previously had no mechanisms to pull together databases for broad analytic purposes or to house databases produced under a wide array of activities. One objective of the NEDS project is to provide CSAT with a flexible analytic capability to use existing data to address policy-relevant questions about treatment for substance use disorders. This report has been produced in pursuit of this objective.

This report examines the types of substances used at admission to treatment, assesses the evidence supporting a focus on a limited subset of these 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. The authors then examine a variety of specific client and service attributes that might account for these respective variations in improvements in substance use, and conclude with recommendations for further analyses as well as implications for practitioners and policy makers.

Sharon Bishop
Project Director
National Evaluation Data Services

ACKNOWLEDGMENTS

We wish to acknowledge our reliance upon the guidance and direction of Ron Smith, Ph.D., Program Evaluation Branch, the Government Project Officer for the NEDS contract. We also wish to thank Robert L. Hubbard, Ph.D., who reviewed and provided valuable comments on earlier drafts of this report. We gratefully acknowledge staff at the Center for Substance Abuse Treatment, Substance Abuse and Mental Health Services Administration (SAMHSA) for their comments and feedback on this report.

Caliber Associates is the prime contractor for NEDS in partnership with Battelle Centers for Public Health Research and Evaluation (CPHRE); the Lewin Group; and National Opinion Research Center (NORC). We thank Dean R. Gerstein, Ph.D. and Zhiwei Zhang, Ph.D., who authored this report, and Marianna Toce, who lent editorial assistance. Many individuals within the Caliber/NEDS team also contributed significantly to this report, including Sharon Bishop, Irene Rich and Iris Mensing, who was responsible for formatting.

EXECUTIVE SUMMARY

Clinicians and students of treatment for substance use disorders have for many years wrestled with the multiplicity of substances that clients use. The appearance in the mid-1980s of crack cocaine was accompanied by early reports about the very rapid onset and dramatic severity of dependence on this drug, particularly among young women. This led to concerns that this new/old substance would prove much more difficult to treat than even such closely related substances as cocaine hydrochloride powder. The weight of evidence from larger studies now argues contrary to that view, and this report provides strong additional support to the earlier findings. Moreover, recurrently since the 1960s, clinicians, policy makers, and researchers have noted the presence of “poly-drug” and “multisubstance” users, in contrast to users focused on just one substance, and wondered whether distinct treatment strategies or program facilities might be necessary to treat this possibly different type of substance use disorder. There is evidence against this conclusion, but additional study is clearly needed, a need this report helps to meet.

The present analysis examines these issues using data from the National Treatment Improvement Evaluation Study (NTIES). NTIES was a large-scale treatment outcomes study conducted by the National Opinion Research Center for the Center for Substance Abuse Treatment (CSAT) to evaluate the effectiveness of comprehensive treatment services provided by CSAT-sponsored demonstration projects. The NTIES project collected longitudinal data from a purposive sample of treatment clients drawn from service delivery units in 16 States across the country. Data on substance use, criminal behavior, employment status, income, housing, risk behaviors, and other psychosocial measures were collected at intake (pre-treatment), during treatment, and at post-treatment follow-up. Data on administrative and clinical elements of the service delivery units (SDUs) were collected from program administrators and clinicians.

1. FINDINGS

Five types of substance use heavily dominated the responses with regard to their primacy of importance in leading NTIES respondents into treatment, as well as their rates of use during the pre-treatment and post-treatment periods. These five core substances were alcohol, marijuana, crack cocaine, cocaine powder and heroin. The NTIES interviews inquired with equal degrees of emphasis and detail into the use of 13 types of substances.

Relatively modest proportions of users of each of the five core substances return to the same peak level of use in the year or so after completing treatment as they reported before treatment. Those who did not improve (that is, those reporting the same or higher peak level

after treatment as before) comprise about one-sixth of the baseline cocaine powder users and one-third of the baseline heroin users, with other substances arrayed in between.

These findings on treatment effectiveness are in accord with previous studies. To deepen the investigation, a variety of statistical models was developed and tested to try to predict which baseline users would improve and which would not. These models incorporated information about pre-treatment characteristics of users, services received and other characteristics of the clinical setting, and behavior in treatment. Among the clinical characteristics was a set of scales derived from interviews with clinicians in the NTIES SDUs, 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.

The results identify one common thread to all outcomes—namely, that continuing drug use during treatment and remaining in treatment for a period of time appreciably less than the planned treatment protocol predict an undesirable outcome at follow-up. Beyond this common thread, there were appreciable differences by type of treatment. Although improvement among heroin users was less frequent than among other drug types in every modality of treatment, it was more readily predictable. In methadone, dose sufficiency and continuing retention were strong predictors of improvement, and clients with more extensive treatment histories fared better than those without such histories. Among heroin users treated in non-methadone programs, length of stay and acceptance and completion of a treatment plan were statistically significant covariates of improvement. The predictors of treatment outcome for users of crack cocaine were very similar to the predictors for heroin.

In contrast, improvement among powder cocaine, marijuana, and alcohol users was predicted not only by drug use during treatment (and, for cocaine and marijuana, treatment protocol completion and length of stay), but also by specifically measured clinical factors. Only one of these factors was significant for all three substances: improvement occurred more often for cocaine, marijuana, and alcohol use when clinicians at the SDU providing treatment devoted their clinical efforts entirely to clients with substance use disorders, rather than these clients comprising only part (albeit, usually the largest part) of their caseloads. Four other clinical indicators were significant for two of the three substance outcomes: for cocaine and alcohol, improvements were associated with case management and a higher proportion of relatively new staff (to the SDU); for marijuana and alcohol, improvements were associated with a de-emphasis on medical services and counseling to promote self-efficacy.

2. IMPLICATIONS FOR RESEARCH

Secondary analyses of public use data sets such as NTIES, DATOS, and CALDATA, to refine and sharpen measurement methods and models, appear very important to further progress in understanding why some treatment episodes “work” and others do not, and precisely what that “work” comprises. Advancement of these efforts also requires a continued investment in large-scale outcome studies that will be able to use the previous study results to develop and test better measures of substance use, pre-treatment characteristics, in-treatment response, and clinical activities, and will be capable of generating adequate numbers of clients to carry out the analyses.

In particular, the assessment of clinical activities through more specific information about clinician-client relationships or interactions appears to be a promising development, one that builds upon and refines the initial efforts in this and other studies. These interactions go well beyond matching the gender and race/ethnicity of counselor and client (or overall SDU staff and client mix). There should be additional analysis of clinician-generated information not only about demographics but also about training, tenure-in-place, conceptual frameworks, and, ultimately, specific relationships between individual clinicians and clients, utilizing the notion of a primary care giver—someone who appears to be easy for clients to name regardless of modality.

3. IMPLICATIONS FOR POLICY MAKERS

The major finding of this analysis (and previous large-scale outcome studies) from a policy perspective is that the treatment system is likely to be resilient in the face of changes in the epidemiology of substance use. During the 1980s and early 1990s, grave concerns were expressed that the tidal wave of cocaine and crack use would prove highly resistant to treatment approaches honed originally on heroin (as documented in the DARP studies), alcohol, and marijuana use. Similar concerns are being voiced currently about the emergence of methamphetamine and MDMA (Ecstasy). The results of this analysis and prior studies of cocaine and other substances prevalent in earlier periods do not encourage alarm in these particular directions. The range of variation in outcomes for different drug types is not very wide. In the event that users of methamphetamine and MDMA begin to enter the treatment system in much larger proportions, the possibility remains that their outcomes might prove different from prior experience.

From an evaluation perspective, these findings suggest that the most central thrust of CSAT’s demonstration programs in the early 1990s—namely, to expand and enhance treatment

by supporting new specialty SDUs and adding clinical resources, particularly case management, to existing SDUs—may well have led to improved treatment outcomes in the NTIES sites.

4. IMPLICATIONS FOR PRACTITIONERS

These results provide empirical support to a common perspective among clinicians treating substance use disorders (SUDs)—namely, that SUDs are phenomena independent of any particular substance, permitting clinicians to apply their training effectively to clients using different substances, including “new” or “emerging” substances with rapidly rising epidemiologic profiles and limited previous documentation of treatment outcomes. Perhaps the most strongly supported consistency here is the clinical importance for each of the core substances of responding quickly to any sign of use, particularly frequent or intense use (and not necessarily of the core substance), during treatment, since these signs are strongly predictive of failure to improve at follow-up.

There is also provisional support in these findings for the importance of treating substance use disorders as a clinical *specialty*. For outcomes involving cocaine, marijuana, and alcohol, clinical units in which virtually all of the clinical staff work exclusively with SUD clients appeared to yield significantly better results according to this analysis, all other things being equal, than SDUs where clinical staff worked with other types of clients as well. These results are not conclusive, but they are certainly supportive of the importance of maintaining specialized units where clinicians who prefer to work only with SUD clients can be housed.

I. INTRODUCTION

I. INTRODUCTION

Clinicians and students of treatment for substance use disorders have for many years wrestled with the multiplicity of substances that clients abuse (Gerstein & Harwood, 1990; McLellan et al., 1994; Hubbard et al., 1989, 1997). The general conceptual strategy behind treatment has been that intoxication, abuse, and dependence are three closely related concepts defining “substance use disorder” (SUD). SUD is a biobehavioral disorder (which, in some types of treatment, has also been viewed more specifically as a personality, spiritual, or brain disorder) involving repeated and/or excessive seeking out and consumption under nonmedical auspices of one or more psychoactive substances, with undesirable medical, psychological, and social consequences that are often progressive in their severity. (American Psychiatric Association, 1994). In this conceptual framework, there are relatively minor variations in the course of the disorder associated with differences among the substances, or families of substances, that are consumed, such as opiates, cannabinoids, alcohol, sedative-hypnotics, cocaine, other stimulants, tranquilizers, and hallucinogens. However, it is still necessary to identify and code dependence on or abuse of each substance separately.

This unified, but differentiated, SUD concept grew from initial recommendations made in the 1960s by an expert committee of the World Health Organization (Eddy et al., 1965). This conceptual approach is now firmly anchored in the current editions of the *Diagnostic and Statistical Manual of the American Psychiatric Association* (fourth edition, or DSM-IV) and the WHO’s *International Classification of Diseases* (10th edition, or ICD-X), as well as in key tenets of nonmedical treatment approaches, such as the multiple 12-step-based fellowships (Alcoholics Anonymous, Narcotics Anonymous, Cocaine Anonymous).

These core diagnostic concepts, however, have not led to discounting the significance or importance of different types of substances. The appearance in the mid-1980s of widely marketed, smokeable free-base crystalline cocaine—most commonly known as “base,” “crack,” or “rock”—was accompanied by early reports about the rapid onset and dramatic severity of dependence on this drug, particularly among young women (Gawin, Khalsa, & Ellinwood, 1994). This led to concerns that persons presenting SUDs involving this “highly addictive” new/old substance would prove much more difficult to treat than those whose SUDs involved more familiar substances, even such closely related substances as cocaine hydrochloride powder—the water-soluble version of cocaine that is usually sniffed, snorted, or dissolved for injection. Earlier studies have provided evidence against this view (Gerstein et al., 1994, 1997; Gerstein et al., 1999; Schildhaus et al., 2000; Simpson et al., 1999), but the weight of this evidence has not yet proven definitive. Moreover, recurrently since the 1960s, clinicians, policy makers, and researchers have noted the presence of “poly-drug” and “multisubstance” users, in contrast to users focused on just one substance, and wondered whether distinct treatment

strategies or treatment facilities might be needed to treat this possibly qualitatively different type of SUD (National Commission, 1973; Gardner, 1981; Hubbard et al., 1989; Institute of Medicine, 1990; Hubbard et al., 1997). Even if distinctly new treatment technologies were not needed, investigations have been undertaken to determine whether specific service elements might contribute differentially to treatment effectiveness for different SUDs or for patients with varying attributes (Broome et al., 1999; Etheridge et al., 1999; Simpson et al., 1997).

The present study examines these concerns using data from the National Treatment Improvement Evaluation Study (NTIES). NTIES was a large-scale treatment outcomes study conducted by the National Opinion Research Center for the Center for Substance Abuse Treatment (CSAT) to evaluate the effectiveness of comprehensive services provided by CSAT-sponsored demonstration projects. The NTIES project collected longitudinal data from a purposive sample of clients drawn from service delivery units (SDUs)¹ in 16 States across the country. Data on substance use, criminal behavior, employment status, income, housing, risk behaviors, and other psychosocial measures were collected at intake (pre-treatment), during treatment, and at post-treatment follow-up. Additional data on administrative and clinical elements of the SDUs were collected from treatment service administrators and clinicians. For more details on NTIES, see the appendix at the end of this report, Gerstein et al. (1997, 1999), and Smith (2000).

This study begins with an examination of the attributions of importance, frequencies of use, and variations in use across the pre-treatment year for 13 types of substance use (including alcohol) reported at admission to treatment by 4,411 clients in the NTIES analytic sample (see appendix for specific inclusion criteria). Five types of substance use are primary in importance in leading NTIES respondents into treatment, as well as in pre-treatment and post-treatment prevalence. These five core substances are alcohol, marijuana, crack cocaine, cocaine powder, and heroin. After narrowing the focus to these substance types and selecting measures that represent the most significant aspects use, the study examines differentials in demographic and motivational characteristics among the substance types, using data from subsets of the NTIES clients who completed all of the data collection instruments. It then explores differences in receipt of treatment services by persons using different drugs, including variations in length of stay and in the clinical approaches of the units that provide treatment services, using a new

¹ An SDU was defined for the purposes of NTIES as a specified clinical staff at a single site providing a single level of care to a defined stream of clients (Gerstein et al., 1997). The classification of level of care as used here was based on three parameters: (1) facility type (e.g., hospital, correctional facility); (2) intensity of care (e.g., 24-hour vs. outpatient visits); and planned duration of service (e.g., more or less than two months). Client streams were defined as any limitations that restricted clients according to age (adult vs. adolescent), sex (men or women only), or eligibility for methadone treatment.

analytical approach to describe these clinical approaches. The final analysis compares treatment outcomes for each substance type and explores the relative contributions made to these treatment outcomes by pre-treatment characteristics, treatment processes, and service characteristics.

II. METHODS

II. METHODS

1. SAMPLE OF SDUs, CLIENTS AND CLINICIANS

Based on a preliminary survey, the NTIES staff originally identified 792 potential SDUs among the population of grant recipients and subrecipients funded by the Treatment Improvement Demonstration programs initiated by CSAT's predecessor agency, the Office for Treatment Improvement, in the early 1990s. After initially screening out units that provided intake, management, and medical services but direct treatment, the NTIES staff enumerated 698 entities that were potential "true" SDUs, and successfully recruited more than three-quarters of these to provide detailed administrative data and aggregated clinical information.

NTIES staff also selected a purposive sample of 82 SDUs to voluntarily enroll individual clients over a period of approximately 14 months in a treatment outcomes study and to engage individual clinicians in a study of their demographic, educational, and training characteristics; caseload profiles; and attitudes toward the importance of different treatment components. Of these 82 eligible SDUs, 78 agreed to participate in the client outcome and clinician studies. However, seven were subsequently omitted from the analytic sample due to early program closure (when funds were not renewed) or minimal case flows, yielding a final analytic sample of 71 SDUs. In 2 of these 71 SDUs however, no clinicians completed the requested forms. Information about these SDUs is provided in Exhibit II-1. The SDUs were divided among five modalities of treatment: methadone (7), outpatient non-methadone (33), short-term residential (16), long-term residential (7), and correctional settings (8). See Exhibits A-2 and A-3 in the appendix for further information about NTIES SDUs.

The NTIES analytic sample of 4,411 clients (drawn from 6,593 who began treatment and completed the initial interview, and 5,388 who completed a 1-year follow-up interview) includes an average of 62 clients from each SDU, which corresponds to approximately 1 client per week of SDU study eligibility. The clinician sample of 1,141 respondents (see Exhibit II-1) averaged about 17 from each SDU. There was substantial variation in the numbers of clients and clinicians recruited to the study from each SDU. About half of the SDUs provided between 20 and 100 NTIES clients each, one-quarter provided fewer than 20, and one-quarter provided between 100 and 217. About half of the SDUs provided between 5 and 15 responding clinicians, about one-fifth provided 4 or fewer, and one-quarter provided between 16 and 43. Based on previous studies of response rates, it is clear that these variations mainly reflect underlying differences in the size of SDU operations, rather than differences in success at enrolling or engaging respondents in NTIES protocols at the different sites.

Demographic and other admission characteristics of clients in the analytic sample have been exhaustively described elsewhere (e.g., Gerstein et al., 1997; see also previous technical reports available from the NEDS Web site, referenced in the appendix). In brief, the average client was 33 years old at admission; the majority were African American; about 70 percent were male; and the most commonly used substances were alcohol, marijuana, crack cocaine, and cocaine powder. About 400 patients in the analytic sample were in methadone SDUs, about 800 in each of long-term residential, short-term residential, and correctional, and about 1600 in outpatient non-methadone SDUs.

EXHIBIT II-1		
NTIES CLIENT AND CLINICIAN RESPONDENTS IN SERVICE DELIVERY UNITS (SDUs)		
	Clients (in 71 SDUs)	Clinicians (in 69 SDUs)
Total	4,411	819
Distribution		
Maximum in SDU	217	43
75 th percentile SDU	101	16
Mean SDU	62.1	11.9
Median SDU	45	10
25 th percentile SDU	19	5
Minimum SDU	1	1
SDU size		
SDUs with fewer than 10 clients	8	–
SDUs with fewer than 20 clients	18	–
SDUs with fewer than 5 clinicians	–	13
SDUs with fewer than 10 clinicians	–	31
Treatment Modality		
Methadone	422 (in 7 SDUs)	105 (in 7 SDUs)
Non-methadone outpatient	1566 (in 33 SDUs)	307 (in 32 SDUs)
Short-term residential	873 (in 16 SDUs)	94 (in 15 SDUs)
Long-term residential	841 (in 7 SDUs)	161 (in 7 SDUs)
Correctional settings	709 (in 8 SDUs)	152 (in 8 SDUs)

2. CHARACTERISTICS OF THE CLINICIAN EXAMPLE

Since this is the first published analysis to use NTIES clinician information, we will provide a more extensive profile of the clinician sample. The clinician staff in all SDUs where NTIES patients were recruited were surveyed cross-sectionally on two occasions one year apart. There were 744 respondents to the first wave of the NTIES clinician survey and 499 to the second, which used the same instrument. Of these 1,243 clinicians, 1,141 were in the 69 SDUs represented in Exhibit II-1. Subsequent analyses identified 349 clinicians as having responded to both surveys, yielding 894 unique clinician respondents, of whom 819 were in the aforementioned 69 SDUs. There were virtually no differences between data elements in the first and second instruments returned by the 349 clinicians responding to both surveys, and we suspect that the lower number of respondents to the second round reflected the disinclination of many other clinicians who responded to the first wave to provide the same information twice. There were at least 5 clinician respondents from more than 80 percent of the SDUs, and a minimum of 94 representing each type of SDU.

Exhibit II-2 describes the educational backgrounds, work histories, and professional training of these 819 clinicians. The mean age was 42 years; a small majority were female; and about half were Caucasian, one-third African American, and the remainder Hispanic or other. One in 10 had not been educated beyond high school, one-third had some college courses, one-quarter were college graduates with no higher degree, and 30 percent had completed a postgraduate degree. In these respects, the clinicians were more female, more Caucasian, and much more highly educated than their clients. About half the clinicians had been with the SDU or parent organization for less than three years. The clinicians, on average, had been working with SUD clients for about four years, and most were working exclusively with SUD clients. About half had received more than 260 hours of SUD training, but about one-fourth had received less than 60 hours. Most had received at least some training on SUD issues within the past year. On all of the data reported in Exhibit II-1, clinicians in the analytic sample of SDUs were within one percentage point of the distributions for clinicians in all NTIES SDUs.

The clinicians were also asked to rank 12 kinds of clinical service activities according to their professional judgments about the relative importance of each activity in contributing to the achievement of clinical goals. These services are listed and the mean rankings summarized in Exhibit II-3. There was substantial variation from the activity with the highest average (mean and median) ranking, 3rd out of 12, to the activity with the lowest average ranking, 10th out of 12. In general, clinicians attached the most importance to two kinds of counseling—namely, counseling designed to help the client control his or her own behavior and counseling designed

to improve the client's self-esteem. The least importance was attached to testing for substance use and dispensing of rewards and punishments.

EXHIBIT II-2				
CHARACTERISTICS OF CLINICIANS				
Characteristic		Percentage	Characteristic	
Characteristic		Percentage	Percentage	
Age			Years working with SDU or parent organization	
23-34		22.8	0-2	54.2
35-49		55.7	3 +	45.8
=> 50		21.5		
Sex			Years working as clinician with SUD clients	
Female		57.6	0-3	41.5
Male		42.4	4-8	34.4
			9 +	24.2
Extent that clients are same sex as clinician			Extent that clinical work is with SUD clients	
None		8.9	Less than half	11.4
A few		20.0	Half or more but not all	19.7
More than a few but less than half		9.1	All	69.9
Half or more, but not all		41.8		
All		20.3	Hours of lifetime training on SUD issues	
			0-60 hours	23.7
Race			61-260 hours	26.6
Caucasian		50.5	261 or more hours	49.7
African American		36.2		
Other		13.3	Hours of past year training on SUD issues	
			None	14.4
Extent that clients are same race as clinician			=< 20 hours	24.4
None		3.2	21-60 hours	38.7
A few		19.1	61 hours or more	22.4
More than a few but less than half		24.0		
Half or more, but not all		48.7	Received other training in the past year	
All		5.0	Yes	73.2
			No	26.8
Education				
High school or less		9.4		
Some college (incl AA)		34.2		
Baccalaureate (incl grad courses)		26.1		
Postgraduate degree		30.3		

EXHIBIT II-3			
CLINICIAN RANKINGS OF THE IMPORTANCE OF CLINICAL ACTIVITIES			
Rank	Clinical Service Activity	Mean	Median
1	Counseling on how to control self-damaging behavior	3.18	3.12
2	Counseling to help improve self-esteem	4.23	3.96
3	Information on drug effects and relevant laws	5.10	5.00
4	Medical examination, treatment of conditions and illnesses	5.39	5.30
5	Assistance in making social environment changes	5.82	5.92
6	Help in learning social and practical skills	5.98	6.01
7	Psychiatric work-up and mental health services.	6.53	6.49
8	Participation in 12-step meetings	6.99	6.75
9	Spiritual counseling	8.20	8.25
10	Job training or continuing education	8.31	8.15
11	Drug or alcohol testing, such as urinalysis	8.55	8.50
12	Behavioral rewards and punishment contingent on behavior	9.62	10.00

3. MEASURES OF SUBSTANCE USE

Each of the NTIES client interviews asked about the nonmedical use—that is, use that is not under a doctor’s regular care for a medical or psychiatric condition—of 13 different types of substances, each of which was listed on a “show card” with various synonyms. The 13 types were: alcohol, cocaine powder, crack cocaine, marijuana/hashish, heroin, uppers (stimulants), opiates other than heroin or methadone, downers (sedatives and tranquilizers), hallucinogens, PCP (phencyclidine), methadone (nonprescribed), inhalants, and miscellaneous others.

A suite of questions was used to measure the frequency and pattern of use of each of these 13 substance types with which the client reported any experience. Several of the questions in this suite were used in the present analysis, as follows:

- **REASON FOR TREATMENT**
[Before admission—probe for every <substance> that applies:]
What is the drug or drug combination that made you come to treatment this time?
- **LIFETIME USE**
[Ever. Also: before admission/during treatment/since concluding treatment:]
Have you used <Substance> five times or more?

- **PAST YEAR and PAST MONTH USE**
[Before admission/after concluding treatment:]
When did you last use <Substance>? Was it within the past month, 1-12 months ago, or more than 12 months ago?
- **PEAK MONTH USE**
[During the 12 months before admission/after concluding treatment:]
In the month you used <Substance> the most, how many days did you use it? Would you say it was 1 day, 2-5 days, 6-10 days, 11-20 days, or 21 days or more?
- **PAST MONTH DAYS DRUNK**
[Before admission/after concluding treatment:]
In the past 30 days, how many days have you been drunk on beer, malt liquor, wine, wine cooler, or hard liquor? Would you say none, 1 day, 2-5 days, 6-10 days, 11-20 days, or 21 days or more?

For users of each substance, we recoded information about Peak Month Use (or, in the case of alcohol, Past Month Days Drunk) during the nominal 12-month period before and after treatment. We recoded the extent of <Substance> use in the peak month as none (meaning there was no use of the substance during the pre-treatment year), 1-5 days, 6-20 days, or 21 days or more. For convenience, we labeled these levels as “none,” “low,” “medium,” and “high.”

EXHIBIT II-4				
CODING SCHEME FOR CHANGE IN <SUBSTANCE> USE				
Peak Month Use Before Treatment	Peak Month Use After Treatment			
	None	Low	Medium	High
Low	-1	0	1	2
Medium	-2	-1	0	1
High	-3	-2	-1	0

Our scheme for capturing behavioral change across treatment was based on the cross-period tabulation in Exhibit II-4. Notice here that the largest negative value (-3) indicates the maximum reduction in substance use and is, therefore, the most desirable result. Also notice that those who report no use of <Substance> in the 12 months before treatment are excluded from the analysis of change in use of that substance. For simple tabulations or logistic regression models employing binary outcomes, negative values in this table are recoded to “1” to

indicate treatment improvement; those who scored zero or a positive value are assigned “0” to indicate no improvement.

4. OTHER CLIENT ATTRIBUTES AT ADMISSION

A number of measures were culled from earlier analyses of client outcomes in order to be used as covariates in modeling changes in substance use from before treatment to after treatment. These measures include:

- **Reasons for coming to treatment.** Four items were selected as dichotomous variables (present/absent) from an open-ended listing of reasons for seeking treatment, as cited by clients at admission: pressure from criminal justice agencies, including a defense attorney; pressure to improve or maintain a family relationship with a parent, spouse, or partner; an issue relating to one’s children, such as custody concerns or wishing to be a better parent; very general personal reasons, such as being tired, disgusted, seeking change, wanting a better lifestyle, and so forth.
- **Referral to treatment.** Three referral sources were selected as dichotomous variables (present/absent): referral by a criminal justice official; referral by a spouse, partner, or family member; self-referral.
- **Prior treatment.** This variable was recoded as a three-level dummy variable, with no prior treatment as the reference group; one prior treatment episode; and two or more prior treatment episodes.
- **Demographics.** Dichotomous variables were included representing demographic characteristics at admission: holding a high school degree or higher, being married, employed, white, age 35 or older.

5. CLIENT–SDU INTERACTION MEASURES

We developed a series of measures of client engagement with the SDU, as follows:

- **Length of Stay.** We classified clients by the number of months in treatment and according to whether they fell above or below the median length of stay observed in the modality of treatment of the SDU in which they received care. These cutting points were set at one month for short-term residential SDUs, two months for correctional or long-term residential SDUs, three months for outpatient SDUs, and seven months for methadone SDUs. The mean and median lengths of stay by SDU modality are shown in Exhibit II-5.

EXHIBIT II-5			
LENGTH OF STAY IN TREATMENT BY MODALITY			
Modality	N=4,411	Length of Stay (months)	
		Mean	Median
Methadone	422	8.72	7
Non-methadone outpatient	1,566	4.36	3
Short-term residential	873	1.83	1
Long-term residential	841	3.34	2.25
Correctional settings	709	2.54	1.75

- **Treatment Completion.** Based on data from SDU records and client self-report, we classified every client as having either completed his or her treatment plan, left treatment before completing the treatment plan, or being still in treatment at the time outcome was measured.
- **Goals of Treatment.** Clients were asked at the time of the discharge interview whether they had agreed with their primary clinician about the goals of their treatment episode and sought to adhere to this agreement. We created a dichotomous variable: those affirming both agreement and adherence, and all others. The specific treatment goals were codified in two dichotomous variables, one reflecting whether abstinence from substance use was an identified goal and the second reflecting whether any other goals were specified by the client.
- **Substance Use during Treatment.** Two ordinal measures indicated the average number of days per month during treatment of substance use and of drunkenness, respectively. The ordinal categories were 0 days, 1-10 days, 11-20 days, and 21-30 days.
- **Services during Treatment.** Binary measures were developed for each of the following services: receipt of any counseling or instruction to build job skills, any attendance at 12-step meetings, and whether the client spent more than one occasion per week on average with his or her primary clinician. In addition, a count variable was developed summing up the number of types of services received beyond counseling about substance use.

An additional dichotomous variable that did not necessarily reflect interaction between the individual client and the SDU was whether the SDU administrator reported that case management services were in active use at the SDU.

III. FINDINGS

III. FINDINGS

1. FIVE CORE SUBSTANCE TYPES

The NTIES questionnaire asked about 13 types of substances, using classifications schemes derived from previous studies that attended to differences in psychological effects, routes of administration, and discriminations considered important by users. We found that information about five types of substances captured virtually all of the major variations in patterns of use. The five core substances were alcohol, marijuana, cocaine powder, crack cocaine, and heroin.

EXHIBIT III-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
Uppers	3	8
Opiates other than heroin or methadone	1	10
Downers	1	10
Hallucinogens	1	5
PCP	1	3
Illegal methadone	>1	4
Inhalants	>1	3
Miscellaneous others	>1	1

A number of findings justified this focus on the core substances, but the most important are summarized in Exhibit III-1, namely the predominance of these five substances in the clients' own assessment of their primary drug problems as well as the reports of frequency of use in the pre-treatment period. First, 96.3 percent of the analytical sample reported at least one of the five core substances as their "reason for treatment."² Only 1.1 percent of the analytic sample reported that only a substance or combination of substances not in the core group served as a reason for treatment. (The remaining part of the sample declined to nominate any substance as a reason for treatment. It appears that members of this subsample did not consider themselves to

² A virtually identical percentage (96.1 percent) was observed in the entire admission cohort of 6,593 clients. We repeated all of the analyses discussed here, where applicable, for the entire admission cohort and for all clients in the outcome sample (N=5,388), and found very similar results to the ones reported here for the analytic sample.

have a substance use problem meriting treatment, but entered the SDU in order to satisfy other demands or due to someone else's belief that SDU treatment was necessary.) Similarly, only about 1 percent of the sample reported pre-treatment substance use that did not include any of the core substances. Moreover, virtually every client in the analytic sample who reported use of one of the five core substances in the year before treatment reported that one or more of the core substances was their reason for treatment.

In order to determine whether there were interdependencies among the core substances or between core and other substances, that is, clustering of drug combinations rather than uncorrelated use patterns for each substance, we performed a principal components analysis on the Peak Month Use measures, which provided the greatest extent of information about not only the prevalence of use during a period of time, but also the density or frequency of use during that period (except for alcohol use, which was measured in terms of drunk-days in the past month, since peak month was not collected). The product-moment correlation matrix for all 13 substances revealed that the highest correlations, while statistically significant, were fairly modest. The correlations connected downers (that is, sedative-hypnotics such as barbiturates as well as tranquilizers) with other opiate narcotics (0.34), cocaine with heroin (0.32), PCP with hallucinogens (0.26), marijuana with hallucinogens (0.23), and heroin with illegal methadone (0.23), other opiate narcotics (0.22), and downers (0.21). Only the association between heroin and cocaine powder involved two of the highly prevalent substances.

The principal components solution (see Exhibit III-2) yielded five vectors with eigenvalues greater than one. The first component (highest eigenvalue) covaried positively with all substances, but at similarly modest levels, except that alcohol, crack cocaine, and the miscellaneous other category were near zero. This suggests 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 two of the major substances—alcohol and crack cocaine—and the residual category of other substances, are not associated with this general tendency. Each of these three exclusions loaded relatively heavily and in relative isolation on one other of the principal components with eigenvalues greater than one. The second factor indicates a dimension on which use of heroin and hallucinogens (and to a marginal degree, methadone versus marijuana and inhalants) tend to be opposed; that is, the more frequent use of one correlates with the less frequent use (mainly, nonuse) of the other. This factor may also reflect that, although marijuana is the single most widely used illegal substance among NTIES clients and in the general population, marijuana use as a primary reason for treatment was reported almost exclusively by younger clients, who were also by far more likely than older ones to report using hallucinogens and inhalants, while the heroin users, particularly those who used methadone illegally (and legally in methadone treatment SDUs) were concentrated among older clients. Thus, if the first

factor can best be interpreted to reflect the general shared characteristic of NTIES clients as substance users, the second factor surfaces the tendency for older and younger clients to differ in their drug preferences.

EXHIBIT III-2					
PRINCIPAL COMPONENTS ANALYSIS OF PEAK MONTH USE					
BEFORE ADMISSION TO TREATMENT					
Substance	Eigenvectors (Eigenvalue) and Coefficients				
	1st (2.08)	2nd (1.48)	3rd (1.14)	4th (1.06)	5th (1.00)
Alcohol	0.07	0.19	0.30	0.55	-0.02
Cocaine powder	0.36	0.22	0.39	-0.22	-0.02
Crack cocaine	0.07	-0.02	0.73	0.06	-0.12
Marijuana/hashish	0.32	0.32	0.23	-0.09	0.002
Heroin	0.32	-0.49	-0.05	-0.26	0.003
Uppers	0.29	0.25	-0.27	0.12	-0.25
Opiates (not heroin or methadone)	0.39	-0.22	-0.17	0.34	-0.12
Downers	0.40	-0.14	-0.12	0.34	-0.09
Hallucinogens	0.33	0.42	-0.12	-0.19	0.14
PCP	0.25	0.26	0.06	-0.39	0.32
Illegal methadone	0.22	-0.33	-0.10	-0.09	0.19
Inhalants	0.19	0.29	-0.13	-0.05	-0.33
Miscellaneous others	0.09	0.05	-0.02	0.35	0.79

Factor coefficients greater than 0.40 are in **boldface**.

Further information on relationships among the five core substances is provided in Exhibit II-2A, which displays relationships during both the pre-admission and follow-up periods (but not across the periods). The correlations in this table are generally somewhat stronger and more consistently positive during the follow-up period compared with before admission. The correlations are generally modest (below .20) in both periods; however, the large sample sizes assure statistical significance for all coefficients with absolute values greater than .01. Cocaine powder has the strongest associations with all other core substance use, especially heroin use. Although the NTIES questionnaire did not explore these conjoining use patterns in detail, other studies strongly implicate the practice of injecting a solution of the two powders at the same time, a combination usually referred to as a speedball.

In summary, these analyses suggest that it is quite reasonable to focus analytically on only the five core substances, and that use of each of these substances can be analyzed

separately. The only potentially important loss of information in this strategy is that frequent use of heroin and cocaine powder co-occurs more often than might be expected by chance given the underlying rates of occurrence in the NTIES population. This particular combination might, therefore, indicate a subgroup requiring separate analysis.

EXHIBIT III-2A					
CORRELATIONS AMONG USE OF CORE SUBSTANCES					
PRIOR TO ADMISSION AND AT FOLLOW-UP					
	Cocaine Powder	Crack Cocaine	Heroin	Marijuana	Alcohol (Drunkness)
Cocaine powder	<i>[1712 \ 735]</i>	.25*** (340/4411)	.36*** (301/4411)	.26*** (382/4410)	.13*** (220/4079)
Crack cocaine	.12*** (988/4358)	<i>[2184 \ 998]</i>	.10*** (198/4411)	.24*** 465/(4410)	.13*** (281/4079)
Heroin	.29*** (664/4375)	-.05*** (464/4367)	<i>[1032 \ 588]</i>	.06*** 194/(4410)	-.06*** (78/4079)
Marijuana	.19*** (1143/4347)	.14*** (1359/4344)	-.004 (564/4356)	<i>[2404 \ 1178]</i>	.31*** (452/4078)
Alcohol (Drunkness)	.06*** (519/3825)	-.009 (616/3822)	-.13*** (182/3838)	.12*** (749/3818)	<i>[1197 \ 871]</i>

Note: ***: $p < .001$. Correlations prior to admission are below the diagonal, correlations at follow-up are above the diagonal. The number of observations is in parenthesis; first number is those who used both substances, second number is total valid observations. The first number in each diagonal cell is the number of clients who used the corresponding substance at all in the period prior to admission; the second number is clients who used during the follow-up period. Total n's are smaller for alcohol due to omission of this question for correctional inmates at the intake interview.

2. CHANGES IN SUBSTANCE USE ACROSS TREATMENT

In many studies of treatment outcomes, including previous NTIES studies, treatment outcomes are approximated by comparing initially the raw averages or group means and then the multivariate-adjusted group means of substance use measures before and after treatment for the entire population entering treatment. This approach assumes that persons who used the substance before treatment and persons who did not use it should be considered of equal importance in determining the effect of treatment on the future use of that substance. This approach merits reconsideration, even though one might argue that using and not using have random components that may be influenced by treatment exposure. Having developed

individual scores to represent relative improvement levels in substance use for the five most significant substances, we questioned whether the appropriate group on which to estimate outcome models for each substance would be the entire NTIES analytic sample or only the subgroup who had used each respective primary substance prior to treatment. The effect of including pre-treatment nonusers in each substance-specific analysis is that the majority of each analytic sample would be composed of individuals who used neither before nor after treatment, for whom variability in the predictive parts of the model might mask or distort the estimated effects of treatment participation on the subgroup who had used the substance during the baseline period.

EXHIBIT III-3										
VARIANCE IN TREATMENT IMPROVEMENT EXPLAINED										
BY SDU DIFFERENCES FOR FULL NTIES ANALYTIC SAMPLE AND PRE-TREATMENT USER SUBGROUPS ONLY										
	Drug Type									
	Cocaine Powder		Crack Cocaine		Heroin		Marijuana		Alcohol (Drunkenness)	
Sample size	4,379	1,712	4,374	2,184	4,403	1,032	4,362	2,404	3,713	1,142
Intercept (std error)	0.0637 (0.015)	0.0633 (0.022)	0.227 (0.045)	0.0585 (0.021)	0.136 (0.026)	0.0863 (0.039)	0.0638 (0.017)	0.114 (0.029)	0.0387 (0.009)	0.0922 (0.032)
Residual (std error)	1.0778 (0.023)	1.116 (0.039)	1.272 (0.027)	1.377 (0.042)	.639 (0.014)	1.563 (0.070)	1.365 (0.029)	1.250 (0.037)	.693 (0.016)	.889 (0.038)
Among-SDU variance	5.6%	5.4%	15.1%	4.1%	17.6%	5.2%	4.5%	8.4%	5.3%	9.4%

For each substance, the left column represents the full analytic sample of 4,411 (excluding missing items) and the right column represents the pre-treatment user group only; except that sample members who were incarcerated for the full 30 days prior to treatment are omitted from both “drunk” samples. The value of Intra-SDU Variance, expressed as a percentage, is the intra-class correlation, ρ , which is the ratio of the intercept variance to the sum of the intercept and residual variances.

In order to assess the advisability of restricting the analytic outcome samples for each substance to pre-treatment users, we compared the variances in improvement scores in a simple two-level model of within-SDU and among-SDU outcomes.³ The results are displayed in Exhibit III-3, particularly the comparison of percentage of total variance that is accounted for by the

³ At the client level, we expressed a client’s outcome as the sum of an intercept for the client’s SDU (β_{0j}) and a random error (r_{ij}) associated with the i^{th} client in the j^{th} SDU: (Drug Use Improvement Scale) $_{ij} = \beta_{0j} + r_{ij}$ where $r_{ij} \sim N(0, \sigma^2)$
 (1) At the SDU level, we express the intercept as the sum of an overall mean (γ_{00}) and a series of random deviations from the mean (u_{0j}): $\beta_{0j} = \gamma_{00} + u_{0j}$ where $u_{0j} \sim N(0, \tau_{00})$
 (2) We estimated the covariance parameters of this nonconditioned mean model through the restricted maximum likelihood method (REML) and derived intra-SDU correlations in treatment improvement for each of the drug types examined.

clustering of similar outcomes within SDUs, thus generating differences in outcomes among SDUs. Although the clustering effect is about the same in both the full and restricted samples for cocaine powder, it appears to be quite different in the restricted sample for each of the other substances, decreasing dramatically for crack cocaine and heroin and doubling in magnitude for marijuana and alcohol. These results support the decision to build treatment outcome models for each substance based on the sample members who reported any use of the specific substance in the year before treatment.

Exhibit III-4 presents the distributions of the multilevel and binary improvement measures of behavioral changes of the five core substances using Peak Month and (for alcohol) Past Month Drunk days among clients who were users of each specific substance before treatment. On the binary variable “improvement/no improvement,” 83 percent of pre-treatment cocaine powder users, 79 percent of crack cocaine users, 69 percent of heroin users, 77 percent of marijuana users, and 74 percent of alcohol intoxicants reported reducing their peak rate of use compared with baseline, after they left the SDU. Broadly speaking, there was a greater degree of improvement in marijuana and both forms of cocaine than in heroin or alcohol intoxication. The more detailed improvement levels add an important nuance to the binary results—namely, that heroin use tends toward a more bifurcated distribution than the other drugs (which are more normally distributed), with the highest percentages at both the extremes of -3 (moving from approximately daily heroin use to abstinence) and no-change scores. Further analyses indicate that the heroin users discharged from methadone and those remaining in methadone treatment at follow-up lend this bipolar shape to the heroin outcomes distribution.

EXHIBIT III-4					
CHANGES IN PEAK MONTH USE BY SUBSTANCE					
Change Score	Cocaine Powder	Crack Cocaine	Heroin	Marijuana	Drunkenness
-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

Tables III-4A to III-4E present results by SDU modality. The results are remarkably uniform, except that methadone patients tended to improve somewhat less often (by about 10 to

15 percentage points) than patients in all other modalities in their use of cocaine powder, crack cocaine, and heroin.

EXHIBIT III-4A					
CHANGES IN PEAK MONTH USE BY SUBSTANCE					
– METHADONE					
Change Score	Cocaine Powder (n=245)	Crack Cocaine (n = 125)	Heroin (n = 407)	Marijuana (n=198)	Drunkenness (n = 54)
-3 (max. improvement)	13.5	12.8	25.1	11.1	7.4
-2	20.8	13.6	13.3	18.7	7.4
-1	36.3	43.2	21.1	42.9	66.7
0 (no change)	18.4	16.8	38.3	21.2	14.8
1	8.2	10.4	1.5	5.1	1.9
2 (negative direction)	2.9	3.2	0.7	1.0	1.9
Improvement	70.6	69.6	59.5	72.7	81.5
No improvement	29.4	30.4	40.5	27.3	18.5

EXHIBIT III-4B					
CHANGES IN PEAK MONTH USE BY SUBSTANCE					
– NON-METHADONE OUTPATIENT					
Change Score	Cocaine Powder (n=428)	Crack Cocaine (n = 703)	Heroin (n = 136)	Marijuana (n=773)	Drunkenness (n = 443)
-3 (max. improvement)	15.2	23.2	19.9	16.7	3.4
-2	24.8	26.7	18.4	15.9	16.9
-1	43.2	27.2	31.6	39.6	44.5
0 (no change)	12.6	17.4	22.8	19.4	27.3
1	2.8	4.8	6.6	7.1	6.1
2 (negative direction)	1.4	0.7	0.7	1.3	1.8
Improvement	83.2	77.1	69.9	72.2	64.8
No improvement	16.8	22.9	30.2	27.8	35.2

EXHIBIT III-4C					
CHANGES IN PEAK MONTH USE BY SUBSTANCE					
– SHORT-TERM RESIDENTIAL					
Change Score	Cocaine Powder (n=403)	Crack Cocaine (n = 524)	Heroin (n = 234)	Marijuana (n=519)	Drunkenness (n = 340)
-3 (max. improvement)	18.6	20.8	32.5	19.7	10.3
-2	28.5	31.3	19.2	21.6	26.2
-1	36.7	29.2	25.6	39.7	45.0
0 (no change)	11.7	13.0	18.4	14.1	14.1
1	3.5	4.6	3.0	3.9	3.8
2 (negative direction)	1.0	1.2	1.3	1.2	0.6
Improvement	83.9	81.3	77.4	80.9	81.5
No improvement	16.1	18.7	22.7	19.1	18.5

EXHIBIT III-4D					
CHANGES IN PEAK MONTH USE BY SUBSTANCE					
– LONG-TERM RESIDENTIAL					
Change Score	Cocaine Powder (n=352)	Crack Cocaine (n = 552)	Heroin (n = 89)	Marijuana (n=499)	Drunkenness (n = 260)
-3 (max. improvement)	17.1	29.9	28.1	20.6	6.2
-2	24.7	26.6	11.2	22.4	25.4
-1	44.6	21.7	30.3	34.9	43.1
0 (no change)	10.2	17.2	25.8	17.6	18.1
1	2.0	3.6	2.3	3.8	6.2
2 (negative direction)	1.4	0.9	2.3	0.6	1.2
Improvement	86.4	78.3	69.7	78.0	74.6
No improvement	13.6	21.7	30.3	22.0	25.4

EXHIBIT III-4E					
CHANGES IN PEAK MONTH USE BY SUBSTANCE					
– CORRECTIONAL FACILITY					
Change Score	Cocaine Powder (n=284)	Crack Cocaine (n = 280)	Heroin (n = 166)	Marijuana (n=415)	Drunkenness (n = 45)
-3 (max. improvement)	22.9	26.1	42.2	26.3	0.0
-2	29.2	24.3	16.3	25.5	13.3
-1	38.0	35.7	22.3	31.1	64.4
0 (no change)	8.8	11.4	16.3	12.8	22.2
1	1.1	1.4	3.0	2.9	0.0
2 (negative direction)	0.0	1.1	0.0	1.5	0.0
Improvement	90.1	86.1	80.7	82.9	77.8
No improvement	9.9	13.9	19.3	17.1	22.2

3. CLINICIAN SERVICE ORIENTATION

In order to determine whether there were underlying dimensions to clinicians' rankings of the relative importance of the 12 service activities measured in the clinician questionnaire, we performed factor analysis using both the full set of individual clinicians as units and using each SDU as a unit. In the latter analysis, we assigned as SDU values the mean rank given to each item by all the clinicians in the SDU. In essence, the latter procedure weighted all SDUs equally, or, one might say, reweighted each clinician by the inverse of the staff size of the SDU. The results of these analyses were virtually identical to those for SDUs as units. We present in Exhibit III-5 the final analytic results from a five-factor varimax rotation, the optimal solution indicated by earlier runs, omitting from the presentation of each factor all item coefficients less than 0.45. Based on this analysis, five independent scales were designated, each reflecting the meaning of the included items that load at the highest levels on the positive and negative sides of the factor. We have interpreted and named these factors as follows:

- Medical (important activities: medical and psychiatric services; not important: 12-step meetings)
- Self-efficacy (important: counseling to build self-esteem and social skills; not important: drug or alcohol testing)
- Behavior control (important: counseling to change self-damaging behavior and social environments; not important: spiritual counseling)

- Drug education (important: information about alcohol and drugs; not important: other training or education)
- Contingency management (important: rewards and punishments).

EXHIBIT III-5						
CLINICIAN SERVICE ORIENTATIONS:						
VARIMAX ROTATION OF A FIVE-FACTOR SOLUTION AT THE SDU LEVEL (N=70)						
	Mean Rank	Factors				
		Medical	Self-efficacy	Behavior Control	Drug Education	Contingency Management
Medical examination, treating physical conditions or illnesses	4	0.865	–	–	–	–
Psychiatric workup, mental health services	7	0.863	–	–	–	–
<i>Participating in 12-step meetings</i>	8	<i>-0.664</i>	–	–	–	–
Counseling to improve self-esteem	2	–	0.602	–	–	–
Help to learn social & practical skills	6	–	0.811	–	–	–
<i>Urinalysis, drug/alcohol testing</i>	11	–	<i>-0.852</i>	–	–	–
Help to change the immediate social environment	5	–	–	0.671	–	–
Counseling to gain control of self-damaging behavior	1	–	–	0.758	–	–
<i>Spiritual counseling</i>	9	–	–	<i>-0.645</i>	–	–
Information about the effects of substances, including laws	3	–	–	–	0.800	–
<i>Job training or continuing education</i>	10	–	–	–	<i>-0.761</i>	–
Rewards and punishments for good and bad behavior	12	–	–	–	–	0.863

Absolute factor loading values < 0.45 are omitted

The small and nonsignificant correlations among these five factors in Exhibit III-6 further suggest the high discriminative validity of these constructed scales.

EXHIBIT III-6							
CORRELATION MATRIX OF SERVICE ORIENTATION SCALES							
AT THE SDU LEVEL (N=70)							
	Mean	S.D.	Behavior Control	Self-efficacy	Drug Education	Medical	Contingency Management
Behavior Control	4.60	0.94	1.00 (0.00)				
Self-efficacy	4.89	1.07	-0.053 (0.67)	1.00 (0.00)			
Drug Education	4.89	1.00	-0.008 (0.95)	-0.076 (0.53)	1.00 (0.00)		
Medical	5.98	1.46	0.226 (0.06)	-0.006 (0.96)	-0.22 (0.07)	1.00 (0.00)	
Contingency Management	9.62	1.49	-0.217 (0.07)	0.088 (0.47)	-0.163 (0.18)	0.026 (0.83)	1.00 (0.00)

4. MODELS OF EXPLANATION FOR TREATMENT OUTCOME

A substantial number of multivariate regression analyses were conducted to examine the components and strength of different possible explanations for variations in treatment outcomes for distinct types of drug use across individuals and across SDUs, in other words, to predict which clients would improve and which would not. The modeling efforts used a variety of standard statistical techniques such as ordinary least squares regression, logistic regression, hierarchical linear models, structural equation models, and various combinations of dependent (outcome) and independent (input) variables. Many of the findings suggested that work to refine the measurement and scaling strategies employed to date would prove analytically rewarding. Nevertheless, a number of relatively clear-cut results emerged, which are summarized in Exhibit III-7. (Note that for this analysis, the sign of the improvement scale was reversed, so that positive values mean improvement and negative values the opposite.) This exhibit reports two kinds of regression results for each substance, including the results of one special analysis run only on heroin clients enrolled in methadone programs. In each case, the results reported here indicate that a particular postulated predictor of treatment outcome was statistically significant, controlling for all other predictors. In most cases, these predictors were also significant correlates of improvement when considered only in restricted subsets of predictors or as a solo predictor of outcome.

In general, no model of improvement in substance use accounted for a high proportion of the total variance in outcome for any substance, whether we measured improvement as a dichotomy or an ordered scale. There clearly are unmeasured sources of variation in

improvement that we have not captured with any of the measures we used. Nevertheless, some degree of covariation has been effectively specified. The greatest, though still moderate, level of explanatory leverage was for heroin use, and, in particular, heroin use among clients in methadone treatment. For heroin use in general and for methadone clients in particular, a single-level logistic model was able to account, respectively, for 17 percent and 36 percent of the total variance in improvement, as measured with the simple dichotomous improvement measure. The significant predictors of improvement in heroin use were as follows:

- Length of stay and frequency of drug use (any drug use, not necessarily heroin) during treatment
- In non-methadone programs, whether treatment had been completed and the treatment plan accepted by the client
- In methadone programs, the number of different types of services received, whether the dose of methadone was (in the client's assessment) high enough, and whether the client had been treated on at least two previous occasions.

The specific elements in the methadone model are entirely in line with the earliest specifications for methadone maintenance on the Dole-Nyswander model: restriction of treatment to persons with repeated previous treatment “failures,” prescription of adequate “blocking” doses, sustained retention in treatment, and ready provision of ancillary rehabilitative services. More generally for treatment of heroin use, the importance for downstream outcome of a subjectively accepted treatment plan with a primary clinician, remaining in treatment for a minimally sufficient duration, and avoidance of frequent drug use during the treatment episode affirm the simple notion that treatment for heroin use that appears to be working well in the short term is associated with increased likelihood that there will be improvement in the longer term.

The frequency of drug use during treatment was a significant predictor of (lack of) improvement across all drug types—indeed it was the only predictor significant across all drug types. One might conclude simply that past behavior predicts future behavior, but this will not suffice. *All* of these individuals were using within the year *before* treatment began, but only about 15 percent of them, with relatively little variation by type, reported any level of drug use *during* treatment. While this relatively limited exposure limits the probative power of this measure, it is nevertheless revealing that clients who do not respond well during treatment are the ones most consistently at risk of an unproductive outcome at followup.

Improvement in crack cocaine use was affected by the same core measures that affected heroin improvement: the frequency of drug use during treatment, completion versus noncompletion of the treatment protocol, and the length of stay. However, the negative

coefficient on the squared length of stay indicates a nonlinear relationship in which, beyond a certain “optimal” point, controlling for all other correlates of outcome, longer stays become associated with a worsening rather than improving outlook for substance use. Changes in cocaine powder use also covaried with length of stay and drug use during treatment; however, for this substance, a number of clinician factors rose to independent significance. In particular, greater improvement occurred at SDUs where clinicians treated only substance use disorder clients, where a greater fraction of clinicians were relatively new to the SDU (fewer than three years), and where there were case managers. In general, these are factors suggestive of SDUs that were specifically responsive to the provisions of the CSAT demonstration programs that encouraged newly enhanced or expanded services. However, we have not yet determined whether there is a direct connection between the expansion and enhancement measures, such as those developed in the NTIES final report to describe the larger universe of NTIES SDUs, and the improvement measures employed here.

For marijuana users, treatment compliance and length of stay were significant predictors of improvement at outcome, and, as with cocaine, clinician factors also emerged as significant covariates of improvement. However, different clinician characteristics achieved significance for marijuana than for cocaine. Marijuana improvement was higher in SDUs where more clinicians held college degrees and where clinicians were likely to assign relatively low priority to medical services or to therapeutic promotion of self-efficacy. (In view of the interdependence of the clinician orientation scales, this result necessarily means that these clinicians assigned a higher priority in the aggregate to substance information, behavior control, and contingency management.) One additional significant result was that improvement in marijuana use occurred more often among users who cited criminal justice sources as a source of pressure leading them to seek treatment. In conjunction with the clinician results, this suggests that marijuana use is more responsive to treatment in populations and SDUs focusing more tightly on the behavioral circumstances and consequences of using.

EXHIBIT III-7						
SUMMARY OF RESULTS OF TREATMENT OUTCOME MODELS						
	Substance					
	Heroin	Heroin (Methadone only)	Crack Cocaine	Cocaine	Marijuana	Alcohol (Drunkness)
Variance explained (adjusted r ²)	logit: .17 OLS: .08	logit: .36 (no OLS)	logit: .08 OLS: .06	logit: .11 OLS: .06	logit: .10 OLS: .04	logit: .19 OLS: .06
OLS intercept	1.12		2.02	.94	1.52	1.23
Two or more prior treatments (versus none)		OR: 3.32				OR: 1.85 OLS: .20
Pressure from the law					OR: 1.69	
Pressure from family						OR: .65
Clinician scale: Medical					OR: .46	OR: .54
Clinician scale: Self-efficacy					OR: .61	OR: .39
Clinician scale: Contingency management						OR: .63
Clinicians mostly male						OLS: -.46
Clinicians: Most at SDU for 3 or more years				OLS: -.48		OLS: -.59
Clinicians treat only substance use clients				OLS: .45		OLS: .70
Clinicians: Most have degrees					OLS: .40	
SDU has case managers				OLS: .15		OR: .63
Received job skill training						OLS: .19
Number of services		OR: 1.26				OR: 1.12
Drug use during treatment	OR: .54 OLS: -.22	OR: .41	OR: .56 OLS: -.33	OR: .59 OLS: -.24	OR: .77 OLS: -.18	OLS: -.13
Treatment not completed	OR: .66 OLS: -.21		OR: .51 OLS: -.16		OR: .66	
Methadone dose high enough		OR: 4.99				
Length of stay above median	OR: 2.36	OR: 3.48				
Length of stay (log of months)			OLS: .19	OLS: .11	OLS: .14	
Length of stay (log of months- squared)	OLS: .06		OLS: -.07		OLS: -.05	
Agreed with and adhered to treatment plan	OLS: .19					

OR: Logistic regression coefficients, transformed to odds ratios. Values less than one represent reduced odds of improvement; values greater than one represent higher odds of improvement

OLS: Ordinary least squares unstandardized regression coefficients. Positive values mean positive correlation with improvement; negative values mean negative correlation with improvement

All listed coefficients are significant at the level of <.05 and negative effects on outcome are **boldfaced**.

Finally, improvement in alcohol use, while related to drug use during treatment, was more weakly associated with the in-treatment measure than were other drug types. On the other hand, a substantially broader set of clinical characteristics were significantly associated with alcohol outcomes. The following characteristics were positively related to improvement: receipt of job training, overall number of services received, presence of case managers, and a higher percentage of SDU staff who were new and who treated only clients with substance use disorders. The following were negatively related to outcome: clinicians who were mostly male and were oriented toward medical, self-efficacy, and contingency management service activities. In addition, clients who reported pressure from family were less likely to improve, while clients reporting two or more prior treatments were more likely to improve. These findings do not easily add up to a simple picture, but they do add up to a persuasive argument that the pre-treatment circumstances and clinical services conditioning improvements in alcohol use are configured differently from those applying to the other core substances, with a somewhat greater similarity to marijuana and cocaine powder than to crack cocaine or heroin.

**IV. SUMMARY AND IMPLICATIONS FOR
FURTHER RESEARCH, POLICY, AND PRACTICE**

IV. SUMMARY AND IMPLICATIONS FOR FURTHER RESEARCH, POLICY, AND PRACTICE

1. SUMMARY

Although the NTIES research interviews inquired with equal degrees of emphasis and detail into the use of 13 types of substances, 5 of these types (the core substances) heavily dominated the responses with regard both to rates of use during the pre-treatment and post-treatment periods and primacy of importance in leading the NTIES respondents into treatment. These five core substances were alcohol, marijuana, crack cocaine, cocaine powder and heroin. Moreover, although there was a general tendency for more intensive or frequent users of some of the core substances to also be frequent users of one or another non-core substance, the core substances were largely independent of each other, with the partial exception that heroin and cocaine powder were used by the same subject somewhat more often during the pre-treatment period than one would expect by chance alone.

It appears productive analytically not only to focus just on the five core substances, but also to look separately at the population entering treatment that uses each of them, and to attend specifically to the peak rate of use of each group across 1-year pre-treatment and post-treatment periods. Viewed in this light, one finds that relatively modest proportions of users of each of the five core substances return to the same peak level of use after treatment as they reported before treatment. Those who did not improve (that is, those reporting the same or higher peak level after treatment as before) comprise about one-sixth of the baseline cocaine powder users and one-third of the baseline heroin users, with other substances arrayed in between.

These findings on treatment effectiveness are in accord with previous studies. To extend the analysis, we developed and tested a variety of statistical models to try to predict which baseline users would improve and which would not. These models incorporated information about pre-treatment characteristics of users, including their demographics, reasons to enter treatment, previous treatment history, services received and other characteristics of the clinical setting for the NTIES treatment episode; and behavior in treatment, including length of stay, drug use during treatment, whether the treatment protocol developed by the primary clinician was accepted by the client, and whether the protocol was completed. Among the clinical characteristics was a set of scales derived from interviews with clinicians in the NTIES SDUs, defining five dimensions of activities: medical services, contingency management, counseling to promote self-efficacy, counseling to promote behavior control, and substance-specific information.

The results identify one common thread to all outcomes, namely, that continuing drug use during treatment and remaining in treatment for a period of time appreciably less than the planned treatment protocol prognosticates an undesirable outcome at follow-up. Beyond this common thread, there were appreciable differences by type of treatment. Although improvement among heroin users was less frequent than among other drug types, it was more readily predictable. In methadone, dose sufficiency and continuing retention were strong predictors of improvement, and clients with more extensive treatment histories fared better. Among heroin users treated in non-methadone programs, length of stay and acceptance and completion of a treatment plan were statistically significant covariates of improvement. The predictors of treatment outcome for users of crack cocaine were very similar to the predictors for heroin.

In contrast, improvement among powder cocaine, marijuana, and alcohol users was predicted not only by drug use during treatment (and, for cocaine and marijuana, treatment protocol completion and length of stay), but also by specifically measured clinical factors. Only one of these factors was significant for all three substances: improvement occurred more often for cocaine, marijuana, and alcohol use when clinicians at the SDU providing treatment devoted their clinical efforts entirely to substance use disorder clients, rather than these clients comprising only part (albeit, usually the largest part) of their caseloads. Four other clinical indicators were significant for two of the three substance outcomes: for cocaine and alcohol, improvements were associated with case management and a higher proportion of relatively new staff (to the SDU); for marijuana and alcohol, improvements were associated with a de-emphasis on medical services and counseling to promote self-efficacy (as these were reported in clinician orientations—we did not here employ measures based on administrative or client accounts of clinical activities). Also for marijuana and alcohol, additional clinical and pre-treatment variables predicted improvement, but the variables were different ones in each case.

2. IMPLICATIONS FOR FURTHER RESEARCH

The findings reported here support the trend of previous outcomes research to focus on outcomes for a few specific substances. These results also strongly support the fruitfulness of treating each subgroup of users separately, and of investing in more intensive efforts to build and employ measures that differentiate levels of change in substance use behavior before, during, and after treatment episodes. We also recommend closer attention to the potential significance of “primary” drug as a possible subgroup differentiator.

Analyses of treatment outcomes that focus on overall populations in treatment rather than substance-specific subgroups, and use simple prevalence measures rather than more refined behavior change scales, probably fall well short of maximizing the potential lessons to be gained

from the information collected in treatment outcome studies. Secondary analyses of research data sets such as NTIES to refine and sharpen these kinds of measurement methods and models appear very important to further progress in understanding why some treatment episodes “work” and others do not, and what precisely that “work” comprises. Advancement of these efforts will also require a continued investment in large-scale outcome studies that will be able to use the previous study results to develop and test better measures of substance use, pre-treatment characteristics, in-treatment response, and clinical activities, and will be capable of generating adequate numbers of clients to carry out the analyses. While careful screening of clients in smaller scale research projects can generate sufficient numbers for such purposes as clinical trials, these trials tend to be mounted in a typical treatment settings, to attract atypical clients, and to have sharply limited capabilities in each instance. While individually inexpensive relative to a single larger scale study, our experience is that the cost per research subject to mount them tends to be much higher.

These results suggest the need to study the configurations of clinical elements within individual SDUs, to create compact and powerful typologies or dimensional scales that are not simply recapitulations of the well known major modalities of treatment. The assessment of treatment components through more specific information about clinician and client interaction, beyond such surface matters as matching of client and counselor gender and race/ethnicity (or client and overall SDU staff) appears to be a promising development, one that has largely been neglected or avoided in previous research. There should be additional analysis of clinician-generated information about not only demographics but training, tenure-in-place, conceptual frameworks, and, ultimately, specific relationships between individual clinicians and clients, utilizing the notion of a primary care giver—someone who appears to be easy for clients to name regardless of modality.

Finally, a future NTIES analysis, and work with other treatment outcome data sets, should focus on the subgroup of cocaine-heroin users in contrast to heroin-only and cocaine-only users, and further assess differences between methadone and non-methadone treatment outcomes for heroin users. The observed lower rates of improvement for heroin use in NTIES and other treatment outcome studies presents a continuing challenge to treatment researchers and clinicians.

3. IMPLICATIONS FOR POLICY MAKERS

The major finding of this research from a policy perspective is that the treatment system is likely to be resilient in the face of changes in the epidemiology of substance use. During the 1980s and early 1990s, grave concerns were expressed that the tidal wave of cocaine and crack use would prove highly resistant to treatment approaches honed originally on heroin,

alcohol, and marijuana use. Similar concerns are being voiced currently about the emergence of methamphetamine and MDMA. The results of the analyses here, like those of earlier studies, do not encourage alarm in these particular directions. The range of variation in outcomes for different drug types is not wide, and these types include powerful depressant, sedative, and stimulant substances; moreover, concentrated forms of marijuana such as hashish have powerful hallucinogenic properties. Nevertheless, data regarding hallucinogens other than marijuana and stimulants other than cocaine's two major forms are much less amenable to analysis than the five core substances because these others have generally been prevalent at much lower baseline rates. In the event that users of methamphetamine and MDMA begin to enter the treatment system in much larger proportions, the possibility remains open that their outcomes might prove different from prior experience.

These results also suggest that a resurgence of heroin use well beyond current levels would likely be a greater challenge to the effectiveness of the treatment system than the aforementioned substances. Fortunately, on the one hand, we have a strong foundation of knowledge about how to make heroin treatment more effective. Unfortunately, on the other hand, for ideological reasons and perhaps for other reasons that are less clear, it has not proven easy to build on this foundation.

4. IMPLICATIONS FOR PRACTITIONERS

These results provide empirical support to a common perspective among SUD clinicians, namely that SUDs are phenomena independent of any particular substance, permitting clinicians to apply their training effectively to clients using different substances, including “new” or “emerging” substances with rapidly rising epidemiologic profiles and limited previous documentation of treatment outcomes. Perhaps the most strongly supported consistency here is the clinical importance for each of the core substances of responding quickly to any sign of substance use, and particularly frequent or intense use (and not necessarily of the core substance) during treatment, since these signs are strongly prognostic of failure to improve at follow-up.

At the same time, these results imply that the underlying uniformities can be overlaid by differences among substance types that can condition treatment outcomes. Among these implications are the following. First, heroin continues to be the hardest drug to treat effectively, with the highest rates of non-improvement. Longstanding “best practices” for heroin treatment, such as the primary care giver cultivating agreement on and adherence to an explicit treatment plan, resolute efforts to sustain clinical contact with the client, and assurance that methadone doses are at “blocking” levels, are all supported by these findings.

There is also some support for the importance of substance use disorders treatment as a clinical *specialty*. For outcomes involving cocaine, marijuana, and alcohol, clinical units in which virtually all of the clinical staff work exclusively with SUD clients yielded significantly better results according to our analyses, all other things being equal, than SDUs where clinical staff worked with other types of clients as well. These results are not conclusive, but they are certainly suggestive of the importance of specialized units where clinicians work intensively with SUD clients.

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APPENDIX

APPENDIX

DESCRIPTION OF THE NATIONAL TREATMENT IMPROVEMENT EVALUATION STUDY AND CENTER FOR SUBSTANCE ABUSE TREATMENT DEMONSTRATIONS (1990-1992)

The National Treatment Improvement Evaluation Study (NTIES) was a national evaluation of the effectiveness of services delivered in comprehensive treatment demonstration programs supported by the Center for Substance Abuse Treatment (CSAT). The NTIES project (1992-1997) was designed and performed for CSAT by the National Opinion Research Center at the University of Chicago with assistance from Research Triangle Institute. The NTIES project collected longitudinal data between FY 1992 and FY 1996 on a purposive sample of clients in treatment programs receiving demonstration grant funding from CSAT. Client-level data were obtained at treatment intake, at treatment exit, and 12 months after treatment exit. Service delivery unit (SDU) administrative and clinician (SDU staff) data were obtained at two time points, one year apart.

1. THE NTIES DESIGN

1.1 The Administrative/Services Component

The NTIES study design had two levels—an administrative or services component and a clinical treatment outcomes component. The administrative component was designed to assess how CSAT demonstration funds were used, what improvements in services were implemented at the program level, and what kind and how many programs and clients were affected by the demonstration awards. Four data collection instruments were used to gather administrative/services data: the NTIES Baseline Administration Report (NBAR), the NTIES Continuing Administrative Report (NCAR), the NTIES Exit Log, and the NTIES Clinician Form (NCF).

The unit of analysis for the administrative component was the SDU, 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, etc.); intensity of care (e.g., 24-hour, etc.); and type of service (e.g., outpatient, etc.). An SDU could be a stand-alone treatment provider or it could be one component of a multitiered treatment organization. For example, a large county mental health agency may be the *organization* within which the SDU is located. The organization may have multiple substance abuse treatment components, such as a county hospital and a county (ambulatory) mental health center. The county hospital may have multiple SDUs, such as an

inpatient detoxification service, an outpatient counseling service, and a hospital satellite center providing transitional care. In summary, the SDU provided NTIES evaluators with a stable, uniform level of comparison for examining service delivery issues.

A range of key clinician-specific data elements (within the administrative component) were assessed using the NTIES Clinician Form (NCF). The NCF items were an important adjunct to the facility- (SDU) level instruments; these items assessed clinician training, experience, client exposure, and service provision, and were completed by all counseling and clinical (medical and therapeutic) staff at the individual SDUs.

1.2 Clinical Treatment Outcomes Component

The unit of analysis for the clinical treatment outcomes component was individual client data. NTIES measured the clinical outcomes of treatment primarily through a “before/after” or “pre- to post-treatment” design. This method compares behaviors or other individual characteristics in the same participants, measured in similar ways, before and after an intervention.

Information about clients’ lives for the *before* period were obtained from the NTIES Research Intake Questionnaire (NRIQ), which was administered sometime during the clients’ first three weeks of treatment. The specific areas assessed included:

- Drug and alcohol use
- Employment
- Criminal justice involvement and criminal behaviors
- Living arrangements
- Mental and physical health.

Information about clients’ lives for the *after* period were obtained from the NTIES Post-discharge Assessment Questionnaire (NPAQ), with the same areas assessed at roughly 12 months post-treatment. Other client data sources included a treatment discharge interview (NTIES Treatment Experience Questionnaire, NTEQ), abstracted client records, urine drug screens collected at the time of the follow-up interview, and arrest reports from state databases.

1.3 The Outcome Analysis Sample

Between August 1993 and October 1994, research staff successfully enrolled 6,593 clients at 71 SDUs to participate in three waves of an in-person, computer-assisted data

collection protocol. These SDUs were chosen from the universe of treatment units receiving demonstration grant funding from CSAT. Some of the selected facilities were wholly supported by CSAT awards, while others received only indirect support or none.

Clients were interviewed three times: shortly after their first day of treatment, when they left treatment, and then at 12 months after the end of treatment. Fifteen percent of the eligible clients refused or avoided participation, and 82 percent of the recruited individuals (5,388 clients) completed a follow-up interview. Additional sample exclusions included:

- Missing or undetermined treatment exit date
- Inappropriate length of follow-up interval (less than 5 or more than 16 months)
- Clients incarcerated for most or all of the follow-up period (nearly all had been treated while incarcerated, and were not yet released).

The additional sample exclusions resulted in a final outcome analysis sample of 4,411 individuals.

2. TREATMENT DEMONSTRATION PROGRAMS

CSAT initiated three major demonstration programs and made 157 multiyear treatment enhancement awards across 47 States and several territories from 1990 through 1992. One objective common to all demonstrations was CSAT's emphasis on the provision of "comprehensive treatment" services to targeted client populations. The recipients of these awards focused special attention on the substance abuse treatment service needs of minority and special populations located primarily within large metropolitan areas. The demonstration programs are briefly described below.

2.1 Target Cities

Under this demonstration, nine metropolitan areas were selected to receive awards, of which half were included in the NTIES purposive sample. The following treatment improvement activities were explicitly provided for in the awards:

- Establishment of a Central Intake Unit (CIU) with automated client tracking and referral systems in place
- Provision of comprehensive services, including vocational, educational, biological, psychological, informational, and lifestyle components

- Improved inter-agency coordination (e.g., mental health, criminal justice, and human service agencies)
- Services for special populations—adolescents, pregnant and postpartum women, racial and ethnic minorities, and public housing residents.

2.2 Critical Populations

Under this demonstration program, awardees were required to implement “model enhancements” to existing treatment services for one or more of the following critical populations: racial and ethnic minorities, residents of public housing, and/or adolescents. Special emphasis was given to services provided to the homeless, the dually diagnosed, or persons living in rural areas. A total of 130 grants were awarded, covering services such as vocational support/counseling, housing assistance, integrated mental health and/or medical services, coordinated social services, culturally directed services, and others.

2.3 Incarcerated and Non-incarcerated Criminal Justice Populations

Under this demonstration program, funds were directed toward improving the standard of comprehensive treatment services for criminally involved clients in correctional and other settings. Some program emphasis was placed on ethnic and/or racial minorities. Nine correctional setting demonstrations were funded: five in prisons, three in local jails, and one across a network of juvenile detention facilities. All projects included a screening component to identify substance-abusing inmates, a variety of targeted treatment interventions (e.g., therapeutic communities, intensive day treatment programs), and a substantial aftercare component.

A total of 10 non-incarcerated projects were funded. Five programs targeted interventions at clients in diversionary programs, three focused services on probationers or parolees, and two targeted both populations. Almost all of the funded demonstration projects included the following components:

- Basic eligibility determination, followed by systematic screening and assessment
- Referral to treatment
- Graduated sanctions and incentives while in treatment
- Intensive supervision in treatment
- Community-based aftercare with supervision and service coordination.

In total, 19 criminal justice projects were funded as part of the CSAT 1990-1992 demonstrations, and, as indicated in the next section, these projects were purposively over-sampled in order to obtain a more robust evaluation of this program.

3. DESCRIPTION OF SDUs AND CLIENTS BY TREATMENT MODALITY AND PROGRAM TYPE

The 71 SDUs contributing clients to the outcome analysis sample are characterized by modality and (demonstration) program type in Exhibit A-1 below. Among the 698 SDUs in the NTIES universe: 52 percent (n=365) were Target Cities programs, 39 percent (n=274) were Critical Populations programs, and 9 percent (n=59) were Criminal Justice programs.

In terms of the SDUs sampled for the NTIES outcome analysis, 44 percent were Target Cities programs, 38 percent were Critical Populations programs, and 23 percent were Criminal Justice programs. Criminal Justice SDUs were purposely over-sampled as part of the NTIES evaluation design (CSAT, 1997). Nearly half of the sampled SDUs were (non-methadone) outpatient programs, and about one-quarter were long-term residential programs.

As shown in Exhibit A-2, 59 percent of all NTIES clients were sampled from Target Cities SDUs. Slightly more than 21 percent of all NTIES clients were sampled from Critical Populations SDUs and 20 percent were sampled from Criminal Justice SDUs. Outpatient (non-methadone) SDUs treated over one-third (35%) of the clients in the outcomes analysis sample, and almost 80 percent of these were sampled from Target Cities programs.

EXHIBIT A-1						
SDUs IN THE OUTCOME ANALYSIS SAMPLE						
Program Title Number of SDUs (% of NTIES Universe) ¹	NTIES Sample	Methodone	Outpatient	Long-term Residential	Short-term Residential	Correctional
Target Cities n=365 (52%)	31 (44%)	6	15	6	4	0
Critical Populations n=274 (39%)	27 (38%)	1	13	10	3	0
Criminal Justice n=59 (9%)	13 (23%)	0	5	0	0	8
Totals N=698 (100%)	71 (100%)	7	33	16	7	8

EXHIBIT A-2					
DISTRIBUTION OF CLIENTS IN THE OUTCOMES ANALYSIS SAMPLE					
Program Title Number of Clients (% of Analysis Sample)	Methodone	Outpatient	Long-term Residential	Short-term Residential	Correctional
Target Cities n=2,600 (59%)	377 (89%)	1,214 (78%)	504 (60%)	505 (58%)	0
Critical Populations n=931 (21%)	45 (11%)	220 (14%)	298 (35%)	368 (42%)	0
Criminal Justice n=880 (20%)	0	132 (8%)	39 (5%)	0	709 (100%)
Totals n=4,411 (100%)	422	1,566	841	873	709

Readers who are interested in more detailed information about the NTIES project are invited to visit the NEDS Web site at: <http://neds.calib.com>. The NEDS Web site provides the full-length version of the NTIES Final Report (1997), as well as copies of all data collection instrument instruments employed in NTIES.¹

¹ The original NTIES universe of SDUs included a program type called *Specialized Services*. Because clients for the outcome analysis sample were not drawn from these SDUs (n=94), they are excluded from the Exhibit.