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METHADONE TREATMENT OUTCOMES IN THE NATIONAL TREATMENT IMPROVEMENT EVALUATION STUDY (NTIES)

Prepared by

Lawrence Greenfield, Ph.D.

Caliber Associates
10530 Rosehaven Street, Suite 400
Fairfax, VA 22030

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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 abuse, and, through treatment, to reduce the ill effects of substance abuse on individuals, families, communities, and society at large. Thus, one important mission of CSAT is to expand the knowledge about and the availability of effective substance abuse treatment and recovery services. To aid in accomplishing that mission, CSAT has invested and continues to invest significant resources in the development and acquisition of high-quality data about substance abuse 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 are most effective 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 and to mine existing data whose potential has not been fully explored. Essentially, NEDS is a pioneering effort for CSAT in that the Center previously had no mechanism established to pull together databases for broad analytic purposes or to house databases produced under a wide array of activities. One of the specific objectives of the NEDS project is to provide CSAT with a flexible analytic capability to use existing data to address policy-relevant questions about substance abuse treatment. This report has been produced in pursuit of that objective.

This analytic report examines the outcomes of methadone-treated clients in the National Treatment Improvement Evaluation Study (NTIES). It addresses two fundamental questions: "How much methadone treatment is required in order to achieve successful outcomes?" and "To what extent will favorable outcomes of methadone treatment persist following the client's termination from treatment?" Using an innovative analytic approach, the study concludes with recommendations for methadone treatment policy, practice, and research.

Sharon Bishop
Project Director
National Evaluation Data Services

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EXECUTIVE SUMMARY

An analysis of data from the National Treatment Improvement Evaluation Study (NTIES) was completed for clients receiving outpatient methadone treatment (N=422). The purpose of the study was to compare treatment outcomes for clients who were maintained on methadone for longer and shorter stays in treatment and for clients who were assessed after long and short follow-up periods. It was hypothesized that a longer stay in treatment would be associated with positive treatment outcomes including lower drug use, reduced HIV/AIDS risk behaviors, lower criminal behaviors, and higher employment. Since clients who remain out of treatment for longer periods are more likely to relapse into drug use, it was also hypothesized that the benefits of treatment would be more evident for clients who were assessed over a relatively short period following discharge from treatment (short follow-up) than for clients who were assessed over a relatively long period following discharge (long follow up).

Methods

In NTIES, outpatient methadone treatment clients (N=422) were assessed at pre-admission and follow-up for drug use, HIV/AIDS risk behaviors, criminality, and employment/support. The pre-admission assessment period was 12 months and the follow-up assessment period ranged from 5 to 20 months. Four groups were assessed. The first group, Maintenance/Short Follow-Up, continued in treatment for 12 or more months until the follow-up assessment (median stay=16.4 months, median follow-up=6.0 months, n=144). The remaining groups were discharged from treatment prior to the follow-up interview and included:

- 3-to-12-Month Stay/Short Follow-Up (median stay=6.6 months, median Follow-up=6.2 months, n=98)
- 3-to-12-Month Stay/Long Follow-Up (median stay=5.1 months, median Follow-up=11 months, n=85)
- G-Month Stay/Long Follow-Up (median stay=1 month, median Follow-up=11 months, n=95).

Reported drug use and other behaviors in the pre-treatment and follow-up reference periods were compared for these groups using Cochran Q, which is a measure of change in behavior over time. Subsequently, Logistic Regression (LR) analyses were completed. Admission characteristics (i.e., age, gender, education, race, prior alcohol/drug treatment) in addition to the baseline behavior at admission, and the client's service delivery unit (SDU) were controlled for in the LR

analyses. Subsequently, separate two-group LR analyses were completed in order to assess the effect of length of stay in treatment, while controlling the duration of the follow-up period.

Results

As compared to the reference group (<3 Month Stay/Long Follow-up), both the Maintenance/Short Follow-up and the 3-to-12 Month/Short Follow-up groups were consistently more likely to report:

- No drug use
- No HIV/AIDS risk behaviors
- No criminal behaviors.

The remaining group, 3-to-12 Month Stay/Long Follow-up did not differ significantly from the reference group in their likelihood of reporting these behaviors.

In comparison to the reference group, the Maintenance/Short Follow-up group was:

- 7 times more likely to report no heroin use
- 2 times more likely to report no cocaine use
- 5 times more likely to report no needle sharing
- 7 times more likely to report no drug selling behavior.

Both the Maintenance/Short Follow-up and the 3-to-12 Month Stay/Short Follow-up groups were more likely to report no sex with more than one partner, no arrest for any offense, no shoplifting, and no court involvement. In similar comparisons between the 3-to-12 Month Stay/Long Follow-up group and the reference group, no differences were found in the likelihood of any of these measures of drug use, HIV/AIDS risk, or criminal behaviors.

On the other hand, each of the remaining groups in comparison to the reference group was between 3 and 4 times more likely to report being currently employed. Interestingly, clients who were age 38 and older in the Maintenance/Short Follow-up group reported lower

employment over time, in contrast to younger clients in this group, who reported higher employment over time.

Conclusions

Overall, the present results were consistent with findings from prior national studies which suggest that better treatment outcomes for outpatient methadone treatment clients are associated both with longer stays in treatment and still being in the program during follow-up. The current study found consistently favorable outcomes including reductions in drug use, HIV/AIDS risk, and reduced criminal behaviors for clients who were maintained on methadone for 12 or more months and for discharged clients who were treated for 3-12 months. For both groups these outcomes were evident during the short follow-up periods (i.e., averaging 6 months) in which they were assessed. In contrast, the discharged clients who received 3-12 months of treatment but had long follow-up periods (i.e., more than 6 months) had no appreciable benefits of treatment in comparison to those who were treated for less than 3 months.

At the policy level, the findings provide support for the expansion of methadone, treatment, the expansion of aftercare services for methadone-treated clients, and the expansion of ancillary services, such as transportation and day care, to support retention in treatment. As to the implications for practice, it was recommended that aftercare plans be developed prior to discharge and that information and referral services be provided to assist discharged clients locate alternative treatment resources. Methodologically, it was suggested that future researchers include a range of follow-up or assessment periods in their designs and that they systematically study the effects of these different follow-up periods. Further research also was proposed at the SDU level to assess the factors that result in increased client retention and better treatment outcomes.

I. INTRODUCTION

Methadone (methadone hydrochloride), a synthetic analgesic, was developed during World War II in Germany as an alternative to morphine for pain relief. Since the mid-1960s, it has been used in the provision of treatment to individuals with heroin and other opiate addiction. The National Drug and Alcoholism Treatment Unit Survey (NDATUS) reported that there were about 100,000 clients receiving outpatient methadone treatment in 1991 (Substance Abuse and Mental Health Services Administration, 1993) in the United States, accounting for about half of all patients in methadone treatment worldwide (Lowinson, Marion, Joseph, & Dole, 1992). A more recent publication (Yarmolinsky & Retig, 1997) puts the number of U.S. clients receiving Outpatient methadone treatment at 115,000.

This report highlights the results of a detailed analysis of data from the National Treatment Improvement Enhancement Study (NTIES) with respect to clients receiving outpatient methadone treatment. The NTIES data were initially published by the National Opinion Research Corporation (NORC, 1997). A summary of the NTIES study design is presented in the Appendix to this report. The purpose of the present study is to assess the outcomes of outpatient methadone treatment for these NTIES clients.

1. BACKGROUND

This section provides background information on outpatient methadone treatment, followed by general information on NTIES and more detailed information about NORC's analysis of the outpatient methadone treatment clients in NTIES. The potential uses of methadone as a drug treatment therapy were discovered serendipitously by Dole and Nyswander (1965) when they noted methadone's utility for stabilizing the clinical status of six long-term users of heroin in helping the patients to function normally with no mood swings. In sufficient dosages, methadone was observed to block "the narcotic effects of normal street doses of short-acting narcotics" (Lowinson, Payte, Salsitz, Joseph, Marion, & Dole, 1997) and to reduce cravings.

Methadone is utilized for short-term and long-term detoxification¹, as well as for maintenance therapy. The goal of maintenance is to have individuals who are addicted to opiates

¹ Technically, a patient is not detoxified from opioids; that is, poisons are not removed from the patient's body. Withdrawal symptoms are the results of the sudden removal of opioids after the body's habituation to them. Detoxification, in this sense, is the supervised withdrawal from opioids; an opioid replacement, usually methadone, is given to the patient in a dosage sufficient to block the withdrawal symptoms. Then, the dosage is gradually reduced to allow the patient's body to adjust to a narcotic-free state.

remain on methadone for as long as they require it to lead a stable life. In some cases it may be the rest of their lives. The Food and Drug Administration (FDA) defines the length of time for short-term detoxification as up to 30 days; the period for long-term detoxification ranges from more than 30 days but less than 180 days (21 CFR 291.505). The provision of methadone for 180 days or more is defined by the FDA as maintenance. Some programs, which technically are maintenance programs by the FDA's definition, espouse the goal of abstinence and can best be described as very long-term detoxification programs or "methadone-to-abstinence" (MTA) programs.

While the use of methadone for detoxification is well accepted, controversy surrounds the concept of long-term or lifelong maintenance. Szasz (1994), for example, argues that drug abuse treatment is a moral and political problem, not a medical problem. Many treatment professionals and members of the general public object on philosophical grounds to the substitution of a long-acting opioid (methadone) for a short-acting opioid (heroin). According to these critics—so-called "methaphobes"—(Scro, 1995), the use of methadone is only acceptable if there is a clearly specified goal of abstinence. Cushman (198 1) and others (Joseph, 1994; Newman, 1991) discussed these controversies in the attempt to dispel some misconceptions surrounding the use of methadone as a long-term maintenance regimen. Experience shows that long-term heroin addicts who leave methadone treatment have very high rates of relapse within 1 year (e.g., Ball & Ross, 199 1), suggesting that the goal of abstinence may be unattainable for some portion of the addicted population.

Recently, methadone maintenance has been used to reduce the risk of another health problem associated with the injection of opiates—namely, HIV infection (Joseph & Appel, 1993). Novick and colleagues (1990) conducted a long-term study of socially rehabilitated methadone maintenance patients who entered treatment concurrent with the start of the HIV infection epidemic. The authors found that patients who had previously engaged in high-risk practices (needle sharing, use of shooting galleries, sexual contact with other drug abusers) had not developed antibodies to HIV and neither had their spouses nor children, suggesting that methadone maintenance was effective in preventing HIV transmission. As AIDS has been recognized as a public health issue, methadone treatment in conjunction with appropriate ancillary counseling has been recognized as effective. To illustrate this point, Metzger et al. (1993) reported on a prospective study of 152 in-treatment (methadone) and 103 out-of-treatment intravenous opiate users. Subjects were interviewed at baseline and at 6-month intervals for a period of 18 months. HIV seroprevalence at baseline was 12 percent overall, including 10 percent for the methadone maintained and 16 percent for the out-of-treatment group. Follow-up

with HIV-negative subjects over the next 18 months revealed a sixfold difference in the rate of seroconversion between the two groups, with the methadone maintained subjects experiencing the lower rates. Out-of-treatment subjects were injecting drugs, sharing needles, visiting shooting galleries, and practicing unsafe sex at significantly higher rates than in-treatment subjects. Magura, Nwakeze. and Demsky (1998) found a reduction in injection frequency use and needle sharing risk for a sample of opiate-addicted methadone treated cocaine users.

While other types of substance abuse treatment programs are more prevalent nationally including outpatient drug-free and short- and long-term residential programs, data from the National Treatment Improvement Evaluation Study (NTIES), National Opinion Research Corporation (NORC, 1997) indicate that outpatient methadone treatment is the most common treatment modality for persons who are addicted to opiates. An accurate assessment of the outcomes of outpatient methadone treatment for opiate addicts, including the consequences of short and long detoxification versus maintenance, may be especially relevant for CSAT decision-makers in determining policies with respect to these approaches to treatment.

1.1 Overview of the NTIES

NTIES was a congressionally mandated study of the effectiveness of substance abuse treatment services supported by the Center for Substance Abuse Treatment (CSAT). The NTIES project collected longitudinal data from purposive samples of substance abuse treatment clients drawn from treatment programs or service delivery units (SDUs)² that were receiving demonstration grant funding from CSAT. The three locations from which the largest clusters of SDUs were drawn were the metropolitan areas of Philadelphia, Baltimore, and Milwaukee. These locations provided ten or more SDUs each. Other locations with five or more eligible SDUs were Atlanta, Chicago, Albuquerque, Los Angeles, and Seattle. Finally, 13 other sites with two or more SDUs were included. The admission cohort in NTIES consisting of 4,411 clients was drawn from a total of 71 SDUs. Of these SDUs, seven contributed to the outpatient methadone treatment sample of 422 clients.

Conducted from 1993 through 1995, NTIES built upon earlier national, multisite treatment evaluation studies including the Drug Abuse Reporting Program (DARP: 1969-1 973), the Treatment Outcome Prospective Study (TOPS: 1979-1 98 1); the Drug Services Research

² CSAT created the concept of the SDU. An SDU is defined as a single site providing a single treatment modality.

Study (DSRS: 1989-1990) and the Drug Abuse Treatment Outcome Study (DATOS: 1991-1993).

In their NTIES analysis, NORC assessed the changes over time in behavioral outcomes for clients who received comprehensive treatment services. They also described and compared the services that were provided to clients in five different types of substance abuse treatment programs, namely, methadone outpatient, drug-free outpatient, short-term residential, long-term residential, and correctional settings. In assessing individual clients, 4,411 NTIES clients were asked about their drug use, HIV/AIDS risk behaviors, criminal behaviors, and employment/income. NORC assessed these behaviors both 12 months prior to treatment and during a follow-up reference period, which varied from 5 to 12 months.

The purpose of this report is to briefly review and extend NORC's prior analysis of the 422 outpatient methadone treatment clients in NTIES by examining issues that were previously not explored. The next section reviews the methodology employed by NORC in its analysis of these outpatient methadone treatment clients. Subsequently, the NORC findings are compared with those of researchers who employed other national databases and where discrepancies are indicated. Finally, the present analysis is described.

1.2 NORC's Analysis of Outpatient Methadone Treatment Clients in NTIES

In an analysis of the 422 outpatient methadone treatment clients in NTIES, the NORC researchers assessed treatment outcomes between admission and follow-up interviews for two client samples, methadone maintenance (Maintenance) and methadone detoxification (Discharged). Maintenance clients (n=144) had longer stays in treatment (median=16 months), and were still in treatment at the time of their follow-up interviews. Discharged clients (n=278) exited treatment prior to the follow-up interview (median=4.4 months), either because they voluntarily left or were administratively discharged.

Comparisons were made between client-reported drug use and other behaviors in the 12-month, pre-treatment reference period and the same behaviors in the follow-up reference period. The latter period, which varied from 5 to 20 months, was longer for the Discharged clients (median= 10 months) in comparison to the Maintenance clients (median=6 months). These differences were statistically adjusted using regression analysis.

For the most part, NORC reported similar outcomes for the Maintenance and Discharged clients. Significant reductions in the percentages of clients reporting drug use between the pre-treatment and follow-up reference periods were found for both groups on marijuana, cocaine, and heroin use. Similarly, the percentages of clients who reported criminal activity declined for both groups. In contrast, no significant increases over time were found in the percentages of clients reporting job income for either group, whereas significant reductions in the percentage of clients receiving welfare income were found only within the Discharged sample.

1.3 NTIES Findings Compared With Other National Studies

The similarity in outcomes for the Maintenance and Discharged clients in the NORC study is noteworthy. It appears to differ from the finding in prior studies that clients with longer stays in treatment have better outcomes than those with shorter stays. Simpson and Sells (1982, 1990) in their respective 6-year and 12-year follow-up studies of clients participating in DARP, compared treatment outcomes for clients who entered treatment under DARP from 1969- 1972. Included in the sample were opioid-addicted clients who remained in treatment more than or less than 3 months (n=490). For clients with less than 3 months of treatment, no benefits of treatment over time were found, whereas those with more than 3 months of treatment had sustained benefits.

Similar results were reported by Hubbard et al. (1989) for opioid-addicted clients in TOPS and by Hubbard et al. (1997) in DATOS. The findings in each of these studies suggest that the benefits of methadone treatment are demonstrated only after the client has remained in treatment for more than 3 months. Furthermore, in TOPS and DATOS, clients who remained in treatment 12 months or longer and those who were on long-term maintenance had most favorable outcomes.

Using logistic regression to control for individual client characteristics as well as baseline behavior, Hubbard et al. (1989) assessed drug use at follow-up for clients who remained in treatment for 1 - 13 weeks, 14-52 weeks, more than 52+ weeks and discharged, and on long-term maintenance. The odds ratios (ORs) were calculated for post-treatment outcomes in the first year after methadone treatment. The comparison group (OR=1) included clients with less than 1 week of treatment.

A lower OR for regular heroin use was found for the more-than-52-weeks-and-discharged clients relative to the less-than- 1 -week-of-treatment clients. Similarly, the long-term

maintenance group had lower odds of regular heroin use, regular consumption of 5 or more drinks in one sitting, and lower odds of predatory illegal acts.

Employing a similar design, Hubbard et al. (1997) compared clients who remained in methadone treatment 3 to 6 months, more than 6 months (but not in the same program at follow-up), and those still in the program at follow-up, relative to clients who remained in treatment less than 3 months. Clients still in the program at follow-up showed a significantly lower risk of using heroin (at follow-up) compared to the less than 3 months group (OR=.24, $p<.01$). Similarly, the risk of using marijuana at follow-up was lower (relative to the less than 3 months group) for both the more-than-6-months and still-in-the-program groups (OR=.44, $p<.05$ and OR=.49, $p<.05$, respectively).

The present report begins with an assessment of the effect of the length of stay in treatment on outcomes for outpatient methadone treatment clients in NTIES. Outpatient methadone treatment clients with relatively long, intermediate, and short stays in NTIES were assessed. As the follow-up periods employed in each group varied, however, the need for methodological refinements became evident. Whereas NORC adjusted for the latter follow-up differences using regression analysis, the present analysis employed a different approach to adjust for these differences, as described below.

2. PRESENT STUDY

A preliminary analysis of the NORC data for outpatient methadone treatment clients in NTIES is first presented. Subsequently, a description of the research questions and analytic approach employed in the main analysis is provided.

2.1 Preliminary NTIES Analysis

In general, the outpatient methadone treatment Discharged group was divided between the clients who were in treatment less than 3 months and those who were in treatment 3-12 months. Specifically, the 278 Discharged clients were assessed separately according to whether they had stays in treatment shorter than 3 months (<3 Month Stay, $n=95$) or 3 months or longer (3-to-12-Month Stay, $n=183$). Each of these client groups was then compared with the Maintenance clients ($n=144$). Unlike the Maintenance group, which remained in treatment continuously throughout the follow-up period (median stay=16 months), the <3 Month Stay (median=1 month) and 3-to-12-Month Stay groups (median=8 months) exited their treatment

facilities prior to the follow-up period. Clients in each of these groups were then compared with the Maintenance group.

The goal of this preliminary analysis was to identify differences in client outcomes among the three groups. Our prediction was that better treatment outcomes would be associated with longer stays in treatment. Accordingly, the Maintenance group was expected to report the most favorable outcomes (i.e., changes) at follow-up relative to intake, the 3-to-12-Month Stay group the next most favorable outcomes and the <3 Month Stay group the least favorable outcomes.

These predictions were for the most part confirmed. Maintenance clients were most likely to report reductions in drug use, criminal behavior and HIV/AIDS risk behaviors over time, followed by the 3-to-12-Month Stay and <3 Months Stay groups, respectively. However, based on these results, it was not possible to conclude that the differences in outcomes were the result of length of stay, as the groups also differed in the length of their follow-up periods. In particular, the Maintenance clients were assessed over relatively shorter follow-up intervals (median=6 months), in comparison with the 3-to-12-Month Stay (median=8 months) and <3 Month Stay (median=11 months) groups. Accordingly, the findings could just as well be accounted for by the length of the follow-up period instead of the length of stay in treatment. In order to rule out this possibility, in subsequent analyses, the length of stay effect on outcomes was assessed while controlling for the follow-up period differences.

2.2 Research Questions

The analysis was designed to assess the independent effects on treatment outcomes of long versus short stays in treatment, and long versus short follow-up periods. Employing this analytic approach, the following research questions were asked:

- Does a longer stay in treatment yield better outcomes than a shorter stay, including reductions in drug use, HIV risk behaviors, criminal behaviors, and increased employment/income?
- Do the benefits of treatment vanish over time with longer versus shorter follow-up periods?

In order to answer the first question, two analyses were completed. In each of these analyses, the outcomes of treatment were assessed for clients who had relatively longer stays in comparison to

clients who had relatively shorter stays in treatment. The clients in each comparison, however, had similar follow-up periods. First, two groups of clients who had relatively short follow-up periods, i.e., averaging 6 months, were compared. In the first group, Maintenance clients were selected who remained in treatment continuously for more than 12 months (Maintenance/Short Follow-up). In the second group, the clients were discharged from treatment after stays of 3-12 months (3-to-12-Month Stay/Short Follow-Up). In a second comparison, two groups of clients with long follow-up periods, averaging 11 months, were compared. The first group had a 3-to-12-Month Stay in treatment prior to discharge (3-to-12-Month Stay/Long follow-up). and the second remained in treatment less than 3 months (<3-Month Stay/Long follow-up). Thus, the clients in each comparison had similar follow-up periods and different lengths of stay in treatment. The outcomes of treatment, in each case, were expected to reveal the effect of a longer versus shorter stay in treatment, while the length of the follow-up period was controlled. Unfortunately, it was not feasible to include in the analysis either a Maintenance/Long Follow-Up group or a <3-Month Stay/Short Follow-Up group.

The second question, "Do the benefits of treatment vanish with longer versus shorter Follow-Up periods?" was assessed in comparing clients who had similar lengths of stay in treatment, i.e., 3-to-12 months with either longer or shorter Follow-Up periods following discharge, averaging 11 and 6 months, respectively. Given the similar lengths of stay in treatment of the two groups, differences in outcomes were expected to be associated with the differences in the follow-up period. It was hypothesized that the group that had the relatively longer follow-up periods would have worse post-treatment outcomes, as the longer period out of treatment would be associated with higher rates of relapse into drug use.

II. METHODS

This section first reviews the research design including the basis for selecting the four client groups. Next, the approach to data analysis is presented including the statistical and coding procedures employed. Subsequently, the approach used in assessing outcomes and a list of the outcome variables that were employed are presented.

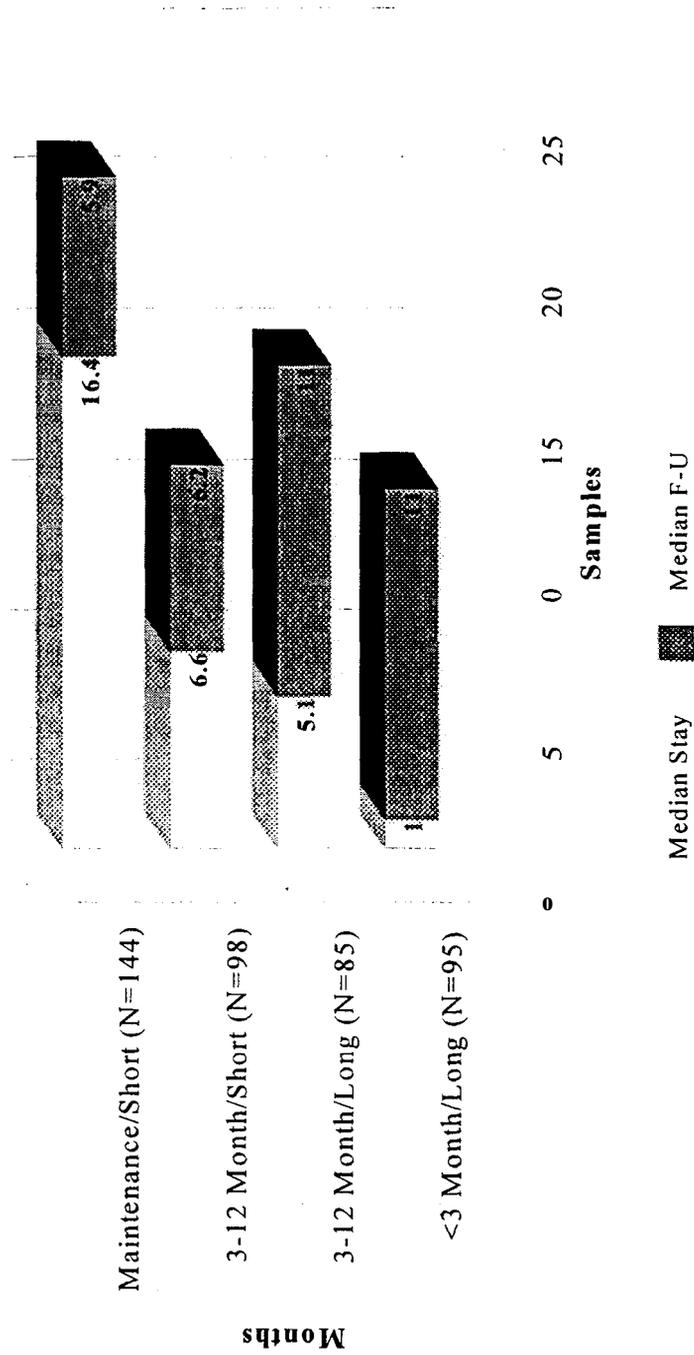
1. RESEARCH DESIGN

Two groups were identified from the NTIES database (N=422 outpatient methadone treatment clients): 144 clients who remained continuously in their treatment programs until the follow-up interview (Maintenance) and 278 who were discharged from their treatment programs (Discharged). The Maintenance clients generally remained in treatment 12 or more months and had relatively short follow-up periods (median 6 months). Accordingly, this group was named Maintenance/Short Follow-Up. The Discharged clients, who generally remained in treatment less than 12 months varied considerably in both their length of stay and their follow-up periods. First, these clients were divided into two groups including those who remained in treatment for 3-to-12 months (n=183) and less than 3 months (n=95) prior to discharge. However, the <3-Month Stay group generally had a relatively long follow-up periods (median 11 months) whereas the group that stayed 3-to- 12 months included clients who had both short and long follow-up periods. Accordingly, in order to match the short and long follow-up periods in the maintenance and <3-Month Stay groups, the 3-to-12-Month Stay group was divided into those clients with short and long follow-up periods, i.e., above and below 9 months, respectively. The first of these 3-to-12-Months Stay groups included clients who had a median follow-up period like the maintenance clients of about 6 months (n=95); the second of these (n=85), like the <3-Month Stay group, 11 months.

These four comparison groups are summarized in Exhibit II- 1, as follows:

- **Maintenance/Short** Follow-Up-Continued in treatment until follow-up (n=144, median stay=1 6.4 months, median number of months assessed at follow-up=6.0)
- **3-to-12-Month Stay/Short** Follow-Up-Discharged from treatment prior to follow-up (n=98, median stay=6.6 months, median follow-up=6.2 months)
- **3-to-12-Month Stay/Long** Follow-Up-Discharged from treatment prior to follow-up (n=85, median stay=5.1 months, median follow-up=1 1 months)
- **<3-Month Stay/Long** Follow-Up--Discharged from treatment prior to follow-up (n=95, median stay=1 month, median follow-up=1 1 months).

**EXHIBIT II-1
NUMBER OF MONTHS IN TREATMENT AND FOLLOW-UP BY SAMPLE**



1.1 Design Limitations

Three major limitations in this design are as follows:

- **Data Completeness.** Unfortunately, because the present study was based on “secondary” data (i.e., originally collected in a prior study), it was not feasible to include a Maintenance/Long Follow-Up group and <3-Month Stay/Short Follow-Up group in the design. In addition to limitations in sample size, the variability in the Maintenance and <3-Month Stay groups with respect to the length of their Follow-Up periods was insufficient for this purpose.
- **SDU Program Variation.** One additional limitation of the present analysis was the fact that the clients in these four groups were unevenly divided within the seven SDUs in which they were served. Whereas each of these seven SDUs treated some clients from each of the four groups, the distribution of these clients varied by group. Thus, the Maintenance/Short Follow-Up clients were over-represented in one SDU, which accounted for 43 percent of this group. The 3-to-12-Month Stay/Short Follow-Up clients were over-represented with 30 percent in a second SDU. Similarly, 30 percent of the 3-to-12-Month Stay/Long Follow-Up clients came from yet a third SDU and 34 percent of the 6-Month Stay/Long Follow-Up clients were drawn from a fourth SDU. These findings suggest that the SDUs varied either in their ability to retain clients in treatment or in their orientations toward maintenance or detoxification. Such differences in orientation may have contributed to the outcomes reported below for each group. Accordingly, for all multivariate analyses described below, the SDU effects due to membership were statistically controlled.
- **Methadone Dosing.** The dosing data for the clients with longer and shorter stays in treatment were available for different time intervals—namely, weekly, monthly, and bi-monthly corresponding to less than 3 months, 3-to-12, and 12 or more months in treatment, respectively. Accordingly, it was not feasible to compare dosing schedules for the different retention groups. Furthermore: as daily dosing information was lacking for any group, it was not feasible to adequately assess dose stabilization, buildup or detoxification schedules for the individual clients. Accordingly, the extent to which dosing contributed to the differences in outcomes found here was not assessed. Nevertheless, the data do suggest the extent to which the dosing standards set forth by CSAT were met by the participating SDUs, as described next.

1.2 Compliance with CSAT Dosing Standards

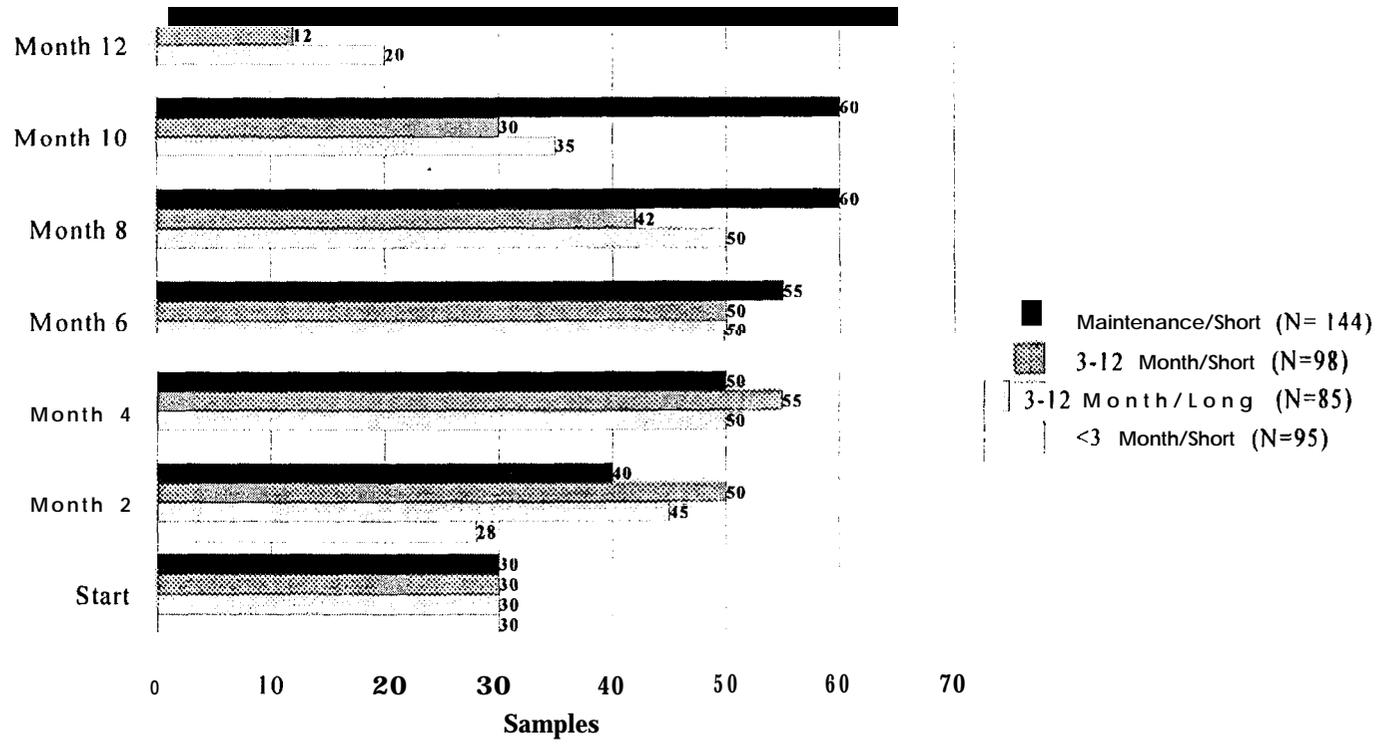
Exhibit II-2 below outlines the CSAT’s recommended dosage for methadone maintenance therapy (Payte & Khuri, 1993).

EXHIBIT II-2		
RECOMMENDED DOSE RANGES OVER THE COURSE OF TREATMENT		
PHASE	PURPOSE	RANGE
Initial dose	Relieve abstinence symptoms	20 to 40 mg
Early induction	Reach tolerance threshold	Initial dose of \pm 5 to 10 mg (every 3 to 24 hours)
Late induction	Establish adequate dose (desired effects)	Initial dose off 5 to 10 mg (every 5 to 10 days)
Maintenance	Maintained desired effects (steady-state occupation opiate receptors)	Usually 80 ± 20 mg (may be <100 mg or >60 mg)

According to Payte and Khuri (1993), treatment sites should provide methadone doses that are enough to produce the desired response in the patient for the desired duration of time with an allowance for a margin of effectiveness and safety. The majority of patients will ultimately fall into a range of effective doses, with the low end of the range being about 50 mg and the high end about 120 mg; for most patients, the effective dose is likely to be about 80 mg, plus or minus 20 mg.

The extent to which these CSAT standards were met in NTIES can be seen in Exhibit II-3, which compares the median methadone dose by month in treatment. Included in the Exhibit II-3 is the median starting dose and the median dose in months 2, 4, 6, 8, 10, and 12 for each of the four groups, respectively, Maintenance/Short Follow-Up, 3-to-12-Month Stay/Short Follow-Up, 3-to-12-Month Stay/Long Follow-Up, and <3-Month Stay/Long Follow-Up. Consistent with these requirements, the median starting dose was the same in all groups—30 milligrams. Except for the Short Detox/Long Follow-Up group, whose doses declined in month 2, the median dose for the remaining groups increased in months 2 and 4. For the Maintenance/Short Follow-Up clients, the methadone dose continued to rise until it stabilized at 60 mg in months 8, 10, and 12, which was also in line with CSAT requirements. The 3-to-12-Month Stay/Short Follow-Up group had a median dose of 50 mg in month 2, 55 mg in month 4 and 50 mg in month 6, which subsequently declined in months 8, 10, and 12, as clients were detoxified out of the program. Similarly, the 3-to-12-Month Stay/Long follow-up clients received a median dose of 45 mg in month 2, which appears to have stabilized at 50 mg in months 4, 6, and 8, only to decline thereafter, as the 3-to-12-Month Stay/Long Follow-Up clients were detoxified out of the program. These dosing patterns show that the Maintenance/Short Follow-Up clients, consistent with their longer stays in treatment, had the highest doses. Similarly, the 3-to-12-Month Stay/Short Follow-Up and 3-to-12-Month Stay/Long Follow-Up clients, consistent with their stays of intermediate length, had moderately high doses and the <3-Month Stay/Long Follow-Up clients, consistent with their shortest stays, had the lowest doses.

**EXHIBIT II-3
MEDIAN METHADONE DOSE BY GROUP AND MONTH IN TREATMENT**



2. DATA ANALYSIS

This section first describes the statistical procedures and variable coding methods employed. This is followed by a discussion of the approach used in assessing outcomes and a list of the outcomes that were assessed.

2.1 Statistical Procedures

Three statistical procedures were used as follows:

- Cochran's Q, a non-parametric statistic, was used to compare changes in behavior over time. This measure was chosen in order to conveniently assess the significance of the changes in the reported drug use and other behaviors between the pre-treatment and follow-up reference periods
- Chi-square was used to assess differences in the percentages of clients demonstrating specific behaviors (e.g., drug use reported in each group within the pre-treatment and follow-up reference periods)
- Logistic regression (LR) was used in order to assess the effects of treatment on specific behaviors during the follow-up reference period while controlling for baseline levels of that behavior in the pre-treatment reference period. Also controlled in the pre-treatment reference period were several individual client characteristics (e.g., age, gender, and education), and as indicated, the seven SDUs from which the clients were selected.

In using LR, two types of analyses were completed: a four-group LR analysis and a two-group LR analysis.

These analyses were designed to assess the odds of each behavior in the follow-up period, while controlling for the baseline level of that behavior in the pre-treatment period. Additionally, various client characteristics at intake were controlled. In the four-group LR analyses, the <3-Month Stay/Long Follow-Up group, which was selected as the reference group, was assigned odds of one. Using the odds ratio (OR) statistics from these analyses, the likelihood of using drugs (e.g., heroin) and engaging in HIV/AIDS risk and criminal behaviors were assessed for each of the remaining groups in comparison to the reference group. In this regard, the Maintenance/Short Follow-Up, 3-to-12-Month Stay/Short Follow-Up, and 3-to-12-Month Stay/Long Follow-Up groups were each compared to the <3-Month Stay/Long Follow-Up group. Subsequently, the two-group LR analyses were completed. First, the Maintenance/Short Follow-

Up clients were compared to the 3-to-12-Month Stay/Short Follow-Up clients, which was employed as the reference group. Second, the 3-to-12-Month Stay/Short Follow-Up clients were compared to the 3-to-12-Month Stay/Long Follow-Up clients. In the first of the latter two analyses, the benefits of a longer stay in treatment were assessed over similar follow-up periods. In the second, the benefits of shorter versus longer follow-up periods were assessed within client groups in treatment for similar periods of time.

2.2 Variable Coding

The variable 'analysis group,' a categorical variable consisting of four 'dummy' variables, represented the four study groups: Maintenance/Short Follow-Up, 3-to-12-Month Stay/Short Follow-Up, 3-to-12-Month Stay/Long Follow-Up, and <3-Month Stay/Long Follow-Up groups. Each 'dummy' variable was coded as '0' when the client did not belong to a given group and '1' when the client was a member of that group. Similarly, in controlling for SDU membership, clients who belonged to a given SDU were coded as '1' for that SDU and '0' for the remaining SDUs in which they did not belong. The characteristics of each client at admission were controlled in these analyses. These variables were dichotomized and coded as '1' for Yes and '2' for No as follows: Gender (male=1), age (>37=1), race (not white=1), marital status (married=1), prior alcohol treatment (Yes=1), prior drug treatment (Yes=1), methadone treatment being the longest prior treatment modality (Yes=1), and having more than one DSM diagnosis in the client record (Yes=1).

The outcome variables in these analyses, such as heroin use were also coded into dichotomous categories for analytic purposes (e.g., '0' representing heroin use [negative outcome], and '1' representing no heroin use [positive outcome]). For example, in comparing the Maintenance/Short Follow-Up group with the <3-Month Stay/Long Follow-Up, or reference group, an $OR > 1$ would mean that the likelihood of no heroin use in the former group was higher relative to reference group. Alternatively, an $OR < 1$, would mean that the likelihood of no heroin use was lower in that group relative to the reference group.

2.3 Assessing Treatment Outcomes

The interview questions employed by the previous authors in assessing clients were based on clients' self-reported behaviors (NORC, 1997). The pre-treatment reference period inquired about the 12 months prior to treatment, whereas the follow-up reference period varied for

individual clients from 5 to 20 months. For the follow-up reference period, interviewers asked about behaviors “since the timesince you left treatment, or since we last spoke with you.”

Whereas the prior authors used regression analysis in order to adjust for these differences in the respective reference periods, in the present analysis such differences were not statistically adjusted, as this would have precluded our ability to compare clients with long and short follow-ups. Instead, in order to assess drug use, HIV/AIDS risk, criminal behaviors, and employment, two strategies were employed. First, in separate analyses, the Maintenance/Short Follow-Up group was compared to the 3-to-12-Month Stay/Short Follow-Up group and the 3-to-12-Month Stay/Long Follow-Up group was compared to the <3-Month Stay/Long Follow-Up group. In the first comparison, both groups had relatively short follow-up periods, and in the second, they each had relatively long follow-up periods. In this way, the length of the follow-up period was controlled in each analysis. Secondly, in addition to assessing behaviors over the entire pre-treatment and follow-up reference period, representative behaviors were also measured over alternative time intervals. For example, cocaine use, crack use, and needle sharing were also assessed over the past 30 days and heroin use was assessed in >20 days of the past 30 of each period. Additionally, under criminal behaviors, the variable court involvement, which was defined as having a current parole and probation status was included along with the criminal behaviors that were previously measured by NORC (1997). These variables, which were measured in the entire follow-up reference period, were arrests for any offense, arrests for drug possession, drug selling and shoplifting. Finally, in measuring employment/income, the variable ‘current employment status’ was included along with the prior measures that were employed by NORC (1997): wage and welfare income over the entire pre-treatment and follow-up reference periods. The consistency of the findings with respect to these measures was assessed, To the extent that the findings hold up over both relatively shorter (e.g., past 30 days) and longer time intervals (e.g., entire follow-up reference period), their reliability would be supported.

2.4 Summary of Outcome Measures

Clients in each treatment group were assessed in the pre-treatment and follow-up periods for the following four types of behavioral outcome measures:

- Drug use:
 - Heroin use in >20 days of the past 30
 - Heroin use in the entire reference period
 - Cocaine use in the past 30 days

- Cocaine use in the entire reference period
- Crack use in the past 30 days
- Crack use in the entire reference period.

- HIV/AIDS risk behaviors:
 - Needle sharing in the past 30 days
 - Needle sharing in the entire reference period.
 - Sex with more than one partner in the entire reference periods.

- Criminal behaviors:
 - Court involved currently
 - Arrested for any offense in the entire reference period
 - Arrested for possession in the entire pre-treatment and follow-up reference period
 - Selling drugs in the entire reference period
 - Shoplifting in the entire reference period.

- Employment/income:
 - Employed currently
 - Wages received in the entire reference period
 - Welfare received in the entire reference period.

III. RESULTS

In this section, the admission characteristics of each of the four client groups (Maintenance/Short Follow-Up, 3-to-12-Month Stay/Short Follow-Up, 3-to-12-Month Stay/Long Follow-Up, and <3-Month Stay/Long Follow-Up) are first presented. These results are shown in Exhibit III-I. The p values in the table are based on Chi-square analysis for comparisons among the four groups. Second, the data pertaining to the two research questions are presented: “Does a longer stay in treatment yield better outcomes, including reductions in drug use, HIV risk behaviors, criminal behaviors, and increased employment/income?“, “Do the benefits of treatment hold up with longer versus shorter follow-up periods?” First, the percentages of clients in each group who reported the behaviors in the pre-treatment and follow-up periods are presented. This is followed by the four-group LR and two-group LR results.

1. GROUP CHARACTERISTICS AT ADMISSION

Exhibit III- 1 shows the percentages of the Maintenance/Short Follow-Up, 3-to-12-Month Stay/Short Follow-Up, 3-to-12-Month Stay/Long Follow-Up, and <3-Month Stay/Long Follow-Up client groups with selected characteristics at admission. The results for gender, education, marital status, race, prior drug treatment, and longest pre-treatment modality were as follows:

- The clients in each group were mostly male (61% to 69%)
- Except for the <3-Month Stay/Long Follow-Up clients (47%), the majority in each group had a high school diploma or GED (56% to 62%)
- The percentages of married clients ranged from 36 percent for the Maintenance/Short Follow-Up group to 23 percent for the 3-to-12-Month Stay/Long Follow-Up group
- The percentage of non-white clients ranged from a low of about 51 percent for the <3-Month Stay/Long Follow-Up clients to a high of 67 percent for the 3-to-12-Month Stay/Long Follow-Up
- The Maintenance/Short Follow-Up group had the highest percentage with prior drug treatment (81%) and the <3-Month Stay/Long Follow-Up group (56%), the lowest percentage (p<.001).

EXHIBIT III-1
PATIENT PRE-TREATMENT CHARACTERISTICS BY TREATMENT STATUS
AND LENGTH OF FOLLOW-UP PERIOD

	Maintenance and Short Follow-Up (MS) %	Long Detox and Short Follow-Up (LDS) %	Long Detox and Long Follow-Up (LDL) %	Short Detox and Short Follow-Up (SDL) %	p
Male	69.4	70.4	61.6	68.4	0.53
HS Diploma/GED	55.9	66	59.5	46.7	0.056
Currently Married	36.1	27.6	22.8	25.3	0.106
Age 38 and over	63.9	62.2	47.1	55.8	0
Non-White	58.3	65.3	67.1	50.5	0.085
Prior Alcohol Treatment	13.9	6.1	27.1	17.9	0.001
Prior Drug Treatment	80.6	73.5	76.5	55.8	0
Methadone - Longest Modality	59	44.6	45.5	28.1	0.002
More than 1 DSM Diagnosis	12.6	11.2	23.3	28.4	0.003

Clients were asked to report the various modalities of treatment they spent time in and the length of time they spent in each. From these responses, the longest prior treatment modality was identified. The percentage of clients who had methadone as their longest prior treatment modality was highest for the Maintenance/Short Follow-Up clients (59%) and lowest for the <3-Month Stay/Long Follow-Up clients (56%) ($p < .002$).

For the remaining characteristics in Exhibit III-1, the Maintenance/Short Follow-Up and 3-to-12-Month Stay/Short Follow-Up clients reported similarly, differing significantly from the 3-to-12-Month Stay/Long Follow-Up and <3-Month Stay/Long Follow-Up, as follows:

- Age. Both the Maintenance/Short Follow-Up and 3-to-12-Month Stay/Short Follow-Up clients had significantly higher percentages who were age 38 and older (62% to 64%) versus (47% to 56%) than the 3-to-12-Month Stay/Long Follow-Up and <3-Month Stay/Long Follow-Up clients, respectively, ($p < .001$)

- **Prior alcohol treatment.** The Maintenance/Short Follow-Up and 3-to-12-Month Stay/Short Follow-Up clients also had smaller percentages with prior alcohol treatment (13.9 and 6.1), versus the 3-to-12-Month Stay/Long Follow-Up and <3-Month Stay/Long Follow-Up clients (27.1 and 17.9), respectively ($p<.002$)
- **DSM III R substance abuse diagnosis.** The Maintenance/Short Follow-Up and 3-to-12-Month Stay/Short Follow-Up clients had lower percentages for the presence of more than one DSM substance abuse diagnosis (12.6 and 11.2) versus the 3-to-12-Month Stay/Long Follow-Up and <3-Month Stay/Long Follow-Up clients (23.3 and 28.4) ($p<.003$), respectively.

2. REPORTED PERCENTAGES IN THE PRE-TREATMENT AND FOLLOW-UP PERIODS

The percentage of clients in each group reporting drug use, HIV risk behaviors, criminal behaviors, and employment/income in the pre-treatment and follow-up periods are presented next.

2.1 Drug Use

In general! higher reductions in heroin use between the pre-treatment and follow-up periods were found for the Maintenance/Short Follow-Up and 3-to-12-Month Stay/Short Follow-Up groups in comparison with the 3-to-12-Month Stay/Long Follow-Up and 6-Month Stay/Long Follow-Up groups, as shown in Exhibit III-2. The results for each of these groups are presented next.

Maintenance/Short Follow-Up

The Maintenance/Short Follow-Up clients had reductions over time in heroin and cocaine use. The reductions in heroin use were found both in assessing behavior in more than 20 days of the past 30 and in the entire reference period. The reductions in cocaine use were found in both the past 30 days and the entire reference period.

Of the Maintenance/Short Follow-Up clients, the percentage reporting use in each period were as follows:

EXHIBIT III-2
PERCENTAGES OF REPORTED DRUG USE AND OTHER BEHAVIORS AT ADMISSION AND FOLLOW-UP BY TREATMENT GROUP

	< 3 MONTH/ SHORT FOLLOW-UP N=95 (SDL)			3-12 MONTH/ LONG FOLLOW-UP N=85 (LDL)			3-12 MONTH/ SHORT FOLLOW-UP N=98 (LDS)			MAINTENANCE/ SHORT FOLLOW-UP N=144 (MS)		
	Pre-Tx	F/U	Q ¹	Pre-Tx	F/U	Q	Pre-Tx	F/U	Q	Pre-Tx	F/U	Q
Drug Use:												
No Heroin-In > 21 days of past 30 ²	67.4	35.8	18***	68.2	31.8	20.4***	68.4	21.4	40.7***	64.6	5.6	81.2***
Used Heroin-Ref. ³	97.9	88.4	6.2*	97.6	81.2	14**	99	66.3	32***	91.3	54.2	50.6***
Used Cocaine-In Past 30 Days	33.7	28.4	0.8	43.5	31.8	3.1	38.8	20.4	12.5***	38.2	15.3	22.2***
Used Cocaine-Ref.	58.9	44.2*	5.8*	58.8	50.6	1.96	62.2	28.6	25.3***	54.2	22.2	40.4***
Used Crack-Past 30 Days	24.2	15.8	0.1	15.5	19	0.5	21.4	10.2	4.8*	12.5	17.4	2.6
Used Crack-Ref.	37.9	31.6	1.2	27.4	25	0.7	31.6	13.3	10.1*	24.3	18.8	2.7
HIV/AIDS Risk:												
Shared Needles-In Past 30 Days	12.6	8.4	0.2	16.5	8.2	2.9	17.3	5.1	10.2*	6.9	2.1	5.4*
Shared Needles-Ref.	24.2	20	0.9	25.9	14.1	5*	27.6	10.2	13.8***	12.5	2.8	12.2***
> 1 Sex Partner-Ref.	36.8	28.4	0.1	36.5	37.6	0	40.8	18.4	14.3***	33.3	13.2	21.6***
Criminal Behavior:												
Court Involved-Currently	30.5	17.9*	5.1*	22.4	12.9	2.7	19.4	5.1	12.2**	21.5	1.4	27.1***
Arrested: Any Offense-Ref.	46.3	34.7	3	31.8	24.7	1.5	33.7	13.3	14.3***	29.2	9	20.5***
Arrested: Drug Possession-Ref.	26.6	17	2.4	14.1	16.5	0.2	13.2	8.2	1.7	9.7	4.2	4*
Selling Drugs-Ref.	71.6	26.3	38.3***	74.1	24.7	33.9***	80.6	16.3	57.5***	76.4	3.5	105***
Shoplifting-Ref.	67.4	34.7	23.4***	64.7	27.1	20.5***	69.1	14.4	51.1***	70.1	11.1	79.4***
Work Support:												
Employed-Currently	12.6	12.6	0	14.1	25.9	5*	19.4	30.6	7.1*	23.6	22.9	0
Wages/Salary-Ref.	21.1	21.1	0	30.6	30.6	0	36.7	29.6	2	31.9	25.7	2.6
Welfare-Ref.	67.4	62.1	1.3	61.2	56.5	0.6	58.2	44.9	5.1*	61.1	54.2	3.6

¹ "Q" refers to the Cochran Q statistic for comparisons between the pre-treatment and follow-up (F/U) data within samples.

² The response categories were 'Yes' and 'No' for all variables.

³ "Ref." refers to the 12 months pre-treatment and 5 to 20 months F/U reference periods.

* p < .05

** p < .01

*** p < .001

-
- Heroin use in more than 20 of the past 30 days was reported by 65 percent in the pre-treatment period, in comparison to only 6 percent in the follow-up period ($p<.001$). Similar results were found for heroin use in the entire reference period
 - Cocaine use in the past 30 days was reported by 38 percent in the pre-treatment period, in comparison to only 15 percent in the follow-up period ($p<.001$). Similar results were found for cocaine use in the entire reference period

The differences between periods in reported crack use for Maintenance/Short Follow-Up clients were not significant.

3-to-12-Month Stay/Short Follow-Up Clients

The 3-to-12-Month Stay/Short Follow-Up clients had pre-post treatment reductions in heroin, cocaine, and crack use. The reductions in heroin use were found both in assessing behavior in more than 20 of the past 30 days and in the entire reference period. Similarly, the reductions in cocaine and crack use between the periods were found both in assessing these behaviors in the past 30 days and in the entire reference period.

Of the 3-to-12-Month Stay/Short Follow-Up clients, the percentages who reported use in each period were as follows:

- Heroin use in more than 20 of the past 30 days was reported by 68 percent in the pre-treatment period, in comparison to only 21 percent in the follow-up period ($p<.001$). Similar results were found for heroin use in the entire reference period.
- Cocaine use in the past 30 days was reported by 39 percent in the pre-treatment period, in comparison to only 32 percent in the follow-up period ($p<.001$). Similar results were found for cocaine use in the entire reference period.
- Crack use in the past 30 days was reported by 21 percent in the pre-treatment period, in comparison with 10 percent in the follow-up period ($p<.05$). Similar results were found for crack use in the entire reference period.

3-to-12-Month Stay-Long Follow-Up Clients

In comparing the results in each period for the 3-to-12-Month Stay/Long Follow-Up clients, significant differences were found for the reported use of heroin only. Of the 3-to-12-Month Stay/Long Follow-Up clients 68 percent and 32 percent reported heroin use in more than

20 of the past 30 days during the pre-treatment and follow-up periods, respectively ($p < .001$). Similar results were found for heroin use in the entire reference period. In contrast, no significant changes in cocaine or crack use were found for the 3-to-12-Month Stay/Long Follow-Up clients either with the past 30 days or the entire reference period measures.

<3-Month Stay/Long Follow-Up Clients

Of the <3-Month Stay/Long Follow-Up clients, reporting heroin use in more than 20 of the past 30 days were 67 percent in the pre-treatment period in comparison with 36 percent in the follow-up period ($p < .001$). Similar results were found in the entire reference period. In contrast, reductions in cocaine use were found in the entire reference period only. The remaining drug use differences for <3-Month Stay/Long Follow-Up clients were not significant.

Next, since significant reductions in heroin use over time were found for each of the four study groups, the groups were further compared for heroin use within each period. Cocaine and crack use were not included in these analyses since the groups differed in their results over time.

Within Period Comparisons

In the pre-treatment period, no significant differences between groups were found in reported heroin use, as similar percentages of clients in each group reported use. In contrast, significant differences in reported use were found between groups in the follow-up period. Such was the case both with the more than 20 of the past 30 days and in the entire reference period measures. For example, the percentage of each group reporting heroin use in more than 20 of the past 30 days during the follow-up period was 6 percent for the Maintenance/Short Follow-Up, 21 percent for the 3-to-12-Month Stay/Short Follow-Up, 32 percent for the 3-to-12-Month Stay/Long Follow-Up, and 36 percent for the <3-Month Stay/Long Follow-Up groups (Chi-square=38.7, $p < .001$, $df=3$). This finding suggests that the reductions in heroin use over time were relatively higher for the Maintenance/Short Follow-Up and 3-to-12-Month Stay/Short Follow-Up clients in comparison to the 3-to-12-Month Stay/Long Follow-Up and <3-Month Stay/Long Follow-Up. Similar results were found for heroin use in the entire reference period.

Summarizing the results in this section, reductions in heroin use between periods were consistently reported in all client groups. Such was the case using more than 20 of the past 30 days or the entire reference period as measures of heroin use. In contrast, only the Maintenance/Short Follow-Up group reported reductions in cocaine use between the periods,

whereas only the 3-to-12-Month Stay/Short Follow-Up group reported reductions in crack use between the periods. No differences between the groups were found in their reported heroin use during the pre-treatment period. Differences in reported heroin use, however, were found in the follow-up period. Specifically, the Maintenance/Short Follow-Up and 3-to-12-Month Stay/Short Follow-Up groups reported less heroin use in the follow-up period than the 3-to-12-Month Stay/Long Follow-Up and 3-to-12-Month Stay/Short Follow-Up clients. These differences suggested that the Maintenance/Short Follow-Up and 3-to-12-Month Stay/Short Follow-Up groups had higher reductions in heroin use between periods in comparison to the 3-to-12-Month Stay/Long Follow-Up and <3-Month Stay/Long Follow-Up.

2.2 HIV/AIDS Risk

Reductions in HIV/AIDS Risk behaviors between the pre-treatment and follow-up periods were highest in the Maintenance/Short Follow-Up and 3-to-12-Month Stay/Short Follow-Up groups. Exhibit III-2 shows the percentages of clients who reported any sharing of needles and drug paraphernalia both in the past 30 days and in the entire pre-treatment and follow-up reference periods, respectively.

Maintenance/Short Follow-Up

Of the Maintenance/Short Follow-Up clients, the findings were as follows:

- Needle sharing in the past 30 days was reported by 7 percent in the pre-treatment period in comparison to 2 percent in the follow-up period ($p<.05$). Similar results were found in the entire reference period.
- Having sex with more than one partner in the entire reference period was reported by 33 percent in the pre-treatment period in comparison to 13 percent in the follow-up period ($p<.001$).

3-to-12-Month Stay/Short Follow-Up

Similar results were found for the 3-to-12-Month Stay/Short Follow-Up clients; the percentages who reported HIV/AIDS risk behaviors were as follows:

- Needle sharing in the past 30 days was reported by 17 percent in the pre-treatment period in comparison to 5 percent in the follow-up period ($p<.05$). Similar results were found in the entire reference period.

- Having sex with more than one partner was reported by 41 percent in the pre-treatment period in comparison with 18 percent in the follow-up period ($p < .001$).

Less consistent results were found for the 3-to-12-Month Stay/Long Follow-Up and <3-Month Stay/Long Follow-Up clients.

3-to-12-Month Stay/Long Follow-Up Clients

Significant differences in reported needle sharing were found during the entire reference period only. Specifically, of the 3-to-12-Month Stay/Long Follow-Up clients reporting needle sharing were 26 percent in the pre-treatment period, in comparison with 14 percent in the follow-up period ($p < .05$). The remaining findings for the 3-to-12-Month Stay/Long Follow-Up clients were not significant.

<3 Month Stay-Long Follow-Up Clients

No significant reductions in any of the reported HIV/AIDS risk behaviors were found between periods for the <3-Month Stay/Long Follow-Up clients.

2.3 Criminal Behavior

The reported reductions in court involvement were highest in the Maintenance/Short Follow-Up and 3-to-12-Month Stay/Short Follow-Up groups. The Maintenance/Short Follow-Up and 3-to-12-Month Stay/Short Follow-Up clients had reductions in reported arrests and all four groups had reductions in reported drug sales and shoplifting. The results for court involvement and arrests are presented next, for each group. After which the results for drug sales and shoplifting will be presented.

Maintenance/Short Follow-Up

These results for the Maintenance/Short Follow-Up clients were as follows:

- Court involvement was reported by 22 percent in the pre-treatment period, in comparison with 1 percent in the follow-up period ($p < .001$)
- Arrests for any criminal offense were reported by 29 percent in the pre-treatment period in comparison to 9 percent in the follow-up period ($p < .001$)

-
- Arrests for drug possession were reported by 10 percent in the pre-treatment period in comparison to 4 percent in the follow-up period ($p<.05$).

Similar results were found for the 3-to-12-Month Stay/Short Follow-Up clients.

3-to-12-Month Stay/Short Follow-Up

Of the 3-to-12-Month Stay/Short Follow-Up clients, the results for court involvement and arrests were as follows:

- Court involvement was reported by 19 percent in the pre-treatment period, versus 5 percent in the follow-up period ($p<.01$)
- Arrests for any criminal offense were reported by 34 percent of clients in the pre-treatment period compared to 13 percent in the follow-up period ($p<.000$).

Finally, arrests for drug possession were reported by 13 percent in the pre-treatment period in compared to 8 percent in the follow-up period (this finding approached significance, $p<.06$).

3-to-12-Month Stay/Long Follow-Up Clients

No significant reductions in court involvement or arrests were found for the 3-to-12-Month Stay/Long Follow-Up clients.

<3-Month Stay/Long Follow-Up Clients

Significant reductions between the pre-treatment and follow-up periods in the percentage of <3-Month Stay/Long Follow-Up clients who reported court involvement, as 30 percent of the <3-Month Stay/Long Follow-Up clients reported court involvement in the pre-treatment period as compared to 18 percent in the follow-up period. On the other hand, no significant differences between periods were found in the percentages of <3-Month Stay/Long Follow-Up clients who reported being arrested.

Drug Sales and Shoplifting

These results are presented separately, as significant reductions between the pre-treatment and follow-up periods in reported drug sales and shoplifting were found in all four groups. These reductions, however, were consistently higher within the Maintenance/Short Follow-Up

and 3-to-12-Month Stay/Short Follow-Up groups in comparison with the 3-to-12-Month Stay/Long Follow-Up and <3-Month Stay/Long Follow-Up groups. More specifically, the clients in each group reported similar baseline levels of these behaviors (i.e., in the pre-admission period) but differed in the reported frequency of these behaviors in the follow-up period. Overall, lower percentages of the Maintenance/Short Follow-Up and 3-to-12-Month Stay/Short Follow-Up clients reported these behaviors in the follow-up period in comparison to the 3-to-12-Month Stay/Long Follow-Up and <3-Month Stay/Long Follow-Up clients. Specifically, the sale of drugs was reported by only 4 percent of the Maintenance/Short Follow-Up clients and 16 percent of the 3-to-12-Month Stay/Short Follow-Up in the follow-up period, in comparison to 25 percent and 26 percent of the 3-to-12-Month Stay/Long Follow-Up and <3-Month Stay/Long Follow-Up clients, respectively, (Chi-square=29.3, [df=3], $p<.001$). Similarly, only 11 percent of the Maintenance/Short Follow-Up clients and 14 percent of the 3-to-12-Month Stay/Short Follow-Up clients reported shoplifting during the follow-up period in comparison to 27 percent and 35 percent of the 3-to-12-Month Stay/Long Follow-Up and <3-Month Stay/Long Follow-Up clients (Chi-Square=24.1, [3], $p<.001$).

2.4 Employment/Income

Increased levels of employment between periods were reported by the 3-to-12-Month Stay/Short Follow-Up and 3-to-12-Month Stay/Long Follow-Up clients only.

3-to-12-Month Stay/Short Follow-Up Clients

Of the 3-to-12-Month Stay/Short Follow-Up clients, 19 percent reported current employment in the pre-treatment period, in comparison to 31 percent in the follow-up period ($p<.05$). Conversely, 58 percent of the 3-to-12-Month Stay/Short Follow-Up clients reported receiving income from welfare in the pre-treatment period in comparison with only 45 percent in the follow-up period ($p<.05$). The results for wage income in the entire reference period were not significant. The results for the 3-to-12-Month Stay/Long Follow-Up clients are presented next.

3-to-12-Month Stay/Long Follow-Up Clients

Of the 3-to-12-Month Stay/Long Follow-Up clients, 14 percent reported current employment in the pre-treatment period in comparison with 26 percent in the follow-up period

($p < .05$). The remaining employment/income variables were not significant for the 3-to-12-Month Stay/Long Follow-Up clients.

2.5 Summary

Summarizing these findings, whereas significant reductions in opiate use were reported by each of the four groups, the Maintenance/Short Follow-Up and 3-to-12-Month Stay/Short Follow-Up clients reported higher reductions in opiate use than the 3-to-12-Month Stay/Long Follow-Up and <3-Month Stay/Long Follow-Up clients. Only the Maintenance/Short Follow-Up and 3-to-12-Month Stay/Short Follow-Up clients had significant reductions over time in cocaine use, needle sharing, sex with more than one partner, arrests for any offense, and arrests for drug possession. Only the 3-to-12-Month Stay/Short Follow-Up clients had reductions between the periods in crack use. Court involvement was reduced over time for the Maintenance/Short Follow-Up, 3-to-12-Month Stay/Short Follow-Up, and <3-Month Stay/Long Follow-Up clients. All 4 groups reported reductions in drug sales and criminal behaviors; however, the Maintenance/Short Follow-Up and 3-to-12-Month Stay/Short Follow-Up clients reported higher reductions in these behaviors when compared to the 3-to-12-Month Stay/Long Follow-Up and <3-Month Stay/Long Follow-Up clients. Employment increased for the 3-to-12-Month Stay/Short Follow-Up and 3-to-12-Month Stay/Short Follow-Up, whereas the Maintenance/Short Follow-Up and <3-Month Stay/Long Follow-Up clients reported no changes in employment between periods. No significant changes were found in the wages/salaries reported between the pre-admission and follow-up reference periods for any group. Significant declines in welfare income were reported by the 3-to-12-Month Stay/Short Follow-Up clients only.

3. LOGISTIC REGRESSION (FOUR-GROUP)

The four-group LR results show consistently favorable results for the Maintenance/Short Follow-Up and 3-to-12-Month Stay/Short Follow-Up clients in comparison with the <3-Month Stay/Long Follow-Up, suggesting that the clients with longer stays in treatment have more favorable outcomes than clients with shorter stays. Exhibit III-3 shows the odds ratios (ORs) for each behavior that was assessed for the Maintenance/Short Follow-Up, 3-to-12-Month Stay/Short Follow-Up, and 3-to-12-Month Stay/Long Follow-Up groups relative to the <3-Month Stay/Long Follow-Up group including drug use, HIV/AIDS risk, criminal behaviors, and work/income, respectively. In all cases, favorable outcomes (e.g., absence of drug use, being employed, not receiving welfare income) were (re)coded as '1' for presence and '0' for absence.

EXHIBIT III-3			
ODDS RATIOS OF DRUG USE AND OTHER BEHAVIORS REPORTED BY 3-12 MONTH/LONG FOLLOW-UP, 3-12 MONTH/SHORT FOLLOW-UP, AND MAINTENANCE/SHORT FOLLOW-UP GROUPS RELATIVE TO <3 MONTH/LONG FOLLOW-UP			
	3-12 MONTH/ LONG FOLLOW-UP OR	3-12 MONTH/ SHORT FOLLOW-UP OR	MAINTENANCE/ SHORT FOLLOW-UP OR
Drug Use¹:			
No Heroin Use-2 1 days of past 30 ²	0.91	1.75	6.67***
No Heroin Use-Ref. ³	1.35	3.12**	5.0***
No Cocaine Use-Past 30 Days	0.98	1.43	1.96
No Cocaine Use-Ref.	0.75	1.96	2.32*
No Crack Use-Past 30 Days	0.66	1.59	0.76
No Crack Use-Ref.	1.54	3.7**	2.63*
HIV/AIDS Risk:			
No Shared Needles-Past 30 Days	1.23	1.33	3.33
No Shared Needles-Ref.	1.64	2.13	7.14**
No >1 Partner Sex	0.75	2.38*	2.94*
Criminality:			
No Court involvement-Currently	1.27	4.35*	12.5***
No Arrests: Any Offense-Ref.	1.67	4.16***	5.88***
No Arrests: Drug Possession-Ref.	0.92	2.38	3.7*
No Drug Sales-Ref.	0.98	2	7.69***
No Shoplifting-Ref.	1.92	3.7**	6.67***
Work Support:			
Employed Currently	3.8*	3.46*	3.1*
Wages/Salary-Ref.	1.58	1.03	1.31
No Welfare-Ref.	1.16	1.61	1.22

Employed Currently and Wages/Salary-Ref. are coded 'Yes'=1, 'No'=0. All others are coded 'Yes'=0, 'No'=1

² OR is the statistically adjusted ratio of responses, e.g., No/Yes in one group relative to a ratio of 1 in the reference group.

³ Ref. refers to the entire Follow-Up reference period, i.e., 12 months pre-admission and 5- 12 months at Follow-Up.

* p < .05

** p < .01

*** p < .001

Accordingly, an $OR > 1$ indicates a higher likelihood of a favorable result relative to <3-Month Stay/Long Follow-Up. Alternatively, an $OR < 1$ indicates a lower odds of its occurrence in comparison to the latter reference group. Also noted in Exhibit III-3 are the significance levels of these OR statistics.

3.1 Drug Use

Maintenance/Short Follow-Up

The Maintenance/Short Follow-Up clients relative to the <3-Month Stay/Long Follow-Up were more likely to report no heroin use in more than 20 of the past 30 days, no heroin use in the entire follow-up reference period, no cocaine use in the entire follow-up reference period, and no crack use in the entire follow-up reference period. These results were as follows:

The Maintenance/Short Follow-Up clients in comparison to the <3-Month Stay/Long Follow-Up clients were:

- Seven times more likely to report no heroin use in more than 20 of the past 30 days ($OR=6.7$, $p<.001$). These results corresponded to a 41 percent higher reduction for the Maintenance/Short Follow-Up clients in the reported heroin use between the pre-treatment and follow-up reference periods than the <3-Month Stay/Long Follow-Up clients (see Exhibit 5).
- Five times more likely to report no heroin use in the entire follow-up reference period ($OR=5$, $p<.001$).
- Two times more likely to report no cocaine use in the entire follow-up reference period ($OR=2.3$, $p<.05$).

Similarly, the Maintenance/Short Follow-Up clients relative to the <3-Month Stay/Long Follow-Up were 3 times more likely to report no crack use in the entire follow-up reference period ($OR=2.6$, $p<.05$).

3-to-12-Month Stay/Short Follow-Up

The 3-to-12-Month Stay/Short Follow-Up clients in comparison with the <3-Month Stay/Long Follow-Up were significantly more likely to report no heroin use in the entire follow-up reference period and no crack use in the entire follow-up reference period. The 3-to-12-Month Stay/Short Follow-Up relative to the <3-Month Stay/Long Follow-Up clients were:

- Three times more likely to report no heroin use in the entire follow-up reference period (OR=3.1, $p<.01$). Consistent with these results, the 3-to-12-Month Stay/Short Follow-Up clients reported an 87 percent higher reduction for heroin use in the entire Follow-Up reference period as compared with the <3-Month Stay/Long Follow-Up clients (see Exhibit 111-2).
- Four times more likely to report no crack use in the entire follow-up reference period (OR=3.7, $p<.01$). This finding corresponded with a 71 percent higher reported reduction in crack use by the 3-to-12-Month Stay/Short Follow-Up clients in comparison with the reported reduction in crack use by the <3-Month Stay/Long Follow-Up clients (see Exhibit III-2).

3-to-12-Month Stay/Long Follow-Up

In contrast, the 3-to-12-Month Stay/Long Follow-Up group did not differ significantly from the <3 Month Stay-Long Follow-Up in the likelihood for reporting no heroin, cocaine, or crack use.

3.2 HIV/AIDS Risk

Maintenance/Short Follow-Up

The odds of HIV/AIDS risk behaviors in the entire follow-up reference period were consistently lower for the Maintenance/Short Follow-Up clients relative to the <3-Month Stay/Long Follow-Up. The Maintenance/Short Follow-Up clients in comparison with the <3-Month Stay/Long Follow-Up were:

- Seven times more likely to report no needle sharing in the entire follow-up reference period (OR=7.1, $p<.01$). Consistent with these results, the Maintenance/Short Follow-Up clients reported a 78 percent decrease in needle sharing between the pre-treatment and follow-up reference periods as compared with a 17 percent reduction between the same periods for the <3-Month Stay/Long Follow-Up clients; a ratio of 4 to 1.
- Three times more likely to report no sex with more than one partner in the entire follow-up reference period (OR=2.9, $p<.05$). Similarly, the Maintenance/Short Follow-Up clients reported a 60 percent decrease in the percentages of clients who reported 'having sex with more than one partner' in comparison with 23 percent for the <3-Month Stay/Long Follow-Up clients; approximately 3 to 1.

3-to-12-Month Stay/Short Follow-Up

The 3-to-12-Month Stay/Short Follow-Up clients in comparison to the <3 Month Stay/Long Follow-Up:

- Did not differ significantly in their likelihood of reporting needle sharing, either in the past 30 days or the entire follow-up reference period
- Were 2 times more likely to report having no sex with more than one partner in the entire follow-up reference period (OR=2.4, $p<.05$). Corresponding to these results, Exhibit III-2 shows a higher reduction in this behavior for the 3-to-12-Month Stay/Short Follow-Up clients relative to the <3-Month Stay/Long Follow-Up, 54 percent versus 23 percent; a 2 to 1 ratio, respectively.

3-to-12-Month Stay-Long Follow-Up Clients

No significant differences were found in the likelihood of these HIV/AIDS risk behaviors for the 3-to-12-Month Stay/Long Follow-Up clients in comparison to the <3-Month Stay/Long Follow-Up.

3.3 Criminal Behaviors

Maintenance/Short Follow-Up Clients

The Maintenance/Short Follow-Up clients (relative to the <3-Month Stay/Long Follow-Up clients) were consistently less likely to report the absence of criminal behaviors including court involvement, arrests for any offense, arrests for drug possession, the sale of drugs, and

shoplifting. The Maintenance/Short Follow-Up clients in comparison with the <3-Month Stay/Long Follow-Up clients were:

- 12 times more likely to report no court involvement as of the follow-up interview (OR=12.5, P<.01)
- Approximately 6 times more likely to report no arrests for any offense in the entire follow-up reference period (OR=.5.9, p<.001)
- About 4 times more likely to report no arrests for drug possession in the in the entire follow-up reference period (OR=3.7, p<.05)
- Almost 8 times more likely to report no drug sales in the entire follow-up reference period (OR=7.7., p<.001).

Finally, the Maintenance/Short Follow-Up clients in comparison to the <3-Month Stay/Long Follow-Up were about 7 times more likely to report no shoplifting in the entire follow-up reference period (OR=6.7, p<.001).

3-to-12-Month Stay/Short Follow-Up

The corresponding odds for the 3-to-12-Month Stay/Short Follow-Up clients relative to the <3-Month Stay/Long Follow-Up clients for these behaviors were as follows:

- The 3-to-12-Month Stay/Short Follow-Up group relative to the <3-Month Stay/Long Follow-Up were 4 times more likely to report:
 - No court involvement as of the Follow-Up interview (OR=4.4, p<.01)
 - No arrests for any offense for any offense in the entire follow-up reference period (OR=4.2, p<.001).

Finally, the 3-to-12-Month Stay/Short Follow-Up clients relative to the <3-Month Stay/Long Follow-Up clients were almost 4 times more likely to report no shoplifting in the entire follow-up reference period (OR=3.7, p<.01).

3-to-12-Month Stay/Long Follow-Up

In contrast, none of the results in Exhibit III-3 for the 3-to-12-Month Stay/Long Follow-Up clients relative to the <3-Month Stay/Long Follow-Up were significant.

3.4 Employment/Income

Maintenance/Short Follow-Up, 3-to-12-Month Stay/Short Follow-Up, and 3-to-12-Month Stay/Long Follow-Up clients were each 3 to 4 times more likely to report current employment as of the follow-up interview in comparison with the <3-Month Stay/Long Follow-Up clients. In contrast, no differences were found in the likelihood of reporting wages/salaries in the reference period or welfare income in the reference period in comparison to the <3 Month Stay/Long Follow-Up clients.

Maintenance/Short Follow-Up

The Maintenance/Short Follow-Up clients in comparison with the <3-Month Stay/Long Follow-Up clients were 3 times more likely to report current employment as of the follow-up interview (OR=3.1, $p<.05$). While a higher percentage of Maintenance/Short Follow-Up clients who were employed in the follow-up period (23%) in comparison to the <3-Month Stay/Long Follow-Up clients (13%) (See Exhibit III-2). The percentage of Maintenance/Short Follow-Up clients who reported current employment was essentially the same in the pre-treatment and follow-up periods. This negative result can partly be explained by the fact that in the LR analysis that controlled for client characteristics, both gender and age were significantly associated with the likelihood of current employment. Specifically, females and clients age 38 and over (age 38+) each were each less likely to be currently employed in comparison with males and clients below age 38, respectively. As reported earlier, both the Maintenance/Short Follow-Up and 3-to-12-Month Stay/Short Follow-Up groups had higher percentages of age 38+ clients in comparison to the 3-to-12-Month Stay/Long Follow-Up and <3-Month Stay/Long Follow-Up. When the age variable was adjusted in the LR analysis, it was reported that the Maintenance/Short Follow-Up clients were 3 times more likely to report current employment in comparison to the <3-Month Stay/Long Follow-Up clients. The effect of client age on current employment for Maintenance/Short Follow-Up clients can be clearly seen in a separate analysis of current employment for the Maintenance/Short Follow-Up clients below age 38 ($n=52$) and the clients who were aged 38+ ($n=92$). Of the Maintenance/Short Follow-Up clients below age 38, 21.2 percent reported current employment in the pre-treatment in comparison to 30.2 percent in the

follow-up period (Chi-square=17, 1 df, $p<.001$). Conversely, of those aged 38+, the corresponding results were 25.3 percent in the pre-admission and 18.7 percent follow-up period, respectively (Chi-square=29, 1 df, $p<.001$).

3-to-12-Month Stay/Short Follow-Up Clients

The 3-to-12-Month Stay/Short Follow-Up clients relative to the <3-Month Stay/Long Follow-Up were also 3 times more likely to report current employment at follow-up (OR=3.5, $p<.05$). Consistent with these findings, the 3-to-12-Month Stay/Short Follow-Up clients reported higher percentage increases in current employment, (i.e., by 5.8 percent) between the pre-treatment and follow-up reference periods, in comparison with the <3-Month Stay/Long Follow-Up clients (see Exhibit III-2).

3-to-12-Month Stay/Long Follow-Up Clients

The 3-to-12-Month Stay/Long Follow-Up clients relative to the <3-Month Stay/Long Follow-Up were almost 4 times more likely to report current employment at follow-up (OR=3.8, $p<.05$). Again, these results were consistent with the percentage changes in Exhibit 111-2. In comparison with to the <3-Month Stay/Long Follow-Up, current employment for the 3-to-12-Month Stay/Long Follow-Up clients increased by 88 percent between the pre-treatment and follow-up periods.

3.5 Summary

Summarizing the findings of this section, the answer to the first research question, “Are longer stays in treatment associated with better outcomes?” was affirmative, as follows. In comparing the Maintenance/Short Follow-Up clients with the <3-Month Stay/Long Follow-Up clients, the Maintenance/Short Follow-Up clients were less likely to use heroin, cocaine, or crack; share needles; have sex with more than one partner; be court involved; be arrested for any offense or drug possession; or sell drugs or shoplift and were more likely to be employed currently. Similarly, in comparing the 3-to-12-Month Stay/Short Follow-Up clients with the <3-Month Stay/Long Follow-Up clients, the 3-to-12-Month Stay/Short Follow-Up clients were less likely to use heroin or crack, have sex with more than one partner, be court involved, be arrested for any offense, or shoplift, and were more likely to be employed currently. In contrast, the 3-to-12-Month Stay/Long Follow-Up clients in comparison with the <3-Month Stay/Long Follow-Up

were more likely to report current employment. Otherwise, no outcome differences were found between these groups.

The fact that the Maintenance/Short Follow-Up and 3-to-12-Month Stay/Short Follow-Up clients had more favorable outcomes in comparison to the <3-Month Stay/Long Follow-Up clients is consistent with the hypothesis that stays in treatment of more than 3 months are associated with more favorable outcomes than stays of fewer than 3 months. Moreover, the Maintenance/Short Follow-Up clients in comparison to the <3-Month Stay/Long Follow-Up clients had more consistently favorable outcomes than remaining groups. For example, Maintenance/Short Follow-Up clients in comparison to the reference group were more likely to report no heroin use in more than 20 of the past 30 days, 'no needle sharing in the entire follow-up reference period,' 'no arrests for drug possession in the entire reference period,' and 'no drug sales in the entire reference period.' These findings suggest that the Maintenance clients who had 12 or more months in outpatient methadone treatment and continuously remained in treatment until follow-up have more favorable outcomes than clients who were discharged from outpatient methadone treatment with less than a 3-month stay in treatment. They further suggest that outcomes for Maintenance/Short Follow-Up clients may be more favorable than clients with a 3-to-12-Month Stay in treatment prior to discharge. This possibility was further explored in the next section, in a direct comparison of the Maintenance/Short Follow-Up group with the 3-to-12-Month Stay/Short Follow-Up group.

Interestingly, the 3-to-12-Month Stay/Short Follow-Up clients were less likely to report heroin and crack use, sex with more than one partner, court involvement, arrests for any offense, and shoplifting in comparison to the <3-Month Stay/Long Follow-Up group. In contrast, the 3-to-12-Month Stay/Long Follow-Up clients reported no significant differences in these behaviors. One factor that may account for these findings is the fact that the 3-to-12-Month/Short Follow-Up group had a median follow-up period of 6 months in comparison to 11 months in the latter group. Therefore, given their longer duration of time out of treatment, the 3-to-12-Month Stay/Long Follow-Up clients were more likely to relapse into drug use, engage in HIV/AIDS risk and criminal behaviors than the 3-to-12-Month Stay/Short Follow-Up clients. Accordingly, the benefits of 3-12 months of treatment may be expected to last for a relatively short period of time only (e.g., 6 months) and then vanish. On the other hand, since the two groups also differed in their median length of stay in treatment (i.e., 6.6 versus 5.1 months) this possibility was further assessed, while controlling for length of stay. For this purpose, a two-group LR analysis was completed, in which the 3-to-12-Month Stay/Short Follow-Up and 3-to-12-Month Stay/Long

Follow-Up clients were directly compared. This analysis is presented below, following the Maintenance/Short Follow-Up and 3-to-12-Month Stay/Short Follow-Up client comparison.

All three groups were significantly more likely to report current employment in comparison with the <3-Month Stay/Long Follow-Up clients. Whereas the 3-to-12-Month Stay/Short Follow-Up and 3-to-12-Month Stay/Long Follow-Up each reported significant increases in the percentages of clients with current employment between the pre-treatment, the Maintenance/Short Follow-Up clients reported no differences over time in the percentages who were currently employed in each period. This discrepancy was explained by the fact that the Maintenance/Short Follow-Up group had a relatively higher percentage of clients aged 38+ than the <3-Month Stay/Long Follow-Up group. Furthermore, while the clients in this group who were below age 38 reported an increase in current employment over time, the age 38+ clients reported a decrease. On the other hand, when this factor was controlled in the LR analysis, all three groups including the Maintenance/Short Follow-Up clients were more likely to report current employment in comparison to the <3-Month Stay/Long Follow-Up clients. None of the latter three groups, however, differed significantly in comparison to the reference group in the likelihood of reporting wages/salary in the entire follow-up reference period. This apparent discrepancy may be accounted for by the fact that most clients were limited in their opportunities to receive wages/salary in the follow-up reference period in comparison to the relatively longer pre-admission reference period. In assessing current employment, on the other hand, comparable periods were employed.

The two-group LR results are presented next to first assess the effect on outcomes of more than 12 months versus 3-to-12-Month Stays in treatment and second, for the 3-to-12-Month Stayers, the effect on outcomes of long versus short follow-up periods.

4. LOGISTIC REGRESSION (TWO-GROUP): LONG VERSUS SHORT STAYS IN OUTPATIENT METHADONE TREATMENT

The four-group LR analysis results appeared to support the hypothesis that a longer stay in treatment results in better outcomes. First, in comparison to the <3-Month Stay/Long Follow-Up group, the Maintenance/Short Follow-Up group had more consistently favorable outcomes. Second, the Maintenance/Short Follow-Up group also had more consistently favorable outcomes in these analyses than did either the 3-to-12-Month Stay/Short Follow-Up or the 3-to-12-Month Stay/Long Follow-Up groups. In contrast, the 3-to-12-Month Stay/Long Follow-Up group in most comparisons did not differ significantly from the <3-Month Stay/Long Follow-Up group,

whereas the 3-12 Months Stay/Short Follow-Up group consistently reported better outcomes than the latter group. One explanation for the latter finding is that the 3-to-12-Month Stay/Long Follow-Up clients had a relatively longer follow-up period in comparison to the 3-to-12-Month Stay/Short Follow-Up clients. In the present section both of these possibilities were investigated. First, the outcomes of treatment for the Maintenance/Short Follow-Up clients and the 3-to-12-Month Stay/Short Follow-Up clients were directly compared in a series of two-group LR analyses. The odds of each behavior for the Maintenance/Short Follow-Up clients were assessed in comparison to the 3-to-12-Month Stay/Short Follow-Up clients, which was selected as the reference group (odds=1). Second, the treatment outcomes for 3-to-12-Month Stay/Short Follow-Up clients and the 3-to-12-Month Stay/Long Follow-Up clients were directly compared. Controlled in these analyses were the same pre-treatment, demographic, and SDU variables as in the four-group analyses. In addition, in assessing the effects of a short versus a long follow-up period only, the length of a stay in treatment was also controlled.

Exhibit III-4 shows the results of both comparisons. The comparisons between the Maintenance/Short Follow-Up and the 3-to-12 Month/Short Follow-Up groups are described next.

4.1 Drug Use

The Maintenance/Short Follow-Up clients in comparison to the 3-to-12-Month Stay/Short Follow-Up were approximately 4 times more likely to report no heroin use in more than 20 in the past 30 days (OR=3.8, $p<.009$) (See Exhibit 111-4) and almost 2 times more likely to report 'no heroin use in the entire follow-up reference period.' The latter finding approached significance (OR=1.9, $p<.079$). These findings suggest that the Maintenance/Short Follow-Up clients relative to 3-to-12-Month Stay/Short Follow-Up clients were more likely to eliminate heroin use.

In similar comparisons, no significant differences were found between the Maintenance/Short Follow-Up and the 3-to-12-Month Stay/Short Follow-Up groups in the likelihood of reporting cocaine use. In a reversal of the heroin findings, the Maintenance/Short Follow-Up clients relative to the 3-to-12-Month Stay/Short Follow-Up clients were more likely to report crack use in the past 30 days (indicated in Exhibit 111-4) and about 8 times less likely to report no crack use in the past 30 days (OR=.13, $p<.001$).

EXHIBIT III-4				
ODDS RATIOS OF DRUG USE AND OTHER BEHAVIORS REPORTED BY MAINTENANCE/SHORT FOLLOW-UP CLIENTS RELATIVE TO 3-TO-12 MONTH/SHORT FOLLOW-UP, AND 3-TO-12 MONTH/SHORT FOLLOW-UP CLIENTS RELATIVE TO 3-TO-12 MONTH/LONG FOLLOW-UP				
	Maintenance/Short Follow-Up Relative to 3-12 Month/Short Follow-Up		3-12 Month/Short Follow-Up Relative to 3-12 Month/Long Follow-Up	
	OR	p<	OR	p<
Drug Use¹:				
No Heroin Use: 21 of past 30 days ²	3.85	0.009	2.38	0.037
No Heroin Use Heroin-Ref ³	1.89	0.079	3.23	0.008
No Cocaine Use: Past 30 Days	1.45	0.436	1.39	0.488
No Cocaine Use-Ref	1.11	0.952	2.86	0.015
No Crack Use: Past 30 Days	0.13	0.001	2.94	0.067
No Crack Use-Ref.	0.47	0.144	2.63	0.07
HIV/AIDS Risk:				
No Shared Needles: Past 30 Days	N/A	N/A	1.47	0.616
No Shared Needles-Ref.	5.26	0.091	2.08	0.284
No >1 Partner Sex	0.89	0.807	3.12	0.009
Criminality:				
No Court Involvement: Currently	11.11	0.215	6.67	0.018
No Arrests: Any Offense: Ref.	1.45	0.5	2.86	0.034
No Arrests: Drug Possession-Ref.	1.45	0.621	3.57	0.029
No Drug Sales-Ref.	3.22	0.073	2.56	0.043
No Shoplifting-Ref.	1.54	0.418	3.45	0.013
Work/Support:				
Employed Currently	0.98	0.968	1.14	0.78
Wages/Salary-Ref.	1.39	0.422	0.78	0.576
No Welfare-Ref.	0.81	0.582	1.49	0.0479

¹ Employed Currently and Wages/Salary-Ref. are coded "yes"=1 and "no"=0. All others are coded "yes"=0 and "no"= 1.

OR is the statistically adjusted ratio of responses, e.g. No/Yes is one group relative to a ratio of 1 in the reference group.

³ Refers to the entire follow-up reference period, i.e., 12 months pre-admission and 5-12 months at follow-up.

4.2 HIV/AIDS Risk

The Maintenance/Short Follow-Up clients relative to the 3-to-12-Month Stay/Short Follow-Up were 5 times more likely to report 'no needle sharing in the entire reference period.' This finding approached significance (OR=.5.3, $p<.091$). There was insufficient variation to assess 'no needle sharing in the past 30 days,' while the results for no multiple-partner sex were clearly not significant.

4.3 Criminal Behaviors

With respect to criminal behaviors, the Maintenance/Short Follow-Up clients relative to the 3-to-12-Month Stay/Short Follow-Up were approximately 3 times more likely to report 'no selling of drugs in the entire follow-up reference period,' a finding that again approached significance (OR=3.2, $p<.073$). Similar comparisons for the remaining criminal behaviors were clearly not significant.

4.4 Employment/Income

No significant differences between the latter groups were found in the likelihood of reporting current employment, wages/salary in the entire follow-up reference period, or welfare income in the entire follow-up reference period.

4.5 Summary

Summarizing the results in this section, the two-group LR analyses indicated the Maintenance/Short Follow-Up clients relative to the 3-to-12-Month Stay/Short Follow-Up to be more likely to report no heroin use in 20+ of the past 30 days and the entire follow-up reference period. This result was consistent with the hypothesis that a longer stay in treatment is associated with better treatment outcomes. Also consistent with this possibility were findings that approached significance, suggesting the Maintenance/Short Follow-Up clients (relative to the 3-to-12-Month Stay/Short Follow-Up clients) were more likely to report 'no needle sharing in the past 30 days' and 'no drug sales in the entire follow-up reference period.' The fact that the Maintenance/Short Follow-Up clients were more likely to report crack use in the past 30 days in comparison to the 3-to-12-Month Stay/Short Follow-Up clients, on the other hand, was inconsistent with this hypothesis.

5. LOGISTIC REGRESSION (TWO-GROUP): LONG VERSUS SHORT FOLLOW-UP PERIODS

In answer to the second research question, the prior four-group analyses showed that the 3-12 Month Stay/Short Follow-Up clients had favorable outcomes in comparison to the <3 Month Stay/Long Follow-Up clients with respect to drug use, HIV/AIDS risk behavior, criminal behaviors, and employment. With the exception of employment, the 3-to-12-Month Stay/Long Follow-Up clients, on the other hand, had no favorable outcomes in comparison with the <3-Month Stay/Long Follow-Up. Taken together, preliminary evidence was found suggesting that 3-12 months of methadone treatment result in favorable outcomes when compared to less than 3 months in treatment. These treatment benefits, however, may persist during relatively short follow-up periods only. Consistent with this possibility, the 3-to-12-Month Stay/Short Follow-Up group that was assessed over a relatively short follow-up period (6 months) had favorable outcomes with respect to drug use, HIV/AIDS risk, and criminal behaviors. Conversely, the 3-to-12-Month Stay/Long Follow-Up, which was assessed over a relatively long follow-up, had unfavorable outcomes with respect to these behaviors. This interpretation is consistent with prior studies suggesting that clients who remain out of treatment are likely to relapse into drug use following discharge (Ball & Ross, 1991). The present findings further suggest that clients are more likely to relapse into drug use the longer that they remain out of treatment. An alternative explanation is that these results were accounted for by differences between the groups in length of stay. Since the 3-to-12-Month Stay/Short Follow-Up group had a relatively longer stay in treatment in comparison with the 3-to-12-Month Stay/Long Follow-Up group (median=6.6 versus 5.1 months), however, this difference needs to be controlled. In further two-group LR analyses, the 3-to-12-Month Stay/Short Follow-Up and 3-to-12-Month Stay/Long Follow-Up groups were directly compared with respect to these behaviors, while controlling for length of stay in addition to the remaining variables that were previously controlled. These variables included (1) the baseline status of the behavior being assessed, (2) the client characteristics that were identified earlier in Exhibit III-1, and (3) the client's SDU membership. Exhibit III-4 shows the results of these analyses next for drug use, HIV/AIDS Risk behaviors, criminal behaviors, and employment/income.

5.1 Drug Use

The 3-to-12-Month Stay/Short Follow-Up clients with relatively shorter follow-up periods in comparison to the 3-to-12-Month Stay/Long Follow-Up clients were more likely to report no use of heroin, cocaine, or crack. Specifically, the 3-to-12-Month Stay/Short Follow-Up clients in comparison with the 3-to-12-Month Stay/Long Follow-Up were:

- Three times more likely to report no heroin use in more than 20 of the past 30 days (OR=2.4, $p<.037$) and 3 times more likely to report no heroin use in the entire follow-up reference period (OR=3.2, $p<.008$)
- Three times more likely to report no cocaine use in the entire reference period (OR=2.9, $p<.015$)
- Three times more likely to report no crack use in the past 30 days (OR=2.9, $p<.067$) and 3 times more likely to report no crack use in the entire follow-up reference period (OR=2.6, $p<.07$)

5.2 HIV/AIDS Risk Behaviors

The 3-to-12-Month Stay/Short Follow-Up clients relative to the 3-to-12-Month Stay/Long Follow-Up did not differ significantly in their likelihood of needle sharing either in the past 30 days or entire reference period. The 3-to-12-Month Stay/Short Follow-Up clients in comparison with the 3-to-12-Month Stay/Long Follow-Up, however, were about 3 times more likely to report no multiple-partner sex in the entire follow-up reference period (OR=3.1, $p<.009$).

5.3 Criminal Behaviors

The 3-to-12-Month Stay/Short Follow-Up clients in comparison with the 3-to-12-Month Stay/Long Follow-Up were:

- Eleven times more likely to report no court involvement as of the follow-up interview (OR=6.7, $p<.018$)
- Two times more likely to report no arrests for any offense in the entire follow-up reference period (OR=2.9, $p<.034$)
- Four times more likely to report no arrests for drug possession in the entire follow-up reference period (OR=3.6, $p<.029$)

- Three times more likely to report no drug sales in the entire follow-up reference period (OR=2.6, $p<.043$).

Finally, the 3-to-12-Month Stay/Short Follow-Up clients in comparison to the 3-to-12-Month Stay/Long Follow-Up were 3 times more likely to report no shoplifting in the entire follow-up reference period (OR=3.4, $p<.013$).

5.4 Employment/Income

The 3-to-12-Month Stay/Short Follow-Up group did not differ from the 3-to-12-Month Stay/Long Follow-Up group in their likelihood of reporting current employment, wages/salary in the entire reference period, or welfare income in the entire reference period.

5.5 Summary

Summarizing the results in this section, the present two-group LR analyses, which directly compared the 3-to-12-Month Stay/Short Follow-Up and 3-to-12-Month Stay/Long Follow-Up clients, were for the most part consistent with the prior four-group LR analysis, in which these groups were each compared to the <3-Month Stay/Long Follow-Up group. Consistently more favorable outcomes were found in each case for the 3-to-12-Month Stay/Short Follow-Up clients. Furthermore, the present analysis found a number of significant (near significant) results that were previously not obtained. Thus, the 3-to-12-Month Stay/Short Follow-Up group in comparison to the 3-to-12-Month Stay/Long Follow-Up' group, in the present analysis only, were more likely to report no heroin use in more than 20 of the past 30 days, no cocaine use in the entire follow-up reference period, no crack use in the past 30 days, no crack use in the entire follow-up reference period, no arrests for drug possession in the entire follow-up reference period, and no drug sales in the entire reference period. In both analyses, the 3-to-12-Month Stay/Short Follow-Up were more likely to report, in comparison to the respective reference groups, no heroin use in the entire follow-up reference period, no >1 partner sex in the entire reference period, no current court involvement, no arrests for any offense in the entire reference period, and no shoplifting in the entire reference period. Taken together, these findings suggest that clients who remain in treatment for 3-to-12 months and have relatively shorter follow-up periods are likely to have more favorable outcomes than those with similar lengths of stay in treatment but who have relatively longer follow-up periods. They further suggest that clients with less than 12 months of methadone treatment should be encouraged to remain in treatment for longer periods of time prior to discharge. Otherwise, the early benefits of treatment will be lost.

IV. SUMMARY AND CONCLUSIONS

This chapter summarizes the research questions and findings and identifies implications for policy, practice, and further research. Conclusions are presented at the end of this chapter.

1. RESEARCH QUESTION ONE-FINDINGS

The first research question was about whether a longer stay in methadone treatment was associated with better treatment outcomes. This question was answered affirmatively in the LR analysis. In comparing the remaining three groups to the reference group (<3-Month Stay/Long Follow-Up) the Maintenance/Short Follow-Up, and the 3-to-12-Month Stay/Short Follow-Up were consistently more likely to report no drug use, no HIV/AIDS risk behaviors, and no criminal behaviors. In contrast, the 3-to-12-Month Stay/Long Follow-Up group did not differ significantly from the reference group in their likelihood of reporting these behaviors. Specifically, the Maintenance/ Short Follow-Up group, in comparison to the reference group for the period more than 20 of the past 30 days, was 7 times more likely to report no heroin use. The Maintenance/ Short Follow-Up group, in comparison to the reference group for the entire follow-up reference period, was also 2 times more likely to report no cocaine use, 5 times more likely to report no needle sharing, and 7 times more likely to report no selling behavior.

Similarly, both Maintenance/Short Follow-Up and 3-to-12-Month Stay/Short Follow-Up groups, in comparison to the reference group for the entire follow-up reference period, were 5 and 3 times more likely to report no heroin use, 2 and 4 times more likely to report no crack use, 3 and 2 times more likely to report no sex with more than one partner, 6 and 4 times more likely to report no arrests for any offense, and 6 and 4 times more likely to report no shoplifting, respectively. Finally, in comparison to the reference group as of the follow-up interview, the Maintenance/Short Follow-Up and the 3-to-12-Month Stay/Short Follow-Up groups were 12 and 4 times more likely to report no court involvement, i.e., not being on probation or parole, respectively.

In similar comparisons between the 3-to-12-Month Stay/Long Follow-Up group and the reference group, no differences were found in the likelihood of any of the latter measures of drug use, HIV/AIDS risk, or criminal behaviors. On the other hand, each of the remaining groups in comparison to the reference group, was between 3 and 4 times more likely to report being currently employed. Interestingly, clients who were aged 38 and older in the Maintenance/Short Follow-Up group reported lower employment over time, in contrast to younger clients in this group, who reported higher employment over time.

Further support for the benefits of a longer stay in treatment came from the first of two series of two-group LR analyses comparing the Maintenance/Short Follow-Up group, which was retained in treatment for 12 or more months, to the 3-12 Month/Short Stay group. It was found that the Methadone/Short Follow-Up group was 4 times more likely to report no heroin use during more than 20 of the past 30 days. Similarly, for the entire follow-up reference period, the Maintenance /Short Follow-Up group was 5 times more likely to report no needle sharing and 3 times more likely to report no drugs sales in comparison to the 3-to-12-Month Stay/Short Follow-Up group. In a surprising reversal of this trend, however, the Maintenance/Short Follow-Up group, in comparison to the 3-to-12-Month Stay/Short Follow-Up reference group, was 8 times more likely to report past 30-day crack use.

2. RESEARCH QUESTION TWO-FINDINGS

To answer the second research question, "Do the positive outcomes of treatment for clients with 3-12 months stays persist over short or long follow-up periods?" the 3-to-12-Month Stay/Short Follow-Up and 3-to-12-Month Stay/Long Follow-Up groups were compared. The results suggested that the positive outcomes of treatment persist for short follow-up periods only. First, the four-group LR analyses results showed that for outcomes other than employment, the 3-to-12-Month Stay/Long Follow-Up clients had less favorable results, as the likelihood of drug use, HIV/AIDS risk, and criminal behaviors for these clients were not significantly different from the <3-Month Stay/Long Follow-Up clients. In contrast, these outcomes were consistently more favorable for the 3-to-12-Month Stay/Short Follow-Up clients in comparison to the <3-Month Stay/Long Follow-Up. These findings suggested that there may be early benefits associated with 3-12 months stays in treatment that are evident for clients during relatively short follow-up periods (e.g., 6 months) but not for long follow-up periods.

Generally, clients who are discharged from outpatient methadone treatment have a high probability of relapsing to drug use, and this probability increases with longer stays out of treatment following discharge. Accordingly, the 3-to-12-Month Stay/Short Follow-Up clients who remained out-of-treatment for shorter periods following discharge were less likely to relapse than the 3-to-12-Month Stay/Long Follow-Up clients. Further support for this possibility was found in the two-group LR analyses, comparing the 3-to-12-Month Stay/Short Follow-Up and 3-to-12-Month Stay/Long Follow-Up groups. The former group with a relatively shorter follow-up period had consistently more favorable outcomes. Specifically, the 3-to-12-Month Stay/Short Follow-Up group in comparison to the 3-to-12-Month Stay/Long Follow-Up was 2 and 3 times more likely to report no heroin use in more than 20 of the past 30 days and in the entire follow-up reference

period, respectively. The former group was also 3 times more likely to report no cocaine use in the entire follow-up reference period and no crack use in either the past 30 days or entire follow-up reference period.

Similarly, the short follow-up group in comparison to the long was more likely to report no court involvement as of the follow-up interview and during the entire follow-up reference period, no sex with more than one partner, no arrests either for drug possession or any offense, and no drug sales or shoplifting. These findings provided additional evidence that the benefits of treatment for clients with 3 to 12 months of treatment relative to less than 3 months are significant, but that they may only be sustained following discharge for relatively short periods of time (e.g., 6 months).

3. IMPLICATIONS FOR POLICY AND PRACTICE

The first policy implication of the study findings is that methadone treatment programs may need to be expanded in order to sustain clients in treatment for longer periods of time, while at the same time meeting the needs of new clients who enter treatment. In identifying favorable outcomes that are associated with longer stays in outpatient methadone treatment, these NTIES findings reinforce the results in other national multi-site studies, including DARP (Simpson & Sells, 1982; 1983), TOPS (Hubbard et al., 1989), and DATOS (Hubbard et al. 1997; Simpson, Joe, & Brown, 1997). These studies have consistently found better client outcomes for clients who were retained in treatment for 3 or more months as compared with clients who were retained for shorter periods.

The present findings suggest that methadone treatment is associated with reductions in drug use, the spread of HIV/AIDS, and criminal behaviors. These favorable results were evident for the Maintenance/Short Follow-Up clients with longer stays in treatment and the 3-to-12-Month Stay/Short Follow-Up clients with less time out-of-treatment. The reductions in heroin and powdered cocaine use, which are frequently injected by intravenous drug users, may account for the reductions in needle sharing. In reducing intravenous drug use and needle sharing, methadone treatment helps to fight the spread of HIV/AIDS. These findings are consistent with prior research by Metzger et al. (1993) who found that methadone-maintained clients are likely to have lower HIV conversion rates over time than out-of-treatment clients.

The fact that reductions in court involvement, arrests for any offense, and arrests for drug possession and reported drug sales and shoplifting were associated with longer stays in outpatient methadone treatment suggests that retaining clients for longer periods in methadone treatment may

have substantial cost savings for society. Data from the California Drug and Alcohol Treatment Assessment (CALDATA) found that substance abusers treated in California's public treatment system in 1991 reduced their criminal activity and health utilization during and in the year subsequent to treatment by amounts worth well over \$1.4 billion (Gerstein et al. 1994). These savings included reduced criminal justice expenses (police protection, adjudication, and corrections), reductions in victim losses (stolen and damaged property, injuries, and lost work), and generally lower levels of health care utilization (hospitalizations, emergency room use, and outpatient care). A major finding of this analysis is that treatment-related economic savings outweighed costs by at least 10 to 1 for outpatient and discharged methadone participants. In the current study, the reductions in court involvement criminal behaviors were evident primarily within the groups who remained in treatment longest or had the shortest out-of-treatment stays following discharge, namely, the Maintenance/Short Follow-Up and 3-to-12-Month Stay/Short Follow-Up clients.

An additional policy implication of the study relates to the effectiveness of expanding aftercare services and targeting them at clients who are discharged from methadone treatment within 3-12 months of their admission. The purpose of expanding aftercare services, would be to encourage clients who are discharged from the program to reapply for treatment. While the findings suggest that clients who receive 3-to-12 months of treatment are likely to benefit from this treatment, these benefits, however, are likely to be sustained for only limited periods of time.

The present findings further suggest that prior to discharge, methadone treatment providers should discuss with the client the client's aftercare plans and, where appropriate, refer the client to alternative treatment resources including drug-free and 12-step programs (e.g., NA, CA, and AA). These suggestions are designed to both increase client retention in treatment and to encourage clients who are discharged to reapply for treatment prior to relapsing into drug use. Otherwise, the benefits of treatment will be lost.

The different results for powdered cocaine and crack use have implications for the treatment of cocaine-abusing clients in methadone programs. In comparison with the <3-Month Stay/Long Follow-Up group, both the Maintenance/Short Follow-Up and the 3-12 Month/Short Follow-Up groups were less likely to report crack cocaine use and only the Maintenance/Short Follow-Up group was less likely to report the use of powdered cocaine. Yet, in directly comparing these two groups, the Maintenance/Short Follow-Up clients were more likely to report crack use in comparison with the 3-to-12-Month Stay/Short Follow-Up clients but did not differ significantly from this group in their reported use of powdered cocaine. These results are consistent with prior

research by Grella, Anglin, and Wugalter (1995 and 1997). In the 1995 study, crack smokers differed from non-crack cocaine users in ethnicity, alcohol use, criminal activity, needle use, and marital status. The authors concluded that crack users represent a subgroup “at higher risk and in need of targeted treatment planning and monitoring.” Interestingly, these conclusions were confirmed in the 1997 study, where the use of powder cocaine decreased at follow-up, whereas crack use increased. These findings further suggest the need for better treatment planning and monitoring of crack users in outpatient methadone treatment programs.

The findings with respect to employment suggest the need to reduce the barriers to employment that are associated with outpatient methadone treatment, particularly for women and older clients (i.e., age 38+). Unlike drug use, HIV/AIDS risk, and criminal behavior, which differed by group in comparison to the <3 Month/Long Follow-Up group, the 3 remaining groups were similarly likely to be employed in comparison to the latter group. Additionally, the Maintenance/Short Follow-Up and 3-to-12-Month Stay/Short Follow-Up groups had higher percentages of older clients who were less likely to be currently employed, and the women in all three groups were less likely to be currently employed than the men. These findings suggest the need for the SDUs to work with both older clients (i.e., age 38+) and women in providing needed ancillary services in order to help them find jobs and improve their job skills. Additional barriers to employment that programs need to address in order to achieve better employment include health and transportation problems and for the women, in particular, child care needs.

Another factor that may facilitate both longer retention and increased employment in methadone treatment is the access to and convenience of treatment. Typically, clients in outpatient methadone treatment must visit their programs 6-7 days a week for their methadone and meet with their counselors in regularly scheduled visits. In some states, take-home doses are not permitted and clients must report daily. Unless the outpatient methadone treatment program provides convenient hours for working clients, these requirements can also present a barrier to employment. Previous research by Greenfield, Brady, and Besteman (1997) found that clients in a mobile methadone program who reduced their travel times to and from the clinic were retained in treatment for much longer periods of time than clients in nearby ‘fixed site’ locations, who had longer travel times.

As a means of increasing access to and convenience of treatment, the administration of LAAM, another synthetic analgesic, for opiate treatment should be considered for expansion. Since the early 1990s, LAAM, has gained favor in treatment communities and legal status with the Federal government as an opiate treatment option. The advantage of LAAM over methadone is

that while the therapeutic effects of methadone last for up to 36 hours, the effects of LAAM last for up to 72 hours (McArthur & Goldsberry, 1994). Another benefit of LAAM is its lower overall cost. LAAM's longer action makes it possible for clients to visit the clinic less often (i.e., every 2 to 3 days) without take-home dosages. A recent study comparing the costs of methadone versus LAAM found that LAAM is 2 to 4 times more expensive than methadone, but the costs would be lower since LAAM would be dispensed less often (Capital Consulting Corporation and The Lewin Group, 1996). Based on these findings, LAAM may be expected to achieve reductions in opiate use similar to methadone with less inconvenience to clients.

4. IMPLICATIONS FOR FURTHER RESEARCH

The present study found more favorable treatment outcomes for Maintenance/Short Follow-Up clients who were receiving methadone maintenance and were also retained in treatment for longer periods of time, in comparison to those who were discharged and retained for shorter periods. These favorable results in NTIES for the Maintenance/Short Follow-Up clients, however, were based on relatively short follow-up periods. The present findings with respect to the differences in follow-up periods have both methodological and substantive implications for research. Methodologically, these findings suggest that researchers include a range of follow-up or assessment periods in their designs and that they systematically study the effects of these different periods. Substantively, additional research is needed to determine whether the favorable outcomes that were evident following short periods of time can be sustained for relatively longer periods of time.

Further research is also needed in order to assess the specific treatment components that account for the favorable treatment outcomes for the Maintenance/Short Follow-Up and 3-to-12-Month Stay/Short Follow-Up clients relative to the 3-to-12-Month Stay/Long Follow-Up and <3-Month Stay/Long Follow-Up clients. In this regard, the extensive services data in NTIES need to be explored in order to assess the services that were associated with the more and less favorable treatment outcomes in this study. Prior research on the factors that are associated with longer stays in treatment suggest that factors at SDU level are highly important in determining length of stay (Maddux, Prihoda, & Desmond, 1994; Magura et al., in press; Simpson et al., 1997). Consistent with these studies, the present analysis suggested that the SDUs varied in their success in retaining clients in treatment, as the percentage of Maintenance/Short Follow-Up clients were higher in some of the SDUs than in others. Further research is needed in order to assess the SDU practices that were associated with these retention differences. One factor that has been shown to affect retention in outpatient methadone treatment is the methadone dose, as higher doses are associated

with longer retention (Magura, Nwacheze, & Demsky, 1998). The data on dosing in NTIES were consistent with this possibility. The Maintenance/Short Follow-Up clients who remained in treatment the longest had higher doses, particularly in months 8, 10, and 12 (see Exhibit II-3). On the other hand, no firm conclusions can be reached regarding the dosing effects in NTIES. In order to assess dosing effects, the stable dosing patterns for individual clients would need to be distinguished from the doses they received during detoxification and buildup. This cannot be readily done in NTIES because of the limited dosing data available for most clients.

Also in regard to retention in treatment, the reasons for discharge in NTIES should be examined in order to determine the extent to which the discharged clients voluntarily quit the program or were “pushed out” by staff because of non-compliance issues. Different retention strategies are likely to apply to each of these client groups. To the extent that the SDU maintains a “zero tolerance” policy for drug use while the client is receiving methadone and rapidly pushes out clients who fail to live up to such a rigorous standard, retention in treatment is likely to be poor. In contrast: SDUs that fail to adequately monitor compliance with program rules and reasonable drug use standards are also not likely to be effective. Further research is need to determine the SDU level practices that can improve the effectiveness of methadone treatment.

5. CONCLUSIONS

Overall, the present results were consistent with findings in prior national studies, which suggest that better treatment outcomes for outpatient methadone treatment clients,, are associated with both longer stays in treatment and still being in the program during follow-up. The current study found consistently favorable outcomes including reductions in drug use, HIV/AIDS risk, and reduced criminal behaviors for clients who were maintained on methadone for 12 or more months and discharged clients who were treated for 3 to 12 months. For both groups these outcomes were evident during the short follow-up periods (i.e., averaging 6 months) in which they were assessed. In contrast, the discharged clients who received 3-12 months of treatment but had long follow-up periods (i.e., more than 6 months) had no appreciable benefits of treatment in comparison to those who were treated for less than 3 months. At the policy level, the findings provide support for the expansion of methadone treatment, the expansion of aftercare services for methadone treated clients and the expansion of ancillary services, such as transportation and day care. As to the implications for practice, it was recommended that aftercare plans be developed prior to discharge and information and referral services be provided in order to assist discharged clients locate alternative treatment resources. Finally, the expanded use of LAAM may be indicated, in addition to the closer monitoring of clients’ crack use. Methodologically, it was suggested that researchers

include a range of follow-up or assessment periods in their designs and that they systematically study the effects of these different periods. Substantively, further research was proposed at the SDU level to assess the factors which result in increased client retention and better treatment outcomes.

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

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The National Treatment Improvement Evaluation Study (NTIES) was a national evaluation of the effectiveness of substance abuse treatment services delivered in comprehensive treatment demonstration programs supported by the Center for Substance Abuse Treatment (CSAT). The NTIES project collected longitudinal data between FY 1992 and FY 1995 on a purposive sample of clients in treatment programs receiving demonstration grant funding from CSAT. 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, 1 year apart.

1. THE NTIES DESIGN

The NTIES study design had two levels—an administrative or services component and a clinical treatment outcomes component.

1.1 The Administrative/Services Component

This study 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: (1) facility type (e.g., hospital, etc.); (2) intensity of care (e.g., 24-hour, etc.); and (3) type of service (e.g., outpatient, etc.). An SDU could be a stand-alone treatment provider or it could be one component of a multi-tiered 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. This is one of four instruments developed for administrative data collection

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 3 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 at admission to treatment, when they left treatment, and then at 12 months after the end of treatment. Less than 10 percent of the recruited clients refused or avoided participation, and more than 83 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.

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

2. TREATMENT DEMONSTRATION PROGRAMS

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CSAT initiated three major demonstration programs and made 157 multi-year treatment enhancement awards across 47 states and several territories during 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 programs 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 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.

EXHIBIT 1						
SDUS IN THE OUTCOME ANALYSIS SAMPLE						
Program Title Number of SDUs (% of NTIES Universe) ¹	NTIES Sample	Methadone	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

As shown in Exhibit 2, 59 percent of all NTIES clients were sampled from Target Cities SDUs. Slightly over 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 (3.5%) of the clients in the outcomes analysis sample, and almost 80 percent of these were sampled from Target Cities programs.

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.

EXHIBIT 2					
DISTRIBUTION OF CLIENTS IN THE OUT "OMES ANALYSIS SAMPLE					
Program Title Number of Clients (% of Analysis Sample)	Methadone	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 instruments employed in NTIES.