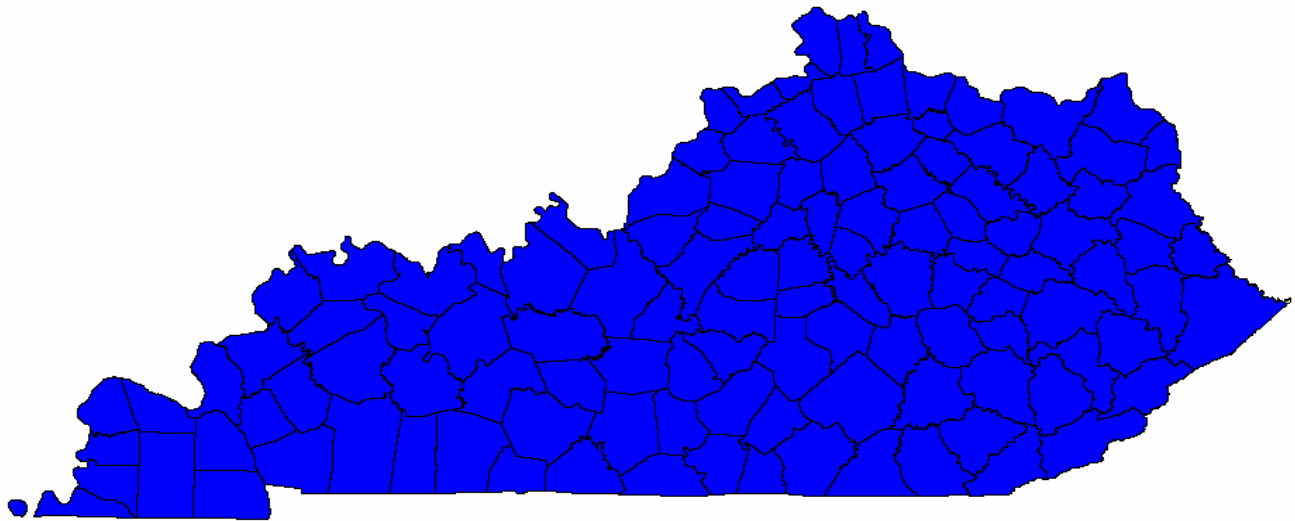


# **Kentucky Substance Abuse Treatment Outcome Study**

## **FY 2002 Follow-up Findings**

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## FOREWORD

The mission of the Kentucky Department of Mental Health and Mental Retardation, Division of Mental Health and Substance Abuse is to provide policy direction, program funding, and program monitoring for substance abuse prevention and treatment programs throughout the Commonwealth. As partial fulfillment of this mission, the Division of Mental Health and Substance Abuse conducts outcome research to determine the effectiveness of state funded substance abuse treatment provided by the 14 state-funded Community Mental Health Centers and their affiliated agencies. The Division contracts with the University of Kentucky Center on Drug and Alcohol Research to conduct this research and to produce reports including the annual **Kentucky Substance Abuse Treatment Outcome Study Follow-up Findings** reports. This Fiscal Year 2002 report presents data on drug and alcohol use, justice system involvement, employment, and mental health complaints collected from substance abuse clients who entered treatment between July 2001 and June 2002. In addition, findings are presented that compare self-reported substance abuse and related behaviors at treatment entry to self-report 12 months after treatment.

The findings in the FY 2002 study suggest positive outcomes for clients served in state funded substance abuse treatment. These results not only indicate positive changes in the lives of those affected by substance abuse but also suggest an important cost offset for Kentucky taxpayers resulting from state-funded substance abuse treatment. The **Kentucky Substance Abuse Treatment Outcome Study FY 2002 Follow-up Findings** report is available on the University of Kentucky Center on Drug and Alcohol Research web site at <http://cdar.uky.edu/ktos/>.

If you have questions or would like to request copies of this report, please contact the Department of Mental Health's Division of Substance Abuse at (502) 564-3487.

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## **Kentucky Substance Abuse Treatment Outcome Study FY 2002 Follow-up Findings Executive Summary**

This report examined intake and follow-up data on 838 substance abuse treatment clients statewide who consented to participate in a treatment follow-up study. A summary of major findings is presented here. The **Kentucky Substance Abuse Treatment Outcome Study FY 2002 Follow-up Findings** full report is available on the University of Kentucky Center on Drug and Alcohol Research website at <http://cdar.uky.edu/ktos/>.

### ***Substance Use Changes***

- ⇒ **63.9% of follow-up clients reported alcohol abstinence** 12 months after treatment, a **47.9% increase from intake**
- ⇒ Among clients who continued to use alcohol, there was a **46.5% decrease** in the number of days alcohol was used
- ⇒ **55.9% of clients reported abstinence from illegal drugs** 12 months after treatment, a **27.5% increase** from intake
- ⇒ There was a **29.4% increase in the number of clients reporting marijuana abstinence** at follow-up. Consequently, **83.9% of clients were abstinent** 12 months after treatment
- ⇒ **81.9% of clients reported abstinence from prescription tranquilizers** at follow-up for a **26.8% increase** 12 months after treatment
- ⇒ **91.1% of clients reported opiate abstinence** 12 months after treatment
- ⇒ **96.2% of clients reported cocaine abstinence** 12 months after treatment

### ***Employment Changes***

- ⇒ There was a **45.3% increase in full-time employment** 12 months after treatment
- ⇒ Including part-time and full-time employment, there was a **35.6% increase in the percent of clients employed** at follow-up
- ⇒ There was a **30.3% increase in the number of days of paid employment** at follow-up

### ***Arrests and Crime Changes***

- ⇒ There was a **62.7% reduction in the number of clients reporting arrests** in the past 30 days at follow-up and a **51.2% reduction** in the past 12 months

- ⇒ **Drug related arrests were reported by 73.3% fewer clients** 12 months after treatment
- ⇒ **65.8% fewer clients reported spending time in jail** in the past 30 days at follow-up

### ***Mental Health Changes***

- ⇒ At follow-up there was a **16% reduction in self-reported depression**
- ⇒ Clients reported a **7% reduction in anxiety** at follow-up
- ⇒ Clients also reported a **42% reduction in suicidal thoughts** since intake
- ⇒ **77% reduction in self-reported suicide attempts** were reported at follow-up
- ⇒ Self-reported health status improved at follow-up with a **39% increase to “excellent” or “very good” health**

### ***Conclusions***

- ⇒ Substance abuse treatment in Kentucky results in **significant reductions in substance use, improved ratings of health and mental health, decreased criminal activity, and increased employment**
- ⇒ These changes result in **decreases in crime costs** to victims and to the public
- ⇒ Kentucky cost savings are estimated at **\$4.03 for every dollar spent on treatment** during 2002





## **Kentucky Treatment Outcome Study Background**

Combined alcohol and drug abuse costs were estimated at \$276.3 billion in the United States in 1995 by the National Institute on Drug Abuse and the National Institute on Alcoholism and Alcohol Abuse (NIDA & NIAAA, 1997) and drug abuse costs alone were estimated at \$160.7 billion for 2000 (ONDCP, 2001). The costs of substance abuse treatment are also high and 70% of the burden for this treatment is born by public funding (Egertson, Fox, & Leshner, 1997). In Kentucky, the state spends approximately \$34 million each year using Federal Block Grant and state general funds. The use of public funds for substance abuse treatment services includes a need for treatment outcome data. Although there are a number of published substance abuse treatment outcomes studies, funding sources continue to call for studies at the program, state, and Federal levels (Swearingen, Moyer, & Finney, 2003). Overall these studies report that treatment is associated with reduced substance use and crime as well as improved employment (Hubbard, Craddock, Flynn, Anderson, & Etheridge, 1997; McLellan, Lewis, O'Brien, & Kleber, 2000; Simpson, Joe, & Broome, 2002). With increasing scrutiny of public funds, increased effort is required to closely examine substance abuse treatment outcomes.

Kentucky funds substance abuse treatment services through the Division of Mental Health and Substance Abuse in the Department of Mental Health and Mental Retardation Services. The Division contracts with 14 Regional Community Mental Health Centers to provide services in all areas of the state. The client eligibility criteria for services (clinical need for treatment and low income) are set by the Division but are determined for clients by treatment centers as part of the intake process. The admission does not require state authorization and each center makes an independent clinical decision about admitting each client. About 21,000 clients receive a substance abuse treatment service each year (including clients admitted in previous years) and there are about 11,000 new intakes each year. However, many clients do not complete the intake process and do not enter formal treatment services.

The Kentucky Treatment Outcome Study (KTOS) is designed to examine the outcomes of treatment provided in the 14 Regional Community Mental Health Centers. KTOS uses a pre- and post-test design with the pre-test data collected by clinicians during the intake process on clients who are entering treatment. The post-test follow-up data are collected by the University of Kentucky 12 months after the intake date.

### ***Study Overview***

In Kentucky, outpatient substance abuse treatment programs collect data within the first three treatment sessions which are used for assessment and treatment planning. For residential programs, KTOS data are collected within the first three days of admission. Both outpatient and residential programs use the same instrument to collect client information.

**Baseline data** are client self-reported information collected by the treatment service providers at intake. These data are part of the state client-level administrative data which can be used to report treatment outcomes and services for the Federal Substance Abuse Prevention and Treatment Block Grant. The KTOS data are matched to the Client Data Set which can be used in monitoring and evaluating substance abuse treatment services (McCarty, McGuire, Harwood, & Field, 1998). Clients who voluntarily agree to participate in the follow-up study must give informed consent to participate before giving personal locator information that is used to locate them for follow-up interviews 12 months after treatment. The consent and follow-up process is approved by the University of Kentucky Institutional Review Board (IRB) and includes informing clients about the purpose of the follow-up study and the study's

confidentiality protections. The KTOS study has a Certificate of Confidentiality from the U.S. Department of Health and Human Services to further protect subjects.

**Follow-up data** are collected from a sample of clients 12 months after treatment. The University of Kentucky collects the follow-up data in telephone interviews with a sample of clients who have voluntarily consented to participate. The follow-up data include the same items that were asked at baseline. This allows for comparisons of client data from intake to follow-up 12 months after treatment.

### ***Data Description***

The FY 2002 KTOS baseline and follow-up data include the following client information:

- Demographic Information
- Employment & Economic Status
- Justice System Involvement
- Alcohol Use
- Illegal Drug Use
- Medical and Psychological Status
- Treatment Utilization

Information on each of these domains is collected for the past 30 days and past 12 months before treatment at the intake interview, and for the past 30 days and past 12 months at follow-up. In addition, these client self-report data are used along with service event data to estimate the cost of treatment as part of the evaluation of avoided costs resulting from positive treatment outcomes. The questions for the FY 2002 KTOS study were developed using the Center on Substance Abuse Treatment's (CSAT) primary data collection instrument, the Government Performance Results Act (GPRA), which is based on the Addiction Severity Index (ASI) (McLellan, et al., 1992). In addition, items were used to examine specific Kentucky concerns such as DUI offenses and participation in self-help.

### ***Study Protocol***

The data collection for the KTOS study begins in state funded substance abuse treatment facilities. Under separate guidelines and contract provisions, state funded substance abuse treatment centers (including Community Mental Health Centers and their affiliated substance abuse treatment agencies) are required to complete the **Client Data Set** on each client, including identifying a minimum of nineteen items that include provider and client information as well as primary and secondary diagnoses, substance use patterns including route of administration, frequency, and age of first use. These data are used in completing the Treatment Episode Data Set (TEDS) reports for CSAT. In addition, the state has included other life history event variables such as physical or sexual abuse and priority population information.

*Baseline/intake Data Collection:* Clients consent to the collection of intake information and submission of this information to the state as part of their permission/consent to treatment. This consent process is part of the state requirement when state or block grant funds support treatment costs. The substance abuse profile extends the basic client data set information by focusing primarily on substance use within the preceding 30 days and within the past 12 months. The baseline KTOS data are submitted to the University of Kentucky Center on Drug and Alcohol Research (CDAR) as an agent acting on behalf of the state. The KTOS intake data were collected by clinicians in either electronic or scan sheet format for FY 2002.

*Follow-up Data Collection:* Clients choose voluntarily to participate in the follow-up study. When collecting Client Data Set information and substance abuse profile information, clinicians explain the follow-up study and ask clients about their interest in participating. Clients who agree to participate must give informed consent using the University of Kentucky Medical Institutional Review Board (IRB) approved consent form. This informed consent is administered by the clinician during an interview. Participation in the follow-up study specifies that a client will provide personal identifying information, including the names, telephone numbers, and addresses of persons who will be able to help locate the client 12 months after treatment. Clients who consent to follow-up and who provide valid locator information are eligible for being selected for a follow-up interview.

### **Sample**

A stratified sampling approach, called proportionate allocation, was used in this study for sample selection (Pedhazur & Schmelkin, 1991). A proportionate allocation sample of the consenting clients is drawn for telephone follow-up using gender, outpatient and residential treatment settings as the sampling frame for keeping the sample proportionate to the population of consenting clients. This means that the follow-up sample has the same proportion of males and females in outpatient and residential treatment as in the overall baseline dataset. The proportionate stratification approach used in this study produces estimates that are as efficient as those of a simple random sample (Pedhazur & Schmelkin, 1991). The follow-up sample was classified into four groups: (1) Outpatient females; (2) Outpatient males; (3) Residential females; and (4) Residential males. Eligible follow-up clients were partitioned into the four groups and were then randomly selected from each group using randomized computer-assisted telephone dialing until the target sample was met for each group. Follow-up telephone interviews were completed by the University of Kentucky Survey Research Center.

There were 7,630 clients in the baseline KTOS data collection at intake, which occurred between July 2001 and June 2002. Of those, 3,338 clients (43.7%) consented to participate in the follow-up study. However, only 1,880 client records were complete and had the minimum locator information for follow-up contact. Follow-up interviews were completed between October, 2002, and October, 2003. During this period, up to 15 call attempts were made to reach each individual. When clients were unable to be contacted at their primary number, backup contact persons listed during the intake interview were contacted in an attempt to locate the participant. The backup persons were given Survey Research Center's toll-free number to provide to the participant.

Of the 1,880 clients who had agreed at baseline to participate in a follow-up interview, 43 (2.3%) refused when contacted, 111 (5.9%) were ineligible, and 880 (46.8%) were unable to be contacted for the reasons listed below:

Ineligibility (n = 111)  
incarcerated (87),  
deceased (18),  
denied receiving past treatment (2),  
non-availability for interview (2),  
language barrier (1), and  
intoxication during interview despite denial of current use (1).

Unsuccessful contact (880)  
    unsuccessful location of individual (462),  
    unsuccessful contact with individual after 15 call attempts (256),  
    no answer during 15 call attempts (102),  
    non-contact by the time the study was closed (48),  
    disconnected phone lines (11), and  
    incorrect number – a computer line (1).

The loss of potential follow-up participants due to refusal, ineligibility, and unsuccessful contact left a final follow-up sample of 846 clients. **This is an overall follow-up rate of 45.0% based on the 1,880 clients who agreed to be contacted for follow-up.** However, examining only those who were successfully contacted and who were eligible, **95.2% agreed to the follow-up.**

Of the 846 clients in the follow-up sample, 8 were later excluded. Five were excluded because they reported answering dishonestly to baseline questions, and another was excluded as a result of providing an incorrect social security number, which precluded obtaining data on services used. Two others were discarded due to response patterns that were clearly invalid to almost all items.

### ***Comparison of Follow-up Sample with Those Not Followed Up***

Random selection of a follow-up sample was not possible due to incomplete locator information on many clients. Also, a number of clients did not consent at baseline to participate in the follow-up interviews. As a result, the representativeness of the follow-up sample and the generalizability of findings are limited. However, the baseline characteristics of the follow-up sample can be compared with the baseline characteristics of clients not included in the follow-up sample to address concerns about generalizability of findings.

There were 838 valid follow-up participants. Demographic, economic, health, legal, and substance use data were collected at intake for clients who did and did not agree to participate in the follow-up interviews. **The consenting follow-up sample differed significantly from those who did not consent in gender, education, and percentage of clients who reported use of psychiatric medications.** The follow-up sample had fewer men (66.8% versus 72.3% for the non-follow-up group), a higher mean education level (11.3 years versus 11.0 years), and the follow-up clients were significantly more likely to be prescribed medicine (29.3% versus 24.2%) than those not followed up.

### ***Objectives***

This report on treatment outcomes has six major objectives:

1. To describe the characteristics of follow-up participants at intake;
2. To examine treatment outcomes in terms of substance use;
3. To examine treatment outcomes in employment, justice system involvement, and mental health status changes;
4. To describe outcomes by major treatment modality and by self-help use;
5. To estimate avoided costs to Kentucky associated with substance abuse treatment; and
6. To discuss implications of follow-up findings for treatment providers.

*Sample Characteristics at Intake:* An examination of the follow-up sample's characteristics is important to understand what factors may contribute to treatment outcome, as well as to generalize findings. Factors included are: demographic information such as age, gender, marital status, ethnicity, education, and living situation; information on current employment and income; information on clients' justice system involvement history and current legal status; information about past and present physical and mental health; and a description of baseline substance use patterns. These analyses are conducted using basic descriptive statistics, such as frequencies and means.

*Substance Use Changes:* Decreases in substance use were examined for each substance and separately for overall illegal drug use selecting each client's most used substance. For the specific substances, increases in abstinence and decreases in days of use were presented for males, females, and the entire sample. For substance use, the reduction in overall days of use was examined by comparing the available days of use at baseline to days of use at follow-up.

*Changes in Employment, Justice System Involvement, and Mental Health:* Improvements in employment, income, and education enrollment; decreases in justice system involvement; and self-reported physical and mental health were examined for males, females, and the entire sample.

*Treatment Type and Volume:* Not all individuals in the KTOS sample received the same types and amounts of treatment services. The types and amounts of services individuals received are presented. In addition, the differences in change in substance use were examined among clients who received residential only or outpatient services only.

*Cost Analysis:* This report examines costs that may have been avoided due to substance abuse treatment from intake to follow-up. For this study only three major areas of cost were examined: (1) Avoided costs from reduced crime; (2) Increases in employment and related taxes paid; and (3) Actual costs of treatment for this sample.

*Treatment Implications:* The findings in this report suggest several important factors that might be considered in planning future treatment services and recovery supports.

## ***Analysis***

This study examines change from intake to follow-up 12 months after treatment using two major analytic approaches. For changes in the percent of clients reporting substance use or related behavior, a z test for proportions was used to test for significance. For changes in the mean number of days of substance use from intake to follow-up, a paired samples t-test was used to test for significance. Findings were reported as significant if the p value was at least .01. In addition, policy makers who have relied on these report findings indicated that percent changes and actual changes in the number of days of substance use are important ways to understand the effects of treatment.

## **Section I. Description of Follow-up Sample at Intake**

### ***Demographic Characteristics***

**Table 1** presents demographic descriptive data at intake for those who consented to follow-up. Data include frequencies and means for gender, age, ethnic background, marital status, living arrangement, and dependents.

The follow-up sample was mostly male (66.8%) with a mean age of 33.4 at intake. It was also predominantly Caucasian (88.4%), with a smaller portion of Black individuals (9.8%), and only 1.9% reporting a Hispanic background. Over one-third of the clients (39.4%) had never been married. Also, the majority of clients were housed (87.6%) rather than institutionalized or homeless. A large proportion (35.2%), just over 1 in 3 clients, reported having dependent children.

**Table 1. Demographic Characteristics of Follow-Up Sample at Intake**

<b>Intake question</b>	<b>Breakdown</b>	<b>N=838</b>
<b>Demographics</b>		
Gender	Male	66.8%
Mean age		33.4
Race <sup>1</sup>	White	88.4%
	Black	9.8%
	Native Am.	0.7%
	Asian	0.5%
	Other	0.6%
Ethnicity: Hispanic / Latino <sup>2</sup>		1.9%
Marital status	Never married	39.4%
	Married	25.1%
	Divorced	26.1%
	Separated	8.4%
	Widowed	1.0%
Current living arrangement	Housed	87.6%
	Institutionalized	10.4%
	Shelter	1.4%
	Street/Outdoors	0.6%
Percent of sample who live with:	Dependent child(ren)	35.2%
	Anyone with an alcohol problem	9.4%
	Anyone with a drug problem	6.7%

<sup>1</sup> Percents do not add to 100 since clients can identify more than one race

<sup>2</sup> Current GPRA measures ask ethnicity as a separate question.

### ***Education, Employment and Economic Status***

**Table 2** presents a description of the sample's education history, employment and economic status at intake. The mean education level was slightly higher than 11<sup>th</sup> grade, although 45.0% reported having less than 12 years of education. Of those clients with less than 12 years of education, 32.5% reported having earned a GED.

About half (48.5%) of the follow-up sample was either employed or enrolled in school/job training at least part-time at intake. About 14.3% of the sample reported disability, and 33.1% reported being unemployed (although 7% of these individuals were enrolled in school/job training part or full-time). The mean number of days of paid work in the past 30 days for the entire sample was about 8. However, the mean number of paid work days in the past 30 days for the employed (part and full time) and job training clients was about 16.8.

**Table 2. Education, Employment and Economic Status at Intake**

<b>Intake question</b>	<b>Options</b>	<b>N=838</b>
<b>Education and employment</b>		
Mean education (in years)		11.3 years
Less than 12 years education		45.0%
GED (among those with less than 12 years education)		32.5%
Enrollment status for school or job training	Not enrolled Full time Part time Other	91.3% 4.9% 2.6% 1.2%
<b>Employment</b>		
	Full time Part time Retired Disabled Unemployed, looking Unemployed, volunteer Other	29.6% 11.4% 1.2% 14.3% 33.1% 1.1% 9.3%
<b>Income</b>		
Mean # days paid for working for those who work		16.8 days
Received income from:	Wages Public assistance Retirement Disability Illegal source Other	53.5% 9.6% 2.6% 15.9% 1.1% 19.5%
Mean monthly income for those receiving the following type of income:	Wages Public assistance Retirement Disability Illegal Other	\$1165 \$260 \$1213 \$1192 \$900 \$765

### **Physical and Mental Health**

**Table 3** presents self-report descriptions of physical and mental health factors at intake. More than half of all participants reported experiencing serious depression, anxiety, or both (not a direct result of alcohol or drug use) during the 12 months preceding intake (not presented in table). Almost a third (29.3%) of clients reported being treated with psychiatric medications in the past 12 months. Almost one-third of the clients (30.7%) reported a lifetime experience of physical abuse victimization, and sexual abuse victimization was reported by 17.9% of clients. On average, clients reported being “considerably” troubled by emotional problems during the past year.

Despite the extent of mental health issues reported, the mean current physical health rating (2.9) suggested that clients, on average, were experiencing “good” to “very good” overall health at the time of intake. However, 28.5% of clients reported “fair” or “poor” health at intake.

**Table 3. Percent of Clients Reporting Physical & Mental Health Factors at Intake**

<b>Intake question</b>	<b>Responses</b>	<b>N=838</b>
<b>Lifetime Abuse experience</b>		
Abuse history	Physical assault	30.7%
	Sexual assault	17.9%
<b>Past 12 months Mental health problem</b>		
Psychological problems not directly a result of alcohol or drug use	Serious depression	43.3%
	Serious anxiety	48.3%
	Serious depression & serious anxiety	36.7%
	Hallucinations	6.3%
	Trouble remembering/concentrating	40.6%
	Trouble controlling violent behavior	16.6%
<b>Suicide</b>		
Suicide history	Suicidal thoughts	14.0%
	Suicide attempts	6.0%
<b>Medication</b>		
Prescribed psychiatric meds		29.3%
<b>Rating emotional problems</b>		
Troubled by emotional problems	0. Not at all	16.4%
	1. Slightly	21.3%
	2. Moderately	23.1%
	3. Considerably	25.0%
	4. Extremely	14.2%
	Mean rating of how troubled (0-4 scale)	3.02
<b>Intake Health rating</b>		
Overall current health rating	1. Excellent	11.1%
	2. Very good	21.5%
	3. Good	38.9%
	4. Fair	20.9%
	5. Poor	7.6%
	Mean rating of current health (1- 5 scale)	2.9



### ***Justice System Involvement***

**Table 4a** presents admission referral and legal status of clients at the time of intake. About two-thirds of participants (65.7%) were referred to treatment by the justice system, and 56.0% of the justice system referrals were admitted due to a DUI. Over one-third (36.8%) of the follow-up clients were referred to treatment from a DUI charge. At intake, 36.5% were on probation or parole, while 9.1% were in Drug Court.

In **Table 4b**, arrest data are presented for all charges, specifically drug-related charges, and drug arrests for DUI. The percent of individuals reporting arrests, and the mean number for those reporting arrests, are presented. More than 60% of clients (63.3%) were arrested at least once during the 12 months before intake, and 13.4% were arrested at least once in the 30 days before intake. Of those clients reporting arrests in the past 12 months, 71.0% had drug-related charges. Moreover, among those reporting arrests in the past 30 days, 53.6% had drug-related charges.

**Table 4b** also presents incarceration time for those arrested. For those arrested during the 12 months before treatment, the mean number of nights in jail was 33.2 and for those arrested in the 30 days before treatment, the mean was 7.5 nights.

**Table 4a. Referral Circumstance and Legal Status at Intake**

<b>Intake question</b>	<b>Options</b>	<b>N=838</b>
Admission/referral reasons	Percent of sample referred by criminal justice system	65.7%
	Percent of overall sample referred following DUI <sup>a</sup> charge	36.8%
Current legal status	In Drug Court	9.1%
	On probation/parole	36.5%

<sup>a</sup>Those admitted due to a DUI were also included as criminal justice referrals.

**Table 4b. Arrest and Incarceration History at Intake**

<b>Intake question</b>	<b>Options</b>	<b>Past 12 months</b>	<b>Past 30 days</b>
<b>Arrests</b>			
Any charge	% of sample arrested on any charge	63.3%	13.4%
	Mean # arrests for those arrested	1.8	1.3
Any drug arrest	% of sample arrested on drug charge	46.4%	7.5%
	Mean # for those arrested on drug charge	1.1	1.3
Drug arrests	% of sample of all those with any arrests whose arrests were for drug charges	71.0%	53.6%
<b>Jail time</b>			
Entire sample	% of total sample spending at least 1 night in jail (including those with no arrests)	66.1%	23.1%
	Mean number nights in jail (including those with no arrests)	32.7	3.4
Those arrested	% spending at least 1 night in jail	92.6%	84.8%
	Mean number nights in jail	33.2	7.5

### ***Treatment History***

**Table 5** presents follow-up clients' self-reported substance abuse treatment history at intake. Almost two-thirds of clients (63.9%) reported a history of substance abuse treatment, and those previously treated had an average of about 3 treatment episodes. Over half the clients at intake (61.4%) reported participating in Alcoholics Anonymous (AA), Narcotics Anonymous (NA), and other self-help groups, and over one-third (36.5%) reported attending AA/NA in the past 30 days. Significantly more women than men (47.7% versus 31.0%) reported attending self-help groups during the past 30 days. Of the people who attended self-help groups, almost one-third (32.5%) reported that the meetings were "always helpful" and over one-fourth (26.9%) reported self-help groups to be "often helpful".

**Table 5. Treatment History at Intake**

<b>Intake question</b>	<b>Options</b>	<b>N=838</b>
Any substance abuse treatment in lifetime	Percent reporting ever having been in treatment before	63.9%
	Mean# of times treated for those reporting prior treatment	2.7
AA, NA, or other Self-help group	Percent of sample who have tried self-help in lifetime	61.4%
	Percent of sample who have tried self-help in past 30 days	36.5%
	For all those who have tried in lifetime, mean # times attended during the past 30 days	4.8
Gender and Self-help group in past 30 days	Percent of women	47.7%***
	Percent of men	31.0%
How often were these meetings helpful (for those attending in lifetime)?	0. Never	10.7%
	1. Rarely	5.0%
	2. Sometimes	24.9%
	3. Often	26.9%
	4. Always	32.5%
	Mean rating of helpfulness (0-4 scale)	2.6

\*\*\*p < .0001

### ***Substance Use at Intake***

**Table 6a** describes the percent of clients reporting substance use at intake for the 12 months and 30 days preceding intake. Alcohol use is reported by most clients with 80.0% of all clients reporting alcohol use within the past 12 months and 42.5% reporting use in the past 30 days at intake. Alcohol use to intoxication in the past 12 months was reported by 66.2% of clients and in the past 30 days by 32.9% of clients. The past 12 months use of marijuana was reported by 50.8% of clients and tranquilizer use was reported by 42.8% of the clients. Opiate use in the past 12 months was reported by 34.9%, a larger percent of clients reporting use of this drug than past 12 months cocaine use, which was reported by 28.0% of clients. Past 12 month stimulant use was reported by 22.6% of clients and nonprescription methadone was reported by 10.3%. Hallucinogens and inhalants were used by very few individuals with only 6.6% reporting hallucinogens and 3.2% reporting inhalant use.

**Table 6a** presents information about the level of use as measured by the percent of time each substance was used in the past 30 days. In order to present data on client reports of days used in the previous 30 days, it is important to adjust the days of use for the days clients spent living in controlled environments such as a jail or hospital. For example, if a client had been in a hospital for 15 days and reported using alcohol for 15 days, the client would have used alcohol half of the time that he or she was able to do so (in a 30 day period).

**TABLE 6a. Substance Use in the Past 12 Months and Past 30 Days at Intake**

Substance	Past 12 months N=838	Past 30 days N=838
Alcohol	80.0%	42.5%
Alcohol to Intoxication	66.2%	32.9%
Marijuana/Hashish	50.8%	28.5%
Tranquilizers	42.8%	25.3%
Opiates	34.9%	20.7%
Cocaine	28.0%	14.1%
Stimulants	22.6%	9.5%
Nonprescription methadone	10.3%	4.2%
Hallucinogens	6.6%	1.3%
Inhalants	3.2%	0.6%

**Table 6b** presents the proportion of days that clients reported using substances at intake, controlling for their time in controlled living environments. The data also show the average days of use for the entire sample and for those clients who reported at least one day of substance use for each substance. For example, in examining the proportion of days of use among the entire sample, alcohol was used 17.4% of the days in the past 30 days, or an equivalent of 5.2 days. However, when examining the average days of use for just those clients who reported at least one day of alcohol use in the past 30 days, the proportion of days of use was 38.7% of days, or an equivalent of 11.6 days. Apart from alcohol, the drug with the greatest number of days of use at intake was tranquilizers, which were reported at 14.0% of the past 30 days (the equivalent of 4.2 days) for the entire sample, and at 54.4% of the past 30 days (the equivalent of 16.3 days) for those who reported at least one day of use. Excluding inhalant use, which was reported by very few clients, the two drugs with the greatest number of days of use among those who reported at least one day of use were opiates and tranquilizers.

**Table 6b. Average Percent Days of Substance Use in the Past 30 Days at Intake**

Substance	Entire sample N=838	Among clients who used for at least 1 day
Alcohol	17.4%	38.7%
Alcohol to Intoxication	13.1%	38.9%
Marijuana/Hashish	12.6%	43.0%
Tranquilizers	14.0%	54.4%
Opiates	11.7%	57.0%
Cocaine	5.2%	39.5%
Stimulants	3.3%	39.3%
Nonprescription methadone	1.5%	34.9%
Hallucinogens	0.2%	15.6%
Inhalants	0.3%	56.6%

### ***Summary of Intake Characteristics***

The follow-up sample included 838 clients, with the majority being white males, and having an average age of about 33 years. The mean education level of clients was eleventh grade with a large number of clients without a high school diploma reported obtaining a GED (32.5%). They also reported low levels of employment with only 29.6% reporting full-time work and almost half of clients (48.5%) reporting unemployment.

Of the follow-up sample clients, two-thirds (63.9%) reported having prior treatment experiences with an average 3 prior treatment episodes. A large number of clients (61.4%) reported having tried self-help groups with 36.5% having used self-help groups in the 30 days prior to intake.

The characteristics of the sample at intake suggest serious substance use problems and serious mental health problems as well. Low employment and a high percent of justice system involvement also suggest severity of substance use. Substance use data show that at intake 80% of clients reported alcohol use in the past 12 months, 50.8% reported use of marijuana, 42.8% reported tranquilizer use and 34.9% reported opiate use.

The intake data suggest that clients in this follow-up sample entered treatment with serious substance abuse problems and serious problems related to substance abuse. The intake substance abuse characteristics of this sample also suggest the importance of treatment to facilitate change. The changes from intake to follow-up are described in the next section of this report.

## **Section II. Changes in Reported Alcohol and Drug Use**

### ***Explanation of Analyses***

Changes in the use of each substance are presented in two ways. First, data pertaining to abstinence in the past 30 days are presented. Second, reductions in the number of days of reported use in the past 30 days are presented for each substance. These data encompass the 30 days preceding interviews at intake and follow-up. Past 30 day measures of substance use have been shown to be a valid way of measuring current substance use (McLellan, et al., 1992). Past 30 day measures can also be useful in assessing current levels of substance use across the life span since longitudinal studies have illustrated the variable course of substance related disorders from reported changes in periods of abstinence, relapse, and increased use patterns (Carroll, 1995). Data are presented by gender and for the total sample. In each substance category, two tables are used to present the abstinence and days of use findings. In the tables reporting reductions in days of use, clients who were in controlled living environments for 30 of the past 30 days were excluded from the analysis since they would not have had access to substances. Clients who were in controlled living environments for a portion of the past 30 days were included but only for the time they were "on the street".

### ***Abstinence Data***

The percent of clients reporting abstinence is presented for each separate substance at intake and at follow-up to show changes in the percent of abstinent clients after treatment. The number and percent of clients who were able to maintain abstinence after treatment is an important variable since many clients enter treatment with attempts at reduction of use or abstinence following criminal charges or other coercions. Maintenance of abstinence is a positive treatment outcome.

### ***Reduction in Each Substance Used***

To accurately represent the days of reported substance use, clients' time in a controlled living environment was statistically controlled by calculating the proportion of days that each participant was "on the street" and in a position to access substances. Substance use days are presented as a percent of clients' non-controlled environment days. For example, if a client had been incarcerated for 15 of the past 30 days, then the client was considered only able to use substances for 15 days. If this client reported 5 days of substance use, then the proportion of days using is  $5/15$ , or 33.3%. In other words, the percent shown in each table for days used is the portion of "on the street" time in which drugs could have been used. As stated above, if clients were in a controlled living environment for all 30 of the past 30 days, they were excluded from the analysis of days of substance use.

Reductions in the proportion of substance use days from baseline to follow-up for each substance were examined separately for males, females, and the entire sample. A paired samples t-test was used to examine the differences between baseline and follow-up percent of days used. This procedure compared the mean proportion of days of substance use at baseline to the mean proportion of days of substance use at follow-up, while statistically accounting for correlations between the two.

In addition to presenting the reductions for males, females, and the entire sample, the significance of differences between genders were examined using the z-test for proportions, which statistically compares two proportions. The results for this analysis are not presented in a table, but are described in the text accompanying each substance.

### Alcohol Use

Alcohol use was examined in terms of self-reports of any use, and use to intoxication in the past 30 days. **Table 7a** presents data on client self-reported abstinence from alcohol, as measured by clients reporting no use in the past 30 days, with 43.2% of clients reporting alcohol abstinence for the past 30 days at both intake and follow-up. An additional 20.7% reported becoming newly alcohol abstinent at follow-up. This represents a 47.9% increase in the percent of clients self-reporting alcohol abstinence at follow-up, compared to intake.

Twelve months after treatment, the majority of the sample (63.9%) reported alcohol abstinence at follow-up, with an even greater percent (76.9%) reporting not drinking to intoxication. The percentage of follow-up non-drinkers and individuals not drinking to intoxication was slightly higher for females. There was a 36.3% increase in the number of female clients reporting not using alcohol to intoxication at follow-up when compared to intake.

**Table 7a. Increase in Percent of Clients with Alcohol Abstinence During Preceding 30 Days**

		Remained abstinent		Newly abstinent		Total % alcohol abstinent at follow-up	% of change <sup>a</sup>
		N	Valid %	N	Valid %		
Alcohol	Male (n = 559)	214	38.3%	115	20.6%	58.9%	↑53.7%**
	Female (n = 276)	147	53.3 %	58	21.0%	74.3%	↑39.5%**
	Total (N = 835)	361	43.2%	173	20.7%	63.9%	↑47.9%**
Alcohol to Intoxication	Male (n = 559)	295	52.8%	117	20.9%	73.7%	↑39.7%**
	Female (n = 276)	176	63.8%	54	19.6%	83.4%	↑30.7%**
	Total (N = 835)	471	56.4%	171	20.5%	76.9%	↑36.3%**

<sup>a</sup>Significance established using z test for proportions.

\*p < .01. \*\*p < .001

For those who continued to use alcohol at follow-up, there were significant reductions from baseline to follow-up in the number of days of alcohol use and alcohol use to intoxication (**Table 7b**). Clients who were in controlled living environments for 30 of the past 30 days were excluded from the analysis since it was assumed they would not have had access to substances. Clients who were in controlled living environments a portion of the past 30 days were included but only for the time they were “on the street”. At baseline, alcohol was used by the sample on average 17.4% of days not in a controlled environment. At follow-up, alcohol was used by the sample an average 9.3% of days controlling for time spent in hospitals or other controlled living environments. This is a 46.5% reduction in days of alcohol use by those who reported any use in the past 30 days. Similarly, alcohol was used *to intoxication* on average 13.1% of the past 30 days at intake (the equivalent of about 4 days), but only 4.9% of the past 30 days at follow-up (the equivalent of about 1.5 days). This is a significant reduction (62.6%) in reported use to intoxication by those who reported using alcohol.

Both males and females experienced significant reductions in alcohol use and use to intoxication after treatment. However, women reported significantly greater reductions in the percent of days of use in the past 30 days than men. Women reported a 58.9% reduction in the portion of days using alcohol in the past 30 days compared to a 39.7% reduction for males.

**Table 7b. Percent of Days in the Past 30 Days Alcohol was Used Intake to Follow-up**

		Mean proportion of days alcohol was used		Percent reduction <sup>a</sup>
		Baseline	Follow-up	
Alcohol	Males (n = 512)	18.4%	11.1%	39.7%**
	Females (n = 255)	15.1%	6.2%	58.9%**
	Total (N = 767)	17.4%	9.3%	46.5%**
Alcohol to Intoxication	Males (n = 513)	13.3%	6.2%	53.4%**
	Females (n = 258)	12.7%	2.6%	79.5%**
	Total (N = 771)	13.1%	4.9%	62.6%**

<sup>a</sup>Significance established using paired-samples t-tests.

\*p < .01. \*\*p < .001.

### ***Overall Changes in Illegal Drug Use***

#### ***Explanation of Analyses***

Illegal drug use was analyzed separately from alcohol use. **Table 8a** displays descriptive data on client self-reported abstinence from the client's most-frequently used illegal drug, as measured by clients self-reporting no use in the past 30 days, with 43.8% of all clients reporting past 30 day no use of any illegal drugs in the past 30 days both at intake and follow-up. An additional 12.1% reported becoming "newly drug abstinent" at follow-up. Twelve months after treatment, over half the sample (55.9%) reported abstinence from illegal drugs at follow-up. This represents a 27.5% increase in the number of clients who report abstaining from illicit drugs after treatment.

**Table 8a. Increase in Percent of Clients who Reported Abstinence from Illegal Drugs (Excluding Alcohol)**

	Remained abstinent		Newly abstinent		Total % abstinent at follow-up	% of change <sup>a</sup>
	N	Valid % of the total sample	N	Valid % of the total sample		
Male (n = 560)	255	45.6%	62	11.1%	56.7%	↑24.3%**
Female (n = 278)	112	40.3%	39	14.0%	54.3%	↑34.8%**
Total (N = 838)	367	43.8%	101	12.1%	55.9%	↑27.5%**

<sup>a</sup>Significance established using z test for proportions.

\*p < .01. \*\*p < .001

**Table 8b** presents the days of self-reported use in the past 30 days for the drug (excluding alcohol) that was used most frequently by each client. This table shows changes from intake to follow-up in the percent of days while controlling for days in a hospital or other controlled living environment. Reduction in use was analyzed using paired samples t-tests. The analyses were conducted for the total sample, as well as for males and females separately. Clients who were in controlled living environments for 30 of the past 30 days were excluded from the analysis since it was assumed they would not have had access to substances. Clients

who were in controlled living environments for a portion of the past 30 days were included but only for the time they were “on the street”.

There were significant reductions in the percent of days of use in the past 30 days for clients’ most used illegal substance, excluding alcohol, from baseline to follow-up. The total sample demonstrated a 33.5% reduction in the percent of days of drug use from intake to follow-up. Females demonstrated a greater reduction in days of illicit drug use than males with women reporting a 40.2% reduction and males reporting a 29.3% reduction, although the difference was not statistically significant.

**Table 8b. Reduction in Days of Use for Clients’ Most-used Substance in the Past 30 Days**

	<b>Baseline</b>	<b>Follow-Up</b>	<b>Percent reduction<sup>a</sup></b>
Male (n = 511)	25.3%	17.9%	29.3%**
Female (n = 257)	33.8%	20.2%	40.2%**
Total (N= 768)	28.1%	18.7%	33.5%**

<sup>a</sup>Significance established using paired-samples t-tests.

\*p < .01. \*\*p < .001.



## ***Changes in Specific Drugs Used***

### ***Marijuana Use in the Past 30 Days***

**Table 9a** presents the percent of clients who reported not using marijuana in the past 30 days, with 64.8% of the sample reporting no use in the past 30 days at intake and remaining abstinent at follow-up. An additional 19.1% of the clients reported using marijuana at intake, but being marijuana abstinent at follow-up. As a result, 83.9% of the sample reported being nonusers at follow-up. This is an increase of 29.4% in the number of clients who reported being abstinent in the past 30 days from marijuana use after treatment. The percent of individuals reporting no use by follow-up was almost the same for males and females.

**Table 9a. Increase in Percent of Clients who Report Marijuana Abstinence**

	Remained abstinent		Newly abstinent		Total % abstinent at follow-up	% of change <sup>a</sup>
	N	Valid % of the total sample	N	Valid % of the total sample		
Male (n = 558)	364	65.2%	101	18.1%	83.3%	↑27.7%**
Female (n = 275)	176	64.0%	58	21.1%	85.1%	↑33.0%**
Total (N = 833)	540	64.8%	159	19.1%	83.9%	↑29.4%**

<sup>a</sup>Significance established using z test for proportions.

\*p < .01. \*\*p < .001

**Table 9b** presents the change in proportion of days that marijuana was used from intake to follow-up controlling for days that the client spent in a controlled living environment. At intake, marijuana was reported by 35.1% of clients, who were using marijuana an average of 12.6% of the past 30 days (the equivalent of 3.8 days). At follow-up clients reported using marijuana only 5.2% of the past 30 days (the equivalent of about 1.5 days). This represents a 58.7% reduction in the frequency of marijuana use at follow-up. The reduction in use was slightly higher for women (63.6% versus 55.6% for men), although this difference was not statistically significant. Clients who were in controlled living environments for 30 of the past 30 days were excluded from the analysis since it was assumed that they would not have had access to substances. Clients who were in controlled living environments a portion of the past 30 days were included, but only for the time they were "on the street".

**Table 9b. Reduction in Days of Marijuana Use in the Past 30 Days**

	Mean proportion of days marijuana was used		Percent reduction <sup>a</sup>
	Baseline	Follow-up	
Male (n = 511)	11.7%	5.2%	55.6%**
Female (n = 257)	14.3%	5.2%	63.6%**
Total (N = 778)	12.6%	5.2%	58.7%**

<sup>a</sup>Significance established using paired-samples t-tests.

\*p < .01. \*\*p < .001.

### ***Tranquilizer Use in the Past 30 Days***

Tranquilizers are a class of prescription drugs including benzodiazepines, barbiturates, and other sedatives, and downers, or hypnotics (for example, Valium, Xanax, Librium, prescribed sleeping pills, downers, and anti-anxiety pills).

There were clinically important but statistically insignificant changes in tranquilizer use from intake to follow-up. **Table 10a** shows that 64.6% of clients reported no tranquilizer use at both intake and follow-up. However an additional 17.3% of the sample reported no longer using tranquilizers at follow-up, resulting in 81.9% of the sample reporting tranquilizer abstinence at follow-up. This is a 26.8% increase in the number of clients reporting tranquilizer abstinence after treatment.

**Table 10a. Increase in Percent of Clients who Report Tranquilizer Abstinence**

	Remained abstinent		Newly abstinent		Total % abstinent at follow-up	% of change <sup>a</sup>
	N	Valid % of the total sample	N	Valid % of the total sample		
Male (n = 558)	366	65.6%	92	16.5%	82.1%	↑25.1%**
Female (n = 275)	172	62.5%	52	18.9%	81.4%	↑30.2%**
Total (N = 833)	538	64.6%	144	17.3%	81.9%	↑26.8%**

<sup>a</sup>Significance established using z test for proportions.

\*p < .01. \*\*p < .001

**Table 10b** presents the change in proportion of days that tranquilizers were used from intake to follow-up, controlling for days the client spent in a controlled living environment. At intake, tranquilizer use was reported by 35.6% of clients, who were using tranquilizers an average of 14.0% of the past 30 days (the equivalent of 4.2 days). At follow-up tranquilizer use was reported by 18.1% of clients, who were using tranquilizers only 11.7% of the past 30 days (the equivalent of about 3.5 days). This represents a 16.4% reduction in the frequency of tranquilizer use at follow-up. The reduction in use was slightly higher for women (23.7% versus 11.9% for men), although this difference was not statistically significant. Clients who were in controlled living environments for 30 of the past 30 days were excluded from the analysis since it was assumed they would not have had access to substances. Clients who were in controlled living environments a portion of the past 30 days were included but only for the time they were “on the street”.

**Table 10b. Reduction in Days of Tranquilizer Use in the Past 30 Days**

	Mean proportion of days tranquilizers were used		Percent reduction <sup>a</sup>
	Baseline	Follow-up	
Male (n = 511)	12.6%	11.1%	11.9%
Female (n = 256)	16.9%	12.9%	23.7%
Total (N = 767)	14.0%	11.7%	16.4%

<sup>a</sup>Significance established using paired-samples t-tests.

\*p < .01. \*\*p < .001.

### ***Opiate Use in the Past 30 Days***

Opiates include heroin, morphine, and prescription analgesics such as OxyContin®, oxycodone, hydrocodone, Percodan®, and Dilaudid®. Kentucky’s opiate use has historically involved mostly prescription drugs.

**Table 11a** shows that 75.1% of clients reported no opiate use in the past 30 days at both intake and follow-up. However an additional 16.0% of the sample reported no longer using opiates at follow-up, resulting in 91.1% of the sample reporting opiate abstinence at follow-up. This is a 21.3% rate of increase in the number of clients reporting opiate abstinence after treatment.

**Table 11a. Increase in Percent of Clients who Report Opiate Abstinence**

	Remained abstinent		Newly abstinent		Total % abstinent at follow-up	% of change <sup>a</sup>
	N	Valid % of the total sample	N	Valid % of the total sample		
Male (n = 558)	429	76.9%	83	14.9%	91.8%	↑19.3%*
Female (n = 274)	196	71.5%	50	18.3%	89.8%	↑25.5%**
Total (N = 832)	625	75.1%	133	16.0%	91.1%	↑21.3%*

<sup>a</sup>Significance established using z test for proportions.

\*p < .01. \*\*p < .001

**Table 11b** presents the change in proportion of days that opiates were used from intake to follow-up, controlling for days the client spent in a controlled living environment. At intake, opiate use was reported by 24.9% of clients, who were using opiates an average of 11.7% of the past 30 days (the equivalent of 3.5 days). At follow-up, opiate use was reported by 8.9% of clients who were using opiates only 6.1% of the past 30 days (the equivalent of less than 2 days). This represents a significant 47.9% reduction in the frequency of opiate use at follow-up. The reduction in use was slightly higher for women (49.7% versus 46.5% for men), although this difference was not statistically significant. Clients who were in controlled living environments for 30 of the past 30 days were excluded from the analysis since it was assumed they would not have had access to substances. Clients who were in controlled living environments a portion of the past 30 days were included but only for the time they were “on the street”.

**Table 11b. Reduction in Days of Opiate Use in the Past 30 Days**

	Mean proportion of days opiates were used		Percent reduction <sup>a</sup>
	Baseline	Follow-up	
Male (n = 511)	9.9%	5.3%	46.5%**
Female (n = 256)	15.5%	7.8%	49.7%**
Total (N = 777)	11.7%	6.1%	47.9%**

<sup>a</sup>Significance established using paired-samples t-tests.

\*p < .01. \*\*p < .001.

**Cocaine Use in the Past 30 Days**

**Table 12a** presents data on cocaine use in the past 30 days at intake and at follow-up. Over three-fourths (84.1%) of clients maintained cocaine abstinence from intake to follow-up. An additional 12.5% of clients reported use at intake but no use at follow-up. This represents a 14.4% increase in the number of clients reporting cocaine abstinence at follow-up when compared to intake.

**Table 12a. Increase in Percent of Clients who Report Cocaine Abstinence**

	Remained abstinent		Newly abstinent		Total % abstinent at follow-up	% of change <sup>a</sup>
	N	Valid % of the total sample	N	Valid % of the total sample		
Male (n = 557)	480	86.2%	56	10.1%	96.3%	↑11.7%
Female (n = 275)	220	80.0%	45	16.4%	96.4%	↑20.5%*
Total (N = 832)	700	84.1%	101	12.5%	96.2%	↑14.4%*

<sup>a</sup>Significance established using z test for proportions.

\*p < .01. \*\*p < .001

**Table 12b** presents the change in proportion of days that cocaine was used from intake to follow-up, controlling for days the client spent in a controlled living environment. At intake, cocaine use was reported for an average of 5.2% of the past 30 days (the equivalent of 1.6 days). At follow-up, cocaine use in the past 30 days was reported for only 0.7% of the past 30 days (the equivalent of less than 1 day). This represents a significant 86.5% reduction in the frequency of cocaine use at follow-up. Clients who were in controlled living environments for 30 of the past 30 days were excluded from the analysis since it was assumed they would not have had access to substances. Clients who were in controlled living environments a portion of the past 30 days were included but only for the time they were “on the street”.

**Table 12b. Reduction in Days of Cocaine Use in the Past 30 Days**

	Mean proportion of days cocaine was used		Percent reduction <sup>a</sup>
	Baseline	Follow-up	
Male (n = 510)	4.0%	0.7%	82.5%**
Female (n = 256)	7.5%	0.7%	90.7%**
Total (N = 766)	5.2%	0.7%	86.5%**

<sup>a</sup>Significance established using paired-samples t-tests.

\*p < .01. \*\*p < .001.

### ***Stimulant Use in the Past 30 Days***

Stimulants represent a class of drugs that includes amphetamine, methamphetamines as well as “meth”, speed, MDMA, Ecstasy, club drugs, and crank. **Table 13a** indicates that very few clients reported using stimulants at baseline and at follow-up. Despite this, there was an increase in the number of clients who reported being abstinent from stimulants at follow-up. While 88.8% of individuals reported no use at intake and at follow-up, an additional 7.7% became nonusers by follow-up.

**Table 13a. Increase in Percent of Clients who Report Stimulant Abstinence from Intake to Follow-up**

	Remained abstinent		Newly abstinent		Total % abstinent at follow-up
	N	Valid % of the total sample	N	Valid % of the total sample	
Male (n = 556)	498	90.0%	34	6.1%	96.1%
Female (n = 277)	224	87.4%	30	10.8%	98.2%
Total (N = 833)	740	88.8%	64	7.7%	96.5%

As shown in **Table 13b**, significant reductions were seen in the proportion of days in the past 30 days that stimulants were used from intake to follow-up. The reductions were significant for the total sample (60.6%) and for females (80.7%). Clients who were in controlled living environments for 30 of the past 30 days were excluded from the analysis since it was assumed they would not have had access to substances. Clients who were in controlled living environments a portion of the past 30 days were included but only for the time they were “on the street”. Percent of change was not examined due to the small number of clients reporting stimulant use at intake and follow-up.

**Table 13b. Reduction in Days of Stimulant Use in the Past 30 Days**

	Mean proportion of days stimulants were used		Percent reduction <sup>a</sup>
	Baseline	Follow-up	
Male (n = 509)	1.9%	1.4%	26.3%
Female (n = 259)	6.2%	1.2%	80.7%**
Total (N = 768)	3.3%	1.3%	60.6%**

<sup>a</sup>Significance established using paired-samples t-tests.

\*p < .01. \*\*p < .001.

### ***Nonprescription Methadone Use in the Past 30 Days***

Nonprescription methadone is obtained through illicit means or is used for purposes other than prescribed. **Table 14a** indicates that 98.1% of the sample reported not using non-prescribed methadone at follow-up. This includes 3.7% of the clients who were users at intake, but not at follow-up.

**Table 14a. Increase in Percent of Clients Who Report Nonprescription Methadone Abstinence**

	Remained abstinent		Newly abstinent		Total % abstinent at follow-up
	N	Valid % of the total sample	N	Valid % of the total sample	
Male (n = 558)	527	94.4%	17	3.1%	97.5%
Female (n = 276)	260	94.2%	14	5.1%	99.3%
Total (N = 834)	787	94.4%	31	3.7%	98.1%

**Table 14b presents** the significant reduction in the proportion of days in the past 30 days of nonprescription methadone use. The proportion of days using nonprescription methadone at intake was 1.5% (the equivalent of less than 1 day) and only 0.5% at follow-up. This represents a 66.7% reduction. In addition to a significant overall reduction, the reduction for females (90.5%) was significantly greater than that for males (50.0%). Clients who were in controlled living environments for 30 of the past 30 days were excluded from the analysis since it was assumed they would not have had access to substances. Clients who were in controlled living environments a portion of the past 30 days were included but only for the time they were “on the street”. Percent of change was not examined due to the small number of clients reporting nonprescription methadone use at intake and follow-up.

**Table 14b. Reduction in Days of Nonprescription Methadone Use in the Past 30 Days**

	Mean proportion of days nonprescription methadone was used		Percent reduction <sup>a</sup>
	Baseline	Follow-up	
Male (n = 511)	1.2%	0.6%	50.0%
Female (n = 258)	2.1%	0.2%	90.5%
Total (N = 769)	1.5%	0.5%	66.7%*

<sup>a</sup>Significance established using paired-samples t-tests.

\*p < .01. \*\*p < .001.

### ***Hallucinogen Use in the Past 30 Days***

**Table 15a** shows that very few clients reported using hallucinogens during the 30 days preceding intake or follow-up. Ninety-seven percent (97.2%) of the sample did not use hallucinogens at either intake or follow-up. In addition, there was an additional portion of individuals (1.3% of the sample) who reported not using by follow-up, so that after treatment, 99.5% of all clients reported no use of hallucinogens during the past 30 days.

**Table 15a. Increase in Percent of Clients Who Report Hallucinogen Abstinence**

	Remained abstinent		Newly abstinent		Total % abstinent at follow-up
	N	Valid % of the total sample	N	Valid % of the total sample	
Male (n = 558)	549	98.4%	6	1.1%	99.5%
Female (n = 276)	270	97.8%	5	1.8%	99.6%
Total (N = 834)	819	97.2%	12	1.3%	99.5%

**Table 15b** presents the proportion of days that hallucinogen users reported using at baseline and at follow-up. Because there were so few clients who used hallucinogens, the reduction in use is not reported. Clients who were in controlled living environments for 30 of the past 30 days were excluded from the analysis since it was assumed they would not have had access to substances. Clients who were in controlled living environments a portion of the past 30 days were included but only for the time they were “on the street”. Percent of change was not examined due to the small number of clients reporting hallucinogen use at intake and follow-up.

**Table 15b. Reduction in Days of Hallucinogen Use in the Past 30 Days**

	Mean proportion of days hallucinogens were used	
	Baseline	Follow-up
Male (n = 511)	0%	0%
Female (n = 258)	0.5%	0.2%
Total (N = 769)	0.2%	0.1%

***Inhalant Use in the Past 30 Days***

Very few clients reported ever using inhalants, as shown in **Table 16a**. By follow-up, 99.7% of the total sample reported no use during the preceding 30 days. For those who did report use, the number of days of use is presented in **Table 16b**. Because of the small number of users, analyses evaluating the reduction in use were not conducted. Clients who were in controlled living environments for 30 of the past 30 days were excluded from the analysis since it was assumed they would not have had access to substances. Clients who were in controlled living environments a portion of the past 30 days were included but only for the time they were “on the street”. Percent of change was not examined due to the small number of clients reporting inhalant use at intake and follow-up.

**Table 16a. Increase in Percent of Clients Who Report Inhalant Abstinence**

	Remained abstinent		Newly abstinent		Total % abstinent at follow-up
	N	Valid % of the total sample	N	Valid % of the total sample	
Male (n = 557)	554	99.5%	2	0.4%	99.9%
Female (n = 275)	271	98.6%	2	0.7%	99.3%
Total (N = 832)	825	99.2%	4	0.5%	99.7%

**Table 16b. Reduction in Days of Inhalant Use in the Past 30 Days**

	Mean proportion of days inhalants were used	
	Baseline	Follow-up
Male (n = 510)	0.2%	0%
Female (n = 257)	0.5%	0.5%
Total (N = 767)	0.3%	0.2%

### ***Injection Drug Use***

**Table 17** presents information about the level of reported IV administration of drugs in the past 30 days. In Kentucky, very few clients report IV drug use with only 3.0% reporting use at intake and 1.8% at follow-up for a 40.0% reduction in this HIV risk behavior. The low number of clients reporting IV drug use precluded analysis for significance of change from intake to follow-up.

**Table 17. Reduction in Clients Reporting IV Drug Use in the Past 30 Days**

	Baseline	Follow-up	Percent reduction <sup>a</sup>
Male (n = 512)	14 (2.7%)	11 (2.2%)	18.5%
Female (n = 258)	9 (3.5%)	3 (1.2%)	65.7%
Total (N = 770)	23 (3.0%)	14 (1.8%)	40.0%

<sup>a</sup>Significance established using paired-samples t-tests.

\*p < .01. \*\*p < .001.

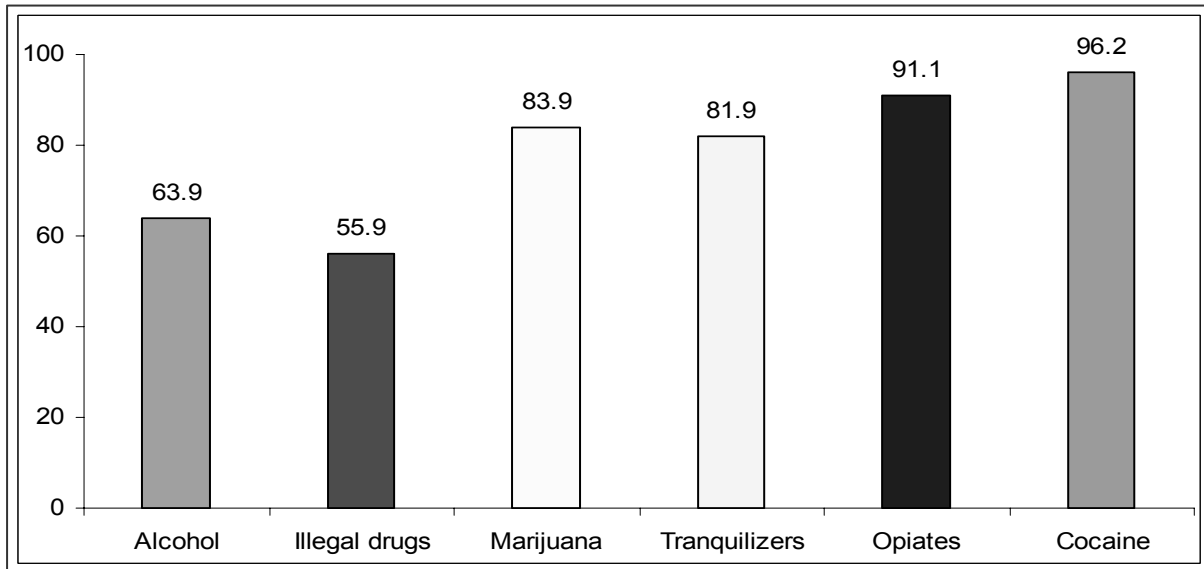
### ***Summary of Substance Abuse Changes***

The follow-up findings suggest important gains in reported abstinence, with almost 84.0% of clients reporting marijuana abstinence and over ninety percent of clients reporting



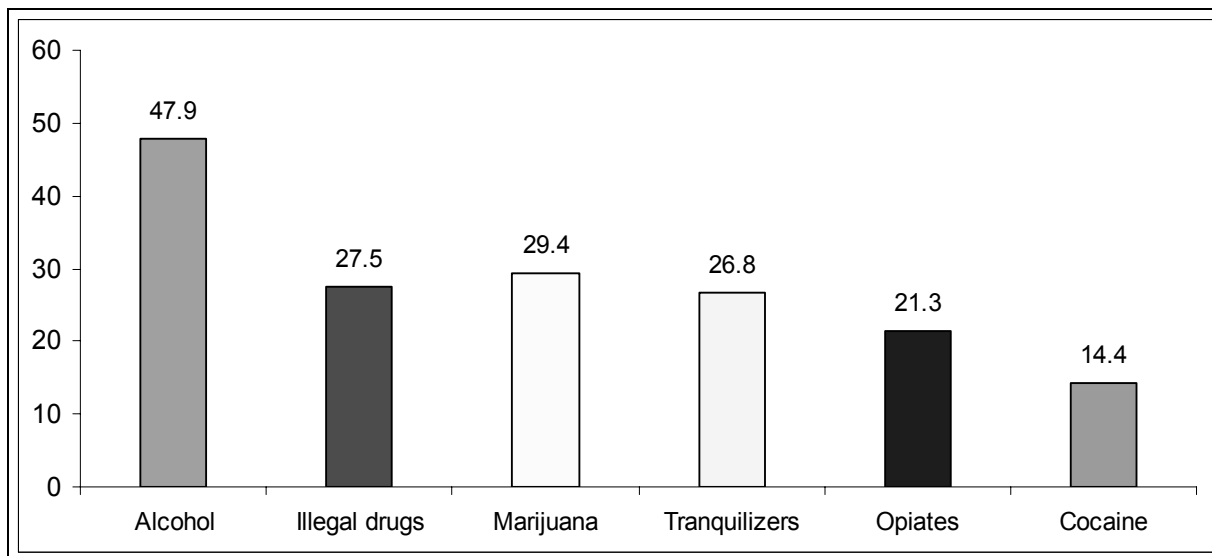
cocaine and opiate abstinence at follow-up. **Figure 1** presents the percent of abstinent clients for each substance 12 months after treatment intake.

**Figure 1. Percent of Clients Abstinent at Follow-up (N=838)**



**Figure 2** presents the overall percent increases in reported abstinence from intake to follow-up. There were important increases in the percent of clients reporting abstinence in each substance. While there was variation among the substances in rate of change, there are positive changes for alcohol and all other drugs.

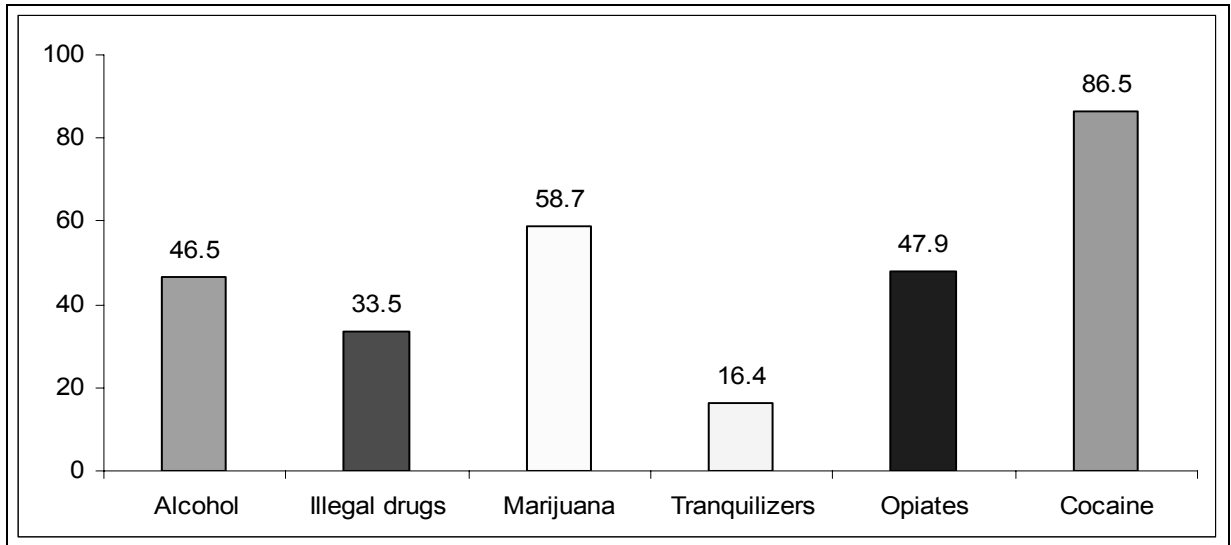
**Figure 2. Increase in the Percent of Clients Reporting Abstinence at Follow-up (N=838)**



As presented in **Figure 3**, there were important reductions in the number of days of reported substance use in the past 30 days among clients who continued to report substance use. While abstinence is a more definitive outcome, a reduction in days of use is also important

and **Figure 3** shows the percent of change in the number of days of substance use for the six substances most reported by clients.

**Figure 3. Percent Reduction in Days of Substance Use at Follow-up (N=838)**



Changes in substance use are also mirrored in increased employment, decreased justice system activity, and improved health and mental health symptoms as described in Section III.

### **Section III. Employment, Justice System Involvement, and Health Outcomes**

Changes in employment, justice system involvement (including arrests and time incarcerated), and health status can serve as other indicators of changes in substance use. Descriptive data, using means and percentages for employment and justice system involvement, are presented for the past 12 months and the past 30 days before intake and at follow-up.

Changes in variables such as employment and education, justice system involvement, and health ratings are presented using the percent of clients in each category. Significance of change is examined from intake to follow-up using a z test for differences in the proportion in each category between the intake and follow-up groups. For continuous data, such as the number of arrests during the preceding 30 days, or the number of days paid for work in the past 30 days, the percent of change (increase or decrease) from intake to follow-up is presented. For these measures, statistical significance was examined using paired samples t-tests. In addition, for days of paid employment, the analysis controlled for the client's days living in a controlled environment where paid work would not be possible.

There were significant improvements in employment, justice system involvement, overall health and mental health from intake to follow-up.

#### ***Employment***

**Table 18** shows changes in employment status and number of days paid for working, as measured for the preceding 30 day period, and changes in education/job training status at the time of the follow-up interview. The percent of clients are presented for each category of employment at intake and follow-up.

Using the z-test for proportions, **significant improvements in employment were noted from intake to follow-up**. The proportion of clients employed full-time increased significantly by 45.3%, the proportion of clients with any employment, even part-time, increased significantly by 35.6%, and the proportion of clients reporting **unemployment decreased significantly** by 48.9%. There was a slight, but statistically insignificant increase (24.5%) in disabled clients, from 14.3% at intake to 17.8% at follow-up.

Overall, **clients were paid for a significantly greater proportion of days of work at follow-up (43.0%) than at intake (33.0%)**. This is a 30.3% increase in the mean proportion of days of paid work, controlling for the days clients lived in a controlled environment, but including clients with no paid days of employment in the past 30 days.

In addition to experiencing significant improvements in employment, the sample demonstrated an overall **increase in school/job training enrollment**. Using the z-test for proportions, there was a significant increase in the percent of individuals enrolled full time (71.4%), and the percent of individuals enrolled full or part time (66.7%).

**Table 18. Changes in Employment, Income, and Educational Status**

	Intake	Follow-up	Percent of change <sup>a</sup>
<b>Employment status<sup>a</sup></b>	<b>N = 828</b>		
Full time	29.6%	43.0%	↑ 45.3% **
Part time	11.4%	12.6%	↑ 10.5%
Any employment (part + fulltime)	41.0%	55.6%	↑ 35.6% **
Unemployed	33.1%	16.9%	↓ 48.9% **
Disabled	14.3%	17.8%	↑ 24.5%
<b>Mean proportion days paid for working in the past 30 days<sup>b</sup> (n = 773)</b>	33.0%	43.0%	↑ 30.3% **
<b>School/job training enrollment status<sup>a</sup></b>	<b>N = 813</b>		
Full time	4.9%	8.5%	↑ 71.4% **
Part time	2.6%	4.1%	↑ 57.7% **
Full or part time	7.5%	12.5%	↑ 66.7% **

<sup>a</sup> Significance established using z-test for proportions.

<sup>b</sup> Significance established using paired samples t-test. Includes only those who were not in a controlled living environment for 30 days in the past 30 days at intake or follow-up

\*p < .01. \*\*p < .001.

### ***Justice System Involvement***

**Table 19a** presents the percent of clients arrested in the past 12 months and past 30 days before intake and at follow-up, as well as the percent of change from intake to follow-up in self-reported arrests. Specifically, it shows that there were **significant reductions in the proportion of clients arrested and incarcerated**. For example, 63.3% of clients reported an *arrest (on any charge)* during the 12 months preceding intake, whereas only 30.9% of clients reported the same during the 12 months before follow-up. This is a 51.2% reduction in arrests in the past 12 months on any charge. An even greater change was a 62.7% reduction in self-reported arrests in the past 30 days on any charge from intake (13.4%) to follow-up (5.0%).

Similar reductions were in self-reported arrests *on drug charges*. The percent of clients reporting arrests on drug charges in the past 12 months decreased from 46.4% at intake to 19.0% at follow-up, a 59.1% reduction. The percent of clients reporting arrests on drug charges in the past 30 days decreased from 7.5% at intake to 2.0% at follow-up, a 73.3% reduction. About two-thirds of the clients (66.3%) spent at least one night in jail in the 12 months before intake and 32.5% reported spending at least one night in jail in the 12 months before follow-up for a 51.0% reduction in self-reported incarceration status. The rate of change was greater for those reporting incarceration in the past 30 days with 23.1% reporting at least one night in jail in the 30 days before intake and only 7.9% reporting incarceration in the past 30 days at follow-up; thus there was a 65.8% reduction in the percent of clients reporting being incarcerated in the past 30 days.

**Table 19a. Changes in Arrests and Incarceration for Entire Sample (N=838)**

		Intake		Follow-up		Percent change <sup>a</sup>
		N	%	N	%	
Arrested on any charge	12 months	529/836	63.3%	259/838	30.9%	↓ 51.2%**
	30 days	112/837	13.4%	42/838	5.0%	↓ 62.7%**
Arrested specifically on drug charge	12 months	389/836	46.4%	159/838	19.0%	↓ 59.1%**
	30 days	64/837	7.5%	17/838	2.0%	↓ 73.3%**
Spent at least 1 night in jail	12 months	553/837	66.3%	272/838	32.5%	↓ 51.0%**
	30 days	192/836	23.1%	66/838	7.9%	↓ 65.8%**

<sup>a</sup>Significance established using z-test for proportions.

\* $p < .01$ . \*\* $p < .001$ .

**Table 19b** presents changes in the mean number of self-reported arrests and nights incarcerated for the entire sample. It shows that there were **significant reductions in the number of self-reported arrests 12 months after treatment**. For clients arrested on any charge, there was a 5.6% reduction in the mean number of *arrests on any charge* during the preceding 12 months from intake (mean = 1.8) to follow-up (mean = 1.7). The mean number of arrests during the preceding 30 days also decreased significantly, from 1.3 at intake to 1.1 at follow-up (a 15.4% reduction). For *drug-related arrests*, the largest reduction was from the 30 days preceding intake (mean = 1.3) to the 30 days preceding follow-up (mean = 1.0), a 23.1% reduction.

There were significant reductions in the reported mean number of nights in jail which decreased from 32.8 nights in the 12 months before intake to 23.1 nights at follow-up for a 29.6% reduction in the nights spent in jail in the past 12 months. In addition, there was a 75.7% reduction in the mean number of nights spent in jail from intake to follow-up.

**Table 19b. Changes in the Mean Number of Arrests and Nights Incarcerated**

		Intake	Follow-up	Percent change <sup>a</sup>
Total self-reported arrests in the past -	12 months	1.8	1.7	↓ 5.6%**
	30 days	1.3	1.1	↓ 15.4%**
Self-reported arrests on drug charges in the past -	12 months	1.6	1.5	↓ 6.3%**
	30 days	1.3	1.0	↓ 23.1%**
Self-reported nights in jail in the past -	12 months	32.8	23.1	↓ 29.6%**
	30 days	3.4	0.8	↓ 75.7%**

<sup>a</sup> Significance established using paired samples t-tests.

\* $p < .01$ . \*\* $p < .001$ .

### **Physical and Mental Health Status**

**Table 20** presents positive changes in overall health and mental health. While the overall mean health rating for all clients did not change significantly from intake to follow-up, the percentage of clients rating their health as “excellent” increased from 11.1% at intake to 15.4% at follow-up, as did the percentage of clients rating their health “very good” (an increase from 21.5% to 29.8%). At follow-up, 45.2% reported their health as “very good” or “excellent”, whereas at intake 32.6% reported their health as “very good” to “excellent”. A small percent of clients reported “poor” health at intake and follow-up with a slight but insignificant increase at follow-up.

**Table 20** also presents significant changes in client mental health ratings. The percentage of clients reporting serious depression decreased from 43.5% at intake to about 36.4% at follow-up, which is a 15.9% reduction in the percent of clients reporting serious depression. There was also a significant reduction in the percent of clients reporting suicidal thoughts, from 14.2% at intake to 8.1% at follow-up for a 42.1% reduction. Similarly, there was a significant reduction (76.7%) in the percent of clients reporting suicidal attempts during the past 12 months, from intake (6.1%) to follow-up (1.4%). There were decreases in reported serious anxiety and hallucinations, but these changes were not statistically significant.

**Table 20. Changes in Health and Mental Health Ratings**

Past 12 months	Intake	Follow-up	Percent of change <sup>a</sup>
<b>Overall health rating</b>	<b>N = 838</b>		
1. Excellent	11.1%	15.4%	↑ 38.7%**
2. Very good	21.5%	29.8%	↑ 38.6%**
3. Good	39.0%	28.9%	↓ 25.5%**
4. Fair	20.9%	17.5%	↓ 25.4%**
5. Poor	7.6%	10.2%	↑ 35.5%
<b>Mean overall health rating</b>	<b>2.9</b>	<b>2.8</b>	N/A
<b>Psychological problems</b>	<b>N = 838</b>		
Serious depression	43.5%	36.4%	↓ 15.9%*
Serious anxiety	48.4%	44.9%	↓ 7.0%
Hallucinations	6.4%	5.4%	↓ 14.3%
Trouble understanding/concentrating	40.7%	41.8%	↑ 3.0%
Trouble controlling violent behavior	16.6%	13.4%	↓ 19.3%
Suicidal thoughts	14.2%	8.1%	↓ 42.1%**
Attempted suicide	6.1%	1.4%	↓ 76.7%**
Prescribed psychiatric medications	29.4%	30.5%	↑ 4.1%

<sup>a</sup> Significance established using z test for proportions.

\* $p < .01$ . \*\* $p < .001$ .

***Summary of Employment, Justice System Involvement, and Health***

Clients reported significant changes in employment both in terms of an increased number of clients reporting part or full-time work and in terms of days of paid employment in the past 30 days. Likewise, clients reported a significant reduction in the number of arrests and nights in jail at follow-up when compared to intake. Mental health and health ratings increased, suggesting improvements among the sample at follow-up. Among these changes, the employment and justice system involvement have the greatest implications for public policy as seen in the estimates of cost savings (See Section V).

## **Section IV. Treatment Services**

Clients entering treatment in Kentucky's publicly funded substance abuse treatment programs can receive a wide range of services including non-medical or medical detoxification, residential, intensive outpatient, case management, outpatient group and individual therapy, as well as rehabilitation services for persistent co-occurring mental health problems. With the exception of residential and intensive outpatient, services are rarely provided as a standard program with a clear treatment discharge. Since the predominant form of treatment is outpatient, the services may be used by clients episodically.

### ***Description of Overall Service Use***

For this study, service data were collected from the Client Event Data Set from the University of Kentucky Research and Data Management Center, which manages all client data, event data, and provider information for the Kentucky Department of Mental Health and Mental Retardation. Client service events were selected for all services for 364 days after the KTOS intake date. Data were selected by service type for each client. It is important to note that these data do not necessarily constitute a count of client treatment "episodes", but a count of all services received 12 months from intake data collection. The exact boundary of outpatient episodes is not defined by clear treatment decisions but is usually concluded from the date of the last service. Since many clients in Kentucky tend to enter, exit, and re-enter treatment, all services within the 12 months post-intake are examined, regardless of episode. While utilization data were analyzed for total amount of treatment received, there were no statistically significant differences in treatment outcome related to length of treatment or amount of services received, though there were differences in treatment modality.

In Kentucky's system of substance abuse treatment, clients may receive a wide array of services rather than just one modality or service type. Many clients receive a variety of services within the categories listed below. For example, under "outpatient therapy" a client could receive psychiatric individual sessions as well as group counseling for substance abuse. The service data presented for clients excludes non-treatment events such as education groups on substance abuse for DUI offenders.



**Table 21** presents the utilization of types of services clients received that were reported to the state. The entire list of services includes over 70 types and they were analyzed by combining them into classes of services. The percent of clients in the seven broad categories is greater than 100% because clients could have received services in more than one category.

Outpatient therapy was the largest portion of services (77.7%), followed by assessment/evaluation (35.7%) and residential treatment (30.4%), which includes 30-day as well as longer term transitional residential treatment. For those receiving any services, the largest number of services provided was in residential treatment (34.9 days), followed by intensive outpatient and therapeutic rehabilitation (25.1 services). Outpatient clients received an average of 15 sessions within the 12 months after intake.

**Table 21. Percent of Clients Receiving Major Types of Substance Abuse Treatment**

Treatment Modality	% Received <sup>1</sup>	Mean (SD) services for those who received
Detoxification/stabilization	14.2%	5.6 (5.0)
Intensive outpatient & therapeutic rehabilitation	12.3%	25.1 (30.9)
Outpatient therapy	77.7%	15.0 (17.8)
Residential treatment	30.4%	34.9(45.0)
Case management	10.9%	24.6 (55.0)
Assessment/evaluation	35.7%	1.8 (1.2)
All Other Types of Services	11.6%	5.0 (4.7)
Any service	100%	30.5 (40.9)

<sup>1</sup> Percents do not add to 100 since clients can be in multiple modalities.

***Effects of Recovery Support and Treatment Modality on Substance Use Outcomes***

In addition to clinical services that are reported to the state in the Client Data Set, clients self-reported participation in other self-help activities that contribute to recovery. Clients reported participating in Alcoholics Anonymous, Narcotics Anonymous, and other self-help groups. Overall, data on self-help participation were available for 679 clients with 35.9% (244) of all clients reporting self-help as part of their recovery.

***Outcomes for Clients Reporting Self-Help and No Self-Help***

There were significant differences in treatment outcomes for clients who reported using self-help when compared to clients who reported not using self-help. To give examples of the differences in alcohol and drug use between self-help users and nonusers, **Tables 22a, 22b, and 22c** present data on alcohol use, alcohol use to intoxication, and overall illegal drug use for the two groups. These differences are evident at intake and follow-up. Clients who reported using self-help reported a greater number of days of alcohol use at intake than clients who reported not using self-help. The self-help group reported alcohol use for 19.8% of days in the past 30 days at intake and the clients who reported not using self-help groups reported alcohol use for 16.1% of the past 30 days. Most importantly, the reductions in the proportion of days using alcohol were greater for those using self-help (74.2%) than for those not using self-help (26.7%). The change scores for self-help clients versus the no self-help clients were different for alcohol use to intoxication with the self-help user group reporting an 84.0% reduction at

follow-up compared to a 51.2% reduction for the no self-help group. In addition, clients who reported using self-help had greater reductions in reported days of use of illegal drugs at follow-up when compared to clients who did not use self-help. Like earlier variables, the analysis of days of reported alcohol use controlled for days of living in a controlled environment.

**Table 22a. Reductions in Days of Alcohol Use in the Past 30 Days Among Self-help Groups**

	Mean proportion of days alcohol was used		Percent reduction <sup>a</sup>
	Baseline	Follow-up	
Self-help (n = 210)	19.8%	5.1%	74.2%**
No Self-help (n = 557)	16.1%	11.8%	26.7%**
Total (N = 767)	17.4%	9.3%	46.5%**

<sup>a</sup> Significance established using paired-samples t-tests.

\*p < .01. \*\*p < .001

**Table 22b. Reductions in Use of Alcohol to Intoxication in the Past 30 Days Among Self-help Groups**

	Mean proportion of days alcohol was used To intoxication		Percent reduction <sup>a</sup>
	Baseline	Follow-up	
Self-help (n = 210)	14.4%	2.3%	84.0%**
No Self-help (n = 561)	12.5%	6.1%	51.2%**
Total (N = 771)	13.1%	4.9%	62.6%**

<sup>a</sup> Significance established using paired-samples t-tests.

\*p < .01. \*\*p < .001

**Table 22c. Reductions in the Use of Illegal Drugs in the Past 30 Days Among Self-help Groups**

	Mean proportion of days illegal drugs were used		Percent reduction <sup>a</sup>
	Baseline	Follow-up	
Self-help (n = 210)	29.2%	16.2%	44.5%**
No Self-help (n = 565)	26.4%	20.4%	22.7%**
Total (N = 775)	27.5%	19.0%	30.9%**

<sup>a</sup> Significance established using paired-samples t-tests.

\*p < .01. \*\*p < .001

***Outcomes for Clients Receiving Residential or Outpatient Services***

Substance abuse treatment in Kentucky involves different treatment modalities and a wide array of services as presented previously in **Table 21**. To better understand treatment outcomes, client differences can be examined by treatment modality. In order to examine distinct differences, the following tables present self-report information from two groups of

follow-up clients who received residential treatment, but no outpatient treatment and clients who received outpatient treatment only and no residential treatment. **Table 23** presents demographic and clinical characteristics at intake for clients who received residential treatment only and clients who received outpatient treatment only and no residential treatment services. Only one factor, unemployment, was significantly different for the two groups with over half the residential treatment group (51.4%) and only 25.8% of the outpatient treatment only group being unemployed. The slight differences in overall demographic characteristics suggest that the changes presented in **Tables 23–30** are related to other clinical or treatment characteristics. These data are for 612 clients; the remaining 226 received a combination of residential treatment and outpatient treatment services or no service data were reported.

**Table 23. Demographics for Residential Only or Outpatient Only Treatment**

<b>Demographic data</b>	<b>% or mean for residential only (N=108)</b>	<b>% or mean for outpatient only (N=504)</b>
Gender: % Male	68.5%	72.2%
Mean age	31.1	34.2
Ethnic background: % White	83.2%	90.7%
Employment status		
Full-time	24.8%	32.8%
Part-time	6.7%	12.4%
Retired	0.0%	1.8%
Disabled	7.6%	17.4%
Unemployed, looking	51.4%*	25.8%*
Other	9.5%	9.8%
Mean days paid for working (whole sample)	6.0	8.5
<b>Health &amp; mental health</b>		
Current overall health rating		
1. Excellent	5.6%	13.1%
2. Very good	27.8%	21.4%
3. Good	38.9%	36.9%
4. Fair	20.4%	20.6%
5. Poor	7.4%	7.9%
Mean overall health rating	3.0	2.9
Serious depression	45.3%	40.1%
Serious anxiety	51.0%	44.1%
Trouble concentrating/understanding	44.8%	38.0%
Trouble controlling violent behavior	21.2%	12.8%
Suicidal thoughts	15.2%	11.8%
Suicide attempts	6.7%	5.4%
Prescribed psychiatric medications	26.9%	27.3%
<b>Justice system involvement</b>		
Arrested on any charge during past 30 days	16.7%	9.9%

Significance established using z test for proportions.

\*p < .01. \*\*p < .001

**Table 24** presents differences in reductions in alcohol use among clients receiving only residential treatment services and clients receiving only outpatient treatment. A greater percent of residential treatment clients reported using alcohol at intake. Residential treatment clients also reported a greater reduction in the proportion of days of alcohol use in the past 30 days than outpatient clients. The change in the percent of clients (45.6% reduction) reporting alcohol use was significant for clients who received only residential treatment when compared to clients with only outpatient treatment, for whom the percent of change was negligible (0.7% reduction). In addition, the residential treatment group reported significant reductions in the proportion of days of alcohol use in the past 30 days (59.0% reduction) where the outpatient group reduction was statistically insignificant (10.1%). The analysis of days of use controls for clients' time in controlled living environments, and clients who were in residential settings such as jails or hospitals for all of the past 30 days were excluded from the analysis.

**Table 24. Past 30 Day Alcohol Use by Residential Only or Outpatient Only Treatment**

	Percent of clients reporting alcohol use		Percent change <sup>a</sup>
	Intake	Follow-up	
Residential only (N = 108)	55.9%	30.4%	↓45.6%**
Outpatient only (N = 504)	40.5%	40.2%	↓0.7%
	Mean proportion of days alcohol was used		Percent change <sup>b</sup>
	Intake	Follow-up	
Residential only (N = 86) <sup>c</sup>	27.8%	11.4%	↓ 59.0%**
Outpatient only (N = 462) <sup>c</sup>	10.9%	9.8%	↓ 10.1%

<sup>a</sup> Significance established using z test for proportions.

<sup>b</sup> Significance established using paired-samples t-tests.

<sup>c</sup> Cases not included if clients were in controlled living environments for all of the past 30 days

\*p < .01 \*\*p < .001

**Table 25** presents differences in reductions in alcohol use to intoxication among clients receiving only residential treatment services and clients receiving only outpatient treatment. A greater percent of residential treatment clients reported using alcohol to intoxication at intake. Residential treatment clients also reported a greater reduction in the proportion of days of alcohol use to intoxication in the past 30 days than outpatient clients. The change in the percent of clients (59.2% reduction) reporting alcohol use to intoxication was significant for clients who received only residential treatment when compared to clients with only outpatient treatment, for whom the percent of change was modest (10.5% reduction). In addition, the residential treatment group reported significant reductions in the proportion of days of alcohol use to intoxication in the past 30 days (67.7% reduction) where the outpatient group reduction was statistically insignificant (29.0%). The analysis of days of use controls for clients' time in controlled living environments, and clients who were in residential settings such as jails or hospitals for all of the past 30 days were excluded from the analysis.

**Table 25. Past 30 Day Alcohol Use to Intoxication By Residential Only or Outpatient Only Treatment**

	Percent of clients reporting alcohol use to intoxication		Percent Change <sup>a</sup>
	Intake	Follow-up	
Residential only (N = 108)	50.5%	20.6%	↓59.2%**
Outpatient only (N = 504)	28.6%	25.6%	↓10.5%
	Mean proportion of days alcohol was used to intoxication		Percent Change <sup>b</sup>
	Intake	Follow-up	
Residential only (N = 86) <sup>c</sup>	24.8%	8.0%	↓ 67.7%**
Outpatient only (N = 462) <sup>c</sup>	6.9%	4.9%	↓ 29.0%

<sup>a</sup> Significance established using z test for proportions.

<sup>b</sup> Significance established using paired-samples t-tests.

<sup>c</sup> Cases not included if clients were in controlled living environments, for all of the past 30 days

\*p < .01 \*\*p < .001

**Table 26** presents the differences in reductions in illegal drug use among clients receiving only residential treatment and clients receiving only outpatient treatment. A greater percent of residential treatment clients reported using illegal drugs at intake than at follow-up. Furthermore, residential treatment clients reported a greater reduction in average days of use than outpatient clients. The change in the percent of clients (56.2% reduction for residential, 18.4% for outpatient) reporting illegal drug use was significant for both groups. However, clients who received only residential treatment, when compared to clients with only outpatient, had a far greater reduction. In addition, the residential treatment only group reported significant reductions in the proportion of days of illegal drug use in the past 30 days (57.4% reduction) where the outpatient group reduction rate (11.6%) was again statistically insignificant, though clinically important. The analysis of days of use controls for clients' time in controlled living environments, and clients who were in residential settings such as jails or hospitals for all of the past 30 days were excluded from the analysis.

**Table 26. Past 30 Day Illegal Drug Use by Residential Only or Outpatient Only Treatment**

	Percent of clients reporting any illegal drug use		Percent change <sup>a</sup>
	Intake	Follow-up	
Residential only (N = 108)	71.7%	31.4%	↓56.2%**
Outpatient only (N = 504)	37.0%	30.2%	↓18.4%*
	Mean proportion of days any illegal drug was used		Percent change <sup>b</sup>
	Intake	Follow-up	
Residential only (N = 86) <sup>c</sup>	37.8%	16.1%	↓ 57.4%**
Outpatient only (N = 462) <sup>c</sup>	19.8%	17.5%	↓ 11.6%

<sup>a</sup> Significance established using z test for proportions.

<sup>b</sup> Significance established using paired-samples t-tests.

<sup>c</sup> Cases not included if clients were in controlled living environments for all of the past 30 days

\*p < .01 \*\*p < .001

**Table 27** presents differences in reductions in marijuana use among clients receiving only residential treatment and clients receiving only outpatient treatment services. A greater percent of residential treatment clients reported using marijuana at intake, and residential treatment clients reported a much greater reduction in proportion of days of illegal drug use than outpatient clients. The change in the percent of clients (60.5% reduction) reporting marijuana use was significant for residential clients when compared to outpatient clients, for whom the percent of change was less, but still significant (24.0% reduction). In addition, the residential treatment only group had significant reductions in the proportion of days of marijuana use in the past 30 days (69.4% reduction) as did the outpatient group reduction rate (42.9%). The analysis of days of use controls for clients' time in controlled living environments, and clients who were in residential settings such as jails or hospitals for all of the past 30 days were excluded from the analysis.

**Table 27. Past 30 Day Marijuana Use by Residential Only or Outpatient Only Treatment**

	Percent of clients reporting marijuana use		Percent change <sup>a</sup>
	Intake	Follow-up	
Residential only (N = 108)	52.2%	20.6%	↓60.5%**
Outpatient only (N = 504)	20.0%	15.2%	↓24.0%*
	Mean proportion of days marijuana was used		Percent change <sup>b</sup>
	Intake	Follow-up	
Residential only (N = 86) <sup>c</sup>	25.5%	7.8%	↓ 69.4%**
Outpatient only (N = 462) <sup>c</sup>	7.0%	4.0%	↓ 42.9%*

<sup>a</sup> Significance established using z test for proportions.

<sup>b</sup> Significance established using paired-samples t-tests.

<sup>c</sup> Cases not included if clients were in controlled living environments for all of the past 30 days

\*p < .01 \*\*p < .001

**Table 28** presents differences in reductions in tranquilizer use among clients receiving only residential treatment and clients receiving only outpatient treatment. A greater percent of residential treatment clients reported tranquilizer use at intake. In addition, residential treatment clients reported a greater reduction in proportion of past 30 days use than outpatient clients. The change in the percent of clients (60.4% reduction) reporting tranquilizer use was significant for clients who received residential treatment when compared to clients with outpatient treatment, for whom the percent of change was not significant (3.1% reduction). In addition, the residential treatment group reported significant reductions in the proportion of days of tranquilizer use in the past 30 days (38.5% reduction) while the outpatient group reported a slight, but statistically insignificant, increase from intake to follow-up (1.7% increase). The analysis of days of use controls for clients' time in controlled living environments, and clients who were in residential settings such as jails or hospitals for all of the past 30 days were excluded from the analysis.

**Table 28. Past 30 Day Tranquilizer Use by Residential Only or Outpatient Only Treatment**

	Percent of clients reporting tranquilizer use		Percent change <sup>a</sup>
	Intake	Follow-up	
Residential only (N = 108)	39.6%	15.7%	↓60.4%**
Outpatient only (N = 504)	19.4%	18.8%	↓3.1%
	Mean proportion of days tranquilizers were used		Percent change <sup>b</sup>
	Intake	Follow-up	
Residential only (N = 86) <sup>c</sup>	17.4%	10.7%	↓ 38.5%
Outpatient only (N = 463) <sup>c</sup>	12.1%	12.3%	↑ 1.7%

<sup>a</sup> Significance established using z test for proportions.

<sup>b</sup> Significance established using paired-samples t-tests.

<sup>c</sup> Cases not included if clients were in controlled living environments for all of the past 30 days

\*p < .01 \*\*p < .001

**Table 29** presents differences in reductions in opiate use among clients receiving only residential treatment and clients receiving only outpatient treatment. A greater percent of residential treatment clients reported opiate use at intake. In addition, residential clients reported a greater reduction in average days of use than outpatient clients. The change in the percent of clients reporting opiate use was significant for clients in both groups with residential at a 73.5% reduction and outpatient at a 43.1% reduction. In addition, the residential treatment only group had significant reductions in the proportion of days of tranquilizer use in the past 30 days (69.4% reduction) while the outpatient group reported slightly less but still significant decreases (40.4% reduction). The analysis of days of use controls for clients' time in controlled living environments, and clients who were in residential settings such as jails or hospitals for all of the past 30 days were excluded from the analysis.

**Table 29. Past 30 Day Opiate Use by Residential Only or Outpatient Only Treatment**

	Percent of clients reporting opiate use		Percent change <sup>a</sup>
	Intake	Follow-up	
Residential only (N = 108)	37.8%	10.0%	↓73.5%**
Outpatient only (N = 504)	15.3%	8.7%	↓43.1%**
	Mean proportion of days opiates were used		Percent change <sup>b</sup>
	Intake	Follow-up	
Residential only (N = 85) <sup>c</sup>	19.6%	6.0%	↓ 69.4%**
Outpatient only (N = 462) <sup>c</sup>	9.4%	5.6%	↓ 40.4%*

<sup>a</sup> Significance established using z test for proportions.

<sup>b</sup> Significance established using paired-samples t-tests.

<sup>c</sup> Cases not included if clients were in controlled living environments for all of the past 30 days

\*p < .01 \*\*p < .001

**Table 30** presents differences in reductions in cocaine use among clients receiving only residential treatment and clients receiving only outpatient treatment. A greater percent of residential treatment clients reported cocaine use at intake. In addition, residential treatment clients reported a greater reduction in the proportion of days of cocaine use than outpatient clients. The change in the percent of clients reporting cocaine use was significant for clients in both groups with residential at a 76.2% reduction and outpatient at a 65.7% reduction. In addition, the residential treatment only group had significant reductions in the average proportion of days of cocaine use in the past 30 days (83.1% reduction) while the outpatient group reported a slightly less, but still significant, decrease (75.0% reduction). There was a difference in both the percent of clients reporting cocaine use at baseline in the two groups and an even greater difference in the proportion of days of reported cocaine use at baseline such that the outpatient group reported less frequent cocaine use *at intake* (2.0%) than the residential clients reported *at follow-up* (3.0%). The analysis of days of use controls for clients' time in controlled living environments, and clients who were in residential settings such as jails or hospitals for all of the past 30 days were excluded from the analysis.

**Table 30. Past 30 Day Cocaine Use by Residential Only or Outpatient Only Treatment**

	Percent of clients reporting cocaine use		Percent change <sup>a</sup>
	Intake	Follow-up	
Residential only (N = 108)	37.0%	8.8%	↓76.2%**
Outpatient only (N = 504)	7.0%	2.4%	↓65.7%**
	Mean proportion of days cocaine was used		Percent change <sup>b</sup>
	Intake	Follow-up	
Residential only (N = 87) <sup>c</sup>	17.8%	3.0%	↓ 83.1%**
Outpatient only (N = 461) <sup>c</sup>	2.0%	0.5%	↓ 75.0%*

<sup>a</sup> Significance established using z test for proportions.

<sup>b</sup> Significance established using paired-samples t-tests.

<sup>c</sup> Cases not included if clients were in controlled living environments for all of the past 30 days

\*p < .01 \*\*p < .001

**Table 31** presents differences in reductions in stimulant use among clients receiving only residential treatment and clients receiving only outpatient treatment. A greater percent of residential treatment clients reported stimulant use at intake. However, residential treatment clients reported a smaller reduction in the proportion of days of stimulant use than did outpatient treatment clients. The change in the percent of clients reporting stimulant use was significant for clients in both groups with residential treatment only at a 61.9% reduction and outpatient treatment only at a 46.7% reduction. Neither group had significant reductions in the average proportion of days of stimulant use at follow-up. The analysis of days of use controls for clients' time in controlled living environments, and clients who were in residential settings such as jails or hospitals for all of the past 30 days were excluded from the analysis.



**Table 31. Past 30 Day Stimulant Use by Residential Only or Outpatient Only Treatment**

	Percent of clients reporting stimulant use		Percent change <sup>a</sup>
	Intake	Follow-up	
Residential only (N = 108)	23.1%	8.8%	↓ 61.9%**
Outpatient only (N = 504)	4.5%	2.4%	↓ 46.7%**
	Mean proportion of days stimulants were used		Percent change <sup>b</sup>
	Intake	Follow-up	
Residential only (N = 86) <sup>c</sup>	7.2%	3.9%	↓ 45.8%
Outpatient only (N = 462) <sup>c</sup>	1.7%	0.9%	↓ 87.5%

<sup>a</sup> Significance established using z test for proportions.

<sup>b</sup> Significance established using paired-samples t-tests.

<sup>c</sup> Cases not included if clients were in controlled living environments for all of the past 30 days

\*p < .01 \*\*p < .001

***Summary of Differences in Outcomes by Treatment Type***

While this analysis of differences in outcome by treatment type only focused on two major modalities, it suggests that given the seriousness of substance abuse problems of clients in state-funded treatment clients may experience more dramatic change in residential than in outpatient treatment. Future studies should examine outcomes for clients receiving services in more than one treatment modality.

In addition, this study suggests that treatment outcomes for clients using self-help may be more positive than for clients who do not use self-help. These differences in treatment outcome take on more clinical and policy significance when outcomes are examined in terms of cost savings as discussed in the next section.

## **Section V. Avoided Costs from Substance Abuse Treatment in Kentucky**

Substance abuse treatment cost savings can be difficult to estimate because of the numerous economic factors associated with crime reduction. In addition, various methods for calculating employment including changes in wages and benefits, as well as changes in health status and health utilization and criminal activity are often considered. For example, in 1994, California commissioned an evaluation of its state funded substance abuse recovery services. Using broad estimates of costs of treatment and reduced crime after treatment, the California Drug and Alcohol Treatment Assessment (CALDATA) report suggested substantial savings to Californians resulting from substance abuse treatment (Gerstein, et al., 1994). The approaches used in the CALDATA study have been applied to other states to estimate cost offsets and savings from treatment services for substance abuse. Other states, as well as federal agencies, have conducted cost-benefit studies of treatment and other drug abuse interventions such as Drug Courts (French, 1995; French & Martin, 1996; French, Mauskopf, Teague, & Roland, 1996; French, Zarkin, Hubbard, & Rachal, 1991; Logan, et al., 2004; Zarkin, French, Anderson, & Bradley, 1994). Although these studies use different methodologies and assumptions about societal costs associated with substance abuse, they provide support for the idea that substance abuse treatment results in cost savings to society and to taxpayers. Generally, these studies have examined changes in rates of substance use, criminal behavior, and employment *after* treatment compared to the same factors *before* treatment. These studies discuss the estimated costs associated with the post-treatment reduction in criminal behavior and unemployment compared to pre-treatment rates of criminal behavior and unemployment.

Cost savings studies also estimate the direct costs of substance abuse treatment and the costs associated with substance abuse, which include lost wages and the costs of crime. Some studies report substantial savings as a ratio of public treatment expenditures to public costs of crime and lost wages. For example, the CALDATA report suggested that for every dollar spent in 1991 on treatment, taxpayers netted seven dollars in savings or cost offsets (Gerstein, et al., 1994). These estimates are similar to more recent analyses of cost savings resulting from substance abuse treatment. For example, Flynn, Kristiansen, Porto & Hubbard, (1999) reported a range of cost benefit ratios from 1.68 to 2.73 with differences that are explained by different assumptions about treatment outcomes for cocaine abuse and crime. It is difficult to compare the cost saving findings from nationally recognized studies to Kentucky. Most of the nationally recognized outcome studies focus on treatment modalities such as long-term residential treatment (Hubbard, et al., 1989), which are not used in Kentucky. These studies, which include the Treatment Outcome Prospective Study (TOPS) (French, et al., 1991), the Drug Abuse Treatment Outcome Study (DATOS) (Hubbard, et al., 1997), and the California Drug and Alcohol Treatment Assessment (CALDATA) (Gerstein, et al., 1994) included long-term residential treatment services. This costly treatment modality is not included in the panel of state-funded treatment services in Kentucky.

For this analysis of avoided costs in Kentucky, client-level data on clinical services were examined for 797 clients in the follow-up sample who received services funded by the Kentucky Division of Substance Abuse and for whom complete service data were available. The method for calculating services and costs associated with services included counting all services received by the follow-up sample for 12 months following the KTOS baseline intake date. This

method does not examine treatment episodes, but uses the total costs of care for publicly funded substance abuse treatment for a year.

KTOS clients in residential treatment (including detoxification and transitional living) received an average of 34.9 days (SD = 45.0) of treatment during the report period. However, this average included 15 (N=797) clients who had over 100 days of residential treatment including special residential services for women with dependent children. This utilization pattern suggests a substantial increase in the average number of residential days from the 2000 KTOS report of only 15 average days of residential treatment. Clients who received various outpatient services, including case management, received an average of 15 outpatient visits. For the 10.9% of clients who received outpatient case management services, the average number of case management services was 24.6 per client. Overall, the follow-up clients (N=797) received 39,903 state-funded services including medical and non-medical detoxification, outpatient counseling, intensive outpatient, case management, crisis stabilization, therapeutic rehabilitation, and supported employment. The cost of all treatment services for these 797 clients was developed using Cost Report rates from the Kentucky Department of Mental Health. The total treatment cost for this sample was \$1,908,833 for the year or \$2,395 per client. In contrast, Flynn, et al., (1999) using NDATUS data on 300 clients from 10 national sites, reported treatment costs for cocaine users at \$8,920 per residential episode and \$2,908 per outpatient episode. It should be noted that the total cost of \$2,395 per client per year for FY 2002 in Kentucky includes all state or SAPT Block Grant funded services - residential, outpatient, case management, psychiatric, and therapeutic rehabilitation services during the year.

To estimate the potential cost savings for Kentucky from state or SAPT Block Grant funded substance abuse treatment, this study compared inferred costs relating to the follow-up sample *before* treatment with the same inferred cost factors *after* treatment. Costs related to changes in arrests, costs of jail time, and employment provide useful indicators of overall savings to society and taxpayers. One of the major justifications for substance abuse treatment is the reduction in crime related to positive treatment outcomes (Hubbard, et al., 1989). Violent crime cost data are from the SAMHSA report *Costs of Alcohol-Connected Violent Crime* (Miller, Galbraith, & Levy, 1996) and property crime and driving under the influence (DUI) cost estimates are from Miller, Cohen, and Wiersema (1996). These studies include victims' treatment costs in the crime cost estimates. All dollar amounts from Miller, Cohen, and Wiersema and the SAMHSA report were adjusted to 2002 dollars for comparability using the Woodrow Federal Reserve Bank CPI indexing system to convert dollar amounts into 2002 values (<http://woodrow.mpls.frb.fed.us/research/data/us/calc/>).

Since the current study includes self-report information, actual crime data could not be used and self-reported arrests are used as proxies for crime. Data on self-reported arrests were collected using GPRA measures for arrests in the past 30 days and were asked in a modified version to include arrests in the past 12 months.

To estimate the costs of crimes, the total arrests for the past 12 months were analyzed using the distribution of types of crimes from Kentucky (<http://www.kentuckystatepolice.org/data/htm>) and applying the percent of type of crime to the arrest data reported by clients in the follow-up sample. These crimes were grouped into basic classes comparable to the previous KTOS reports, which include murder, forcible rape, manslaughter and assault in the category of violent crimes. The distribution of the 196,294 crimes in 2000 for these categories in Kentucky

was: (1) Drug Trafficking and Possession - 38,252 (19.5%); (2) Property - 74,083 (37.8%); (3) Violence - 38,738 (19.7%); and (4) DUI - 45,221 (23.0%). Using victim crime cost estimates for these classes of crime resulted in crime costs as indicated in **Table 32**.

### **Crime Reductions**

**Table 32** presents changes in self-reported arrests at intake, the victim costs of crime and the reduction in self-reported arrests at follow-up as well as crime costs for those self-reported crimes. **Table 32** shows the amount of avoided victim costs from crime after substance abuse treatment. **Table 32** includes arrests during treatment as well as after treatment. These data suggest a substantial difference in costs to society from arrests that are reported at follow-up. It should be noted that data for DUI arrests do not reflect whether clients reporting DUI arrests also had accidents with resulting injury or deaths. A single DUI offense with loss of life is estimated to cost society \$3,463,643 (2002 dollars) and one offense resulting in disability is estimated to cost \$219,741 (Miller, Cohen, & Wiersema., 1996). Other physical injury secondary to a DUI is estimated to cost \$67,733 (Miller, Galbraith, & Levy, 1996). Looking at the overall reductions in average victim costs of crime for these clients, Kentuckians avoided an estimated \$3.78 for a 12-month period of arrest costs for every \$1.00 spent in one year for substance abuse treatment.

**Table 32. Past 12 Month Arrests at Baseline and Follow-up and Estimated Victim Costs of Crime (N=838)**

<b>Arrests by type of crime</b>	<b>Past 12 month arrests at intake</b>	<b>Estimated cost per arrest</b>	<b>Cost of crimes at intake</b>	<b>Follow-up arrests</b>	<b>Cost of crimes</b>	<b>Reduction in cost</b>
Trafficking & possession	186	\$3,358	\$689,059	86	\$287,271	\$336,350
Property	360	\$5,098	\$1,833,599	166	\$844,648	\$988,950
Violence	188	\$32,595	\$6,130,192	87	\$2,823,876	\$3,306,315
DUI	220	\$21,852	\$4,797,525	101	\$2,209,983	\$2,587,542
<b>Total*</b>	<b>953</b>	<b>14,045</b>	<b>\$13,384,936</b>	<b>439</b>	<b>\$6,165,779</b>	<b>\$7,219,158</b>

\*Total is more than sample size since clients could have multiple arrests.

**Table 33** presents changes in costs associated with jail time from intake to follow-up for the entire sample. At intake, clients reported 27,419 nights in jail in the past 12 months. At follow-up clients reported 19,395 nights in jail in the past 12 months which is a 29.3% reduction in the number of nights in jail. Using Kentucky jail costs developed by the Kentucky Jailers Association, the total costs of jail time for the 12 months before intake was \$1,041,922 (Kentucky Jailers Association, 2004). At follow-up, the nights in jail in the past 12 months is estimated to cost \$737,010, for a \$304,912 reduction in costs. Adding the reductions in jail costs to the avoided victim costs of crime, suggests that the total avoided costs of crime at \$7,524,070 for a savings that can be expressed as \$3.94 for every \$1.00 spent on treatment.

**Table 33. Reductions in Nights in Jail and Related Costs (N=838)**

<b>Jail time and costs</b>	<b>At intake</b>	<b>At follow-up</b>	<b>Reduction in nights in jail</b>
Overall number of nights spent in jail in the past 12 months	27,419	19,395	8,024 (29.3%)
Annualized total <b>estimated cost</b> of jailing at \$38.00 per night	\$1,041,922	\$737,010	\$304,912

***Changes in Employment***

**Table 34** presents increases in employment and estimated changes in employment earnings. Using an estimated labor value of \$7.00 per hour, employment earnings increased from intake to follow-up by 57.7% for an estimated increase of \$2,544,192 in employment earnings for the entire sample 12 months after intake. With state tax on these employment earnings estimated at \$152,652 (6.0%), there are additional offsets to the treatment costs for this sample of clients. Adding these estimated tax revenues to the avoided costs of crime results in a savings that can be expressed as \$4.03 for every dollar spent on treatment.

**Table 34. Increased Employment and Earnings (N=838)**

<b>Employment variable</b>	<b>Baseline</b>	<b>Follow-up</b>	<b>Increase in employment</b>
<b>Number of clients</b> working full or part-time	340	466	126
Annualized – <b>days worked</b> in the past 30 days for follow-up sample	78,780	124,212	45,432
<b>Total annualized hours</b> of paid work	630,240	993,696	363,456
Annualized total <b>estimated labor value</b> at \$7.00 per hour times total hours	\$4,411,680	\$6,955,872	\$2,544,192

***Summary of Avoided Costs***

Using client self-report data on arrests and estimated costs per crime, an estimate of the total crime costs can be made for the follow-up sample before and after treatment. In addition, treatment event data and cost report information from the Kentucky Department of Mental Health was used for specific treatment costs for the follow-up sample.

The reductions in self-reported arrests for Kentucky clients, combined with cost estimates for their crimes and increased earnings and tax revenues, suggest a cost avoidance for Kentucky taxpayers which is estimated at a ratio of 4.03 to 1. **In other words, Kentucky saved \$4.03 for every dollar spent on treatment during 2002.**

These avoided costs are important for policy development in Kentucky and contribute to the understanding of substance abuse treatment. The findings also suggest important issues for treatment planning both on a client level and at the program level as discussed in the next section.

## **Section VI. Implications of Study Findings for Substance Abuse in Kentucky**

The FY 2002 KTOS Follow-up findings include important information for treatment providers. The findings suggest that substance abuse treatment outcomes in Kentucky are very similar to outcomes reported in other research studies (Hubbard, et al., 1997; Swearingen, et al., 2003). Consistent with anecdotal information from clinicians, the substances that appear to be most used and used most frequently are alcohol, marijuana, tranquilizers, and opiates. The emergence of tranquilizer and opiate use over the past few years in Kentucky may be of particular importance to treatment providers. Use of these two substances has been reported by more clients than has use of cocaine in the three previous KTOS Follow-up Reports. Consequently, illegal use of pharmaceutical drugs constitutes a major portion of the substance abuse problem reported by clients in substance abuse treatment in Kentucky.

In addition, treatment providers may find other substance use and change findings important in this report. First, this report supports the idea that treatment contributes to client abstinence from commonly used substances. Second, there are differences in change values for the different substances, which suggest a need for more targeted interventions for specific substances. Third, important differences were reported in the treatment outcomes for clients who used residential versus outpatient treatment. Fourth, there were important outcome differences between clients who reported using self-help and clients who did not report using self-help. Finally mental health symptoms changed very little at follow-up, which suggests more careful assessment and treatment of co-occurring disorders. Lastly, there were important differences in the outcomes by gender, with women achieving greater reductions in days of drug use than men.

### ***Abstinence Findings***

Since over 60% of the clients entered treatment with a justice system referral, and 36.8% had a DUI incident precipitating treatment, it is likely that many clients entered treatment already attempting abstinence. This report shows that there were many clients who reported abstinence at intake *and who maintained abstinence at follow-up* which is an important treatment goal. In addition, clients became abstinent 12 months after treatment. Both abstinence findings can be related to treatment goals. For clients who do not achieve abstinence, decreased substance use is reported for days used in the past 30 days. Therefore, treatment should address both the need to increase the number of clients who are abstinent as well as to reduce the level of use among clients who cannot achieve abstinence.

### ***Substance-specific Change***

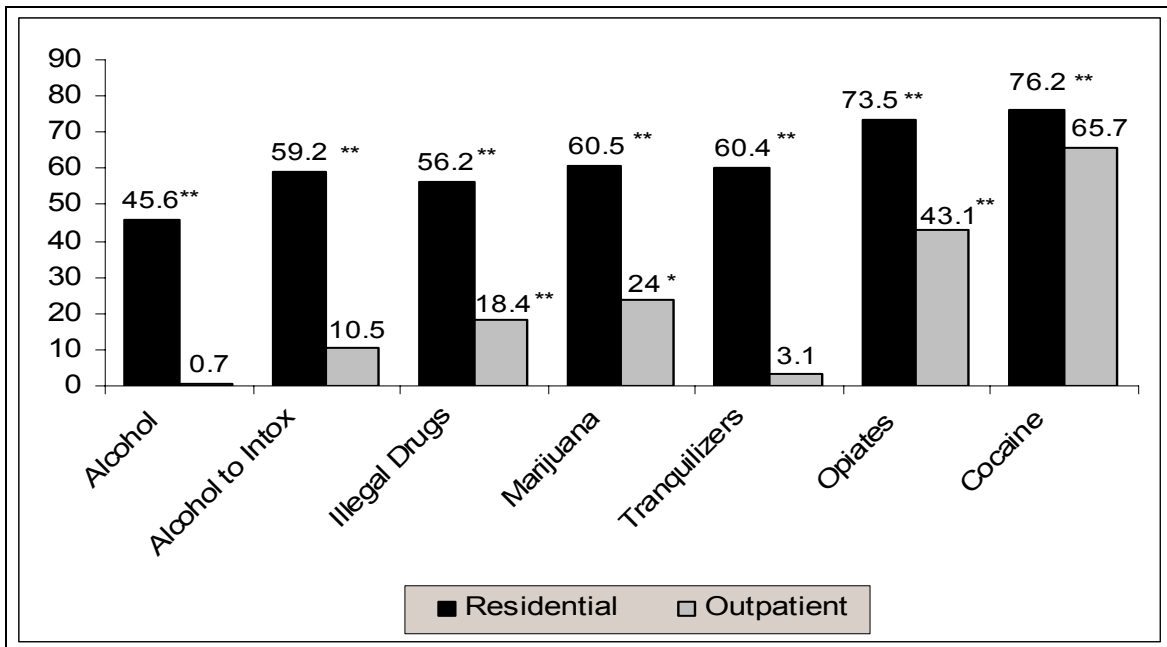
The FY 2002 KTOS findings suggest that there are major differences in change in abstinence as well as days of use of the different substances. For example, there was a 47.9% increase in the number of clients reporting alcohol abstinence, but less than half that rate of change for opiate abstinence (21.3%). In addition, the percent of change in the number of clients reporting tranquilizer abstinence (26.8%) was about half the rate of change for alcohol abstinence. In examining the reduction in the number of days of substance use in the past 30 days, alcohol use was reduced by 46.5%, marijuana use by 58.7% and opiate use by 47.9%. These data suggest there may be differences in achieving abstinence for certain substances. It may also suggest that treatment should target certain drugs, with others considered less

harmful. While these differences are unclear, treatment providers should consider the different types of substances used.

**Residential and Outpatient Treatment**

The report examined differences in client outcomes for clients who received only residential treatment and clients who received only outpatient treatment. The Governor’s Statewide Drug Control Assessment Summit 2004 highlighted the need for more residential treatment capacity. Currently, there are 822 publicly funded residential and detoxification beds in Kentucky. Findings from this study suggest that treatment outcomes for residential treatment are more positive than outpatient treatment. **Figure 4** presents the differences between residential and outpatient clients in the rate of change for the number of clients reporting any substance use. Only two substances show approximately the same rate of change – opiates and cocaine. Overall, these two treatment modalities appear to have very different outcomes although most residential clients entered treatment with much higher substance use rates. Clearly, the rate of change is more dramatic for clients in residential treatment. Planning for treatment services capacity could consider these outcomes.

**Figure 4. Percent of Reduction in the Number of Substance Users from Intake to Follow-up Among Residential and Outpatient Clients (N=612)**

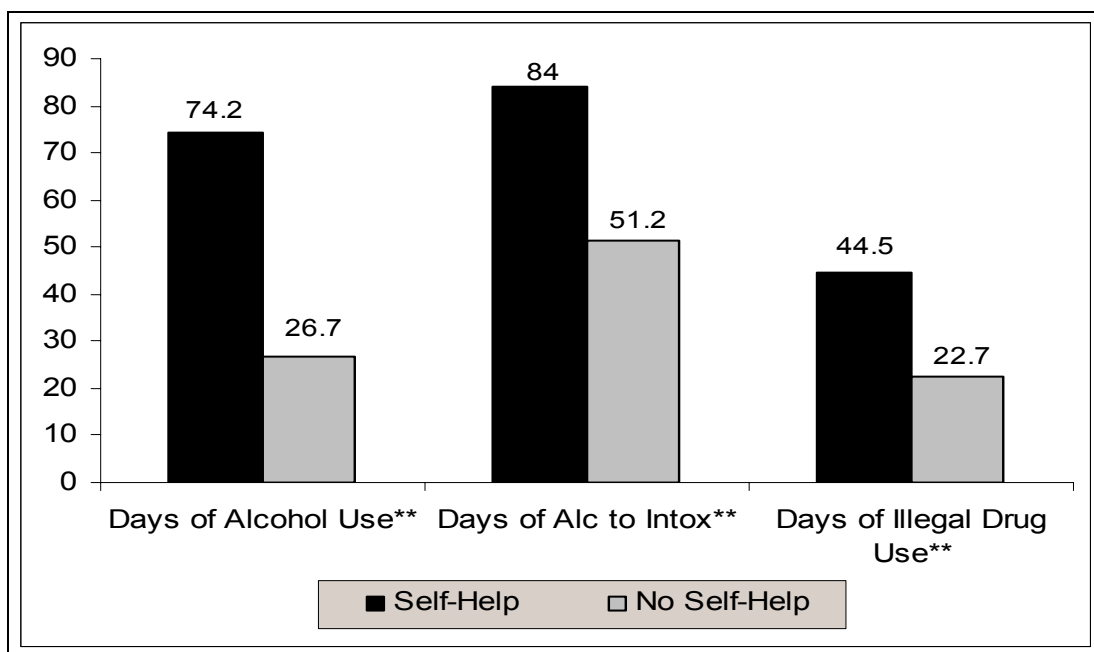


Significance established using z test for proportions. \*p < .01 \*\*p < .001

### **Self-help**

There were significant differences in client outcomes for those who reported using self-help versus clients who reported no self-help. Self-help includes Alcoholics Anonymous and Narcotics Anonymous. **Figure 5** presents the percent of change in the number of days of alcohol use, days of alcohol use to intoxication, and days of illegal drug use from intake to follow-up. There was a dramatic difference between clients using self-help and those who did not. While clients using self-help at follow-up reported a greater number of days of substance use at intake, they reported far greater decreases at follow-up. These changes were statistically and clinically significant and suggest that clinicians may need to examine clients' opportunities for self-help involvement during and after treatment. Like differences in residential and outpatient treatment, treatment planning services should incorporate thinking about the use of self-help in attaining and maintaining abstinence.

**Figure 5. Percent of Reduction in the Days of Substance Use from Intake to Follow-up Among Clients Using and Not Using Self-help (N=612)**



Significance established using z test for proportions. \*p < .01 \*\*p < .001

### **Mental Health Problems**

Among the many changes reported by clients, the mental health symptoms had only modest improvement at follow-up. This finding suggests a need for closer attention to co-occurring disorders during substance abuse treatment. In previous KTOS reports, the reduction in mental health symptoms was greater than that reported by clients in this report. Clinicians may need to focus more attention on co-occurring disorders during treatment, particularly depression and anxiety.



### ***Gender Differences***

The findings in this report suggest that women entering substance abuse treatment have a greater number of days of substance use in the past 30 days for opiates, tranquilizers, marijuana, and all illegal drugs than men. On the other hand, men have a greater number of days of alcohol use in the past 30 days than women. However, women reported greater percents of change from intake to baseline than men. For example, women reported a 40% reduction in overall illegal drug use at follow-up compared to men who reported a 29% reduction. More women were alcohol abstinent at intake than men, but men reported a greater rate of change in the percent of alcohol abstinence at follow-up than did women. Still, at follow-up far more women (74%) were alcohol abstinent than men (59%). With tranquilizer use, women (24%) had twice the rate of change in number of days of use compared to men (12%). These findings suggest that women who enter treatment may have more positive treatment outcomes than men, particularly in regards to sustained abstinence.

### ***Summary of Treatment Implications***

In summary, the report findings provide information that may help shape treatment planning for clients with severe substance abuse problems. These findings suggest major differences in outcomes by treatment modalities, and between men and women as well as between clients who do and do not use self-help. Women appear to have more positive treatment outcomes as measured both by abstinence rates and by the number of days of substance use in the past 30 days. Treatment planning should include awareness of these factors including the need for more attention to co-occurring disorders.

## **Section VII. Study Limitations**

This report presents information on 838 clients who received substance abuse treatment during state fiscal year 2002 in Kentucky publicly funded treatment programs. There are several areas of limitation to the findings presented in this report. First, both the intake data and the follow-up data are self-reported. While self-reports have been shown to be valid in comparison to urinalyses (Rutherford, Cacciola, Alterman, McKay, & Cook, 2000) reliance on self-reports in this study may be an important limitation. Second, unlike many outcome studies, this study does not focus on a single treatment modality or a set of pre-selected treatment modalities such as residential treatment, or any one approach like social skills training. This study examines client characteristics at intake who have participated in many different treatment modalities including both residential and outpatient. Third, clinicians have varying interview skills and this might impact the reliability of the data they collected for the baseline. Finally, avoided cost estimates are an approximation of savings for Kentucky and are based on national cost estimate models.

### ***Validity of Self-reports***

While there can be reason to question the validity and reliability of self-reports of substance use, recent research has supported earlier findings about the reliability and accuracy of substance users' reports (Del Boca & Noll, 2000; Rutherford, et al., 2000). Earlier studies found that the context of the interview influences reliability (Babor, Stephens, & Marlatt, 1987) and generally self-reports even at the beginning of treatment as well as during treatment have been shown to be reliable (Rutherford, et al., 2000). Concerns about deception in self-reports is most likely at baseline where information is being collected by a clinician whom clients may see as affiliated with the courts, probation or parole systems. Distortion at follow-up, when the interviewer is unknown to the client may be less likely. Overall, studies have reported little evidence to support the idea that social undesirability of substance abuse behaviors is a major contributing factor to under-reporting (Bradburn, 1983). In addition, it is important to understand the reliance on self-reports in health research as well as in substance abuse studies. For example, research on other chronic health problems such as diabetes, chronic headache, obesity, hypertension and heart disease often depends on self-reported diet, exercise, medication compliance, and weight reduction efforts (Holroyd, et al., 2001; Mokdad, et al., 2001; Pereira, et al., 2002). While there are concerns about the validity of self-reports, research in the fields of health, mental health, and substance abuse uses self-report to collect information about daily behaviors.

### ***No Single Treatment Modality***

Another study limitation is that many different modalities and clinical approaches are included as well as dual diagnosis treatment approaches that can include medication and psychiatric care along with substance abuse counseling. Most treatment outcome studies using follow-up data examine a specific type of treatment with controls over length of stay and specific interventions used. This statewide study examines clients who have received many different types of treatment with greatly varied lengths of stay in treatment.

### ***Clinicians as Data Collectors***

This study relies on clinicians for baseline data collection, including locator information from consenting clients. The baseline data are collected by clinicians with varying levels of training and skill with structured interviewing. Consequently, reliability for substance use and other questions may pose another limitation. Also, clinicians may have limited awareness of the

importance of collecting accurate locator information, which can affect follow-up contact rates and, consequently, the sample representativeness.

***Limitations in Avoided Costs Estimates***

The avoided costs estimates presented in this report have several limitations. First, the arrest data were self-reports. While the literature suggests that client self-reports can be valid (Del Boca & Noll, 2000; Rutherford, et al., 2000) the validity of self-reports is unknown in this study. Second, there are also limitations on access to third-party data such as paid unemployment benefits, welfare, corrections, and law enforcement, which were not used in this study. Third, national rather than specific state costs estimates were used, except for the jail costs, which were developed for Kentucky. Finally, there are potential avoided costs to society that were not included that might affect cost savings estimates. However, data presented here are an appropriate approximation of savings that result from Kentucky state-funded substance abuse treatment.

## **Section VIII. Concluding Remarks**

The Fiscal Year 2002 KTOS report presents information on 838 Kentucky substance abuse clients who participated in baseline and follow-up interviews. The client self-reports on substance use and related behavior indicate that the goals of treatment are being addressed by the state-funded substance abuse treatment services provided by the Community Mental Health Centers. These outcome findings represent benefits to substance abuse clients, their families, and the Commonwealth.

This study presents findings that are not only statistically significant but also clinically relevant. The findings are consistent with findings from more carefully controlled studies that include similar follow-up measures (Gossop, Marsden, Stewart, & Rolfe, 1999). In addition, this study focuses on a real-world clinical population in public sector treatment rather than using a sample that has excluded subjects with complicating characteristics such as multiple drug use and mental health problems in addition to substance abuse. The study also includes clients with limited responses to treatment, given their limited economic status, employment problems at intake, and other complicating conditions (Leon, Kopta, Howard, & Lutz, 1999). These findings may have greater implications for the vulnerable populations served by state funded programs since no client was excluded from the study due to specific clinical eligibility criteria (Humphreys & Weisner, 2000).

It is also important to note that addiction is a chronic disease with complex and enduring psychological, spiritual, and social factors (Leukefeld & Leukefeld, 1999; McLellan, et al., 2000) as well as major biological factors that contribute to problems with achieving abstinence (Leshner, 1997). The evaluation of substance abuse treatment outcomes can be viewed in the context of treatment for other chronic health problems such as diabetes mellitus, hypertensive disease, asthma, and obesity in terms of difficulty in achieving positive treatment outcomes. In fact, McLellan, et al. (2000) reported that alcoholism treatment outcomes are at least as positive, if not better, than outcomes for the treatment of type 2 diabetes mellitus, hypertension, and asthma in spite of the fact that most substance abuse treatment is designed for an acute rather than chronic condition.

Substance abuse treatment in Kentucky results in significant reductions in substance use and crime as well as other problems associated with substance abuse. These findings parallel other national treatment outcome studies with changes in problem behavior following treatment in Kentucky's state-funded treatment centers.

In summary, clients who received substance abuse treatment in state funded substance abuse treatment programs reported significant increases in rates of abstinence. There was a 20.7% increase in the number of clients who became alcohol abstinent after treatment, with 63.9% of all clients reporting alcohol abstinence at the follow-up interview. The self-reported days of alcohol use in the past 30 days also decreased by 46.5% after treatment. The percent of clients reporting abstinence from illegal drugs also increased to 55.9%, and the number of days of use of illegal drugs decreased by 27.5%. There was a 29.4% increase in the number of clients reporting marijuana abstinence from intake to follow-up, with 83.9% of clients reporting abstinence 12 months after treatment. Tranquilizers represent a class of prescription drugs that are of increasing concern in Kentucky. The percent of clients reporting abstinence from tranquilizers 12 months after treatment was 81.9% - a 26.8% increase in the number reporting abstinence. Opiate use, which is primarily a prescription drug problem in Kentucky, also

decreased significantly with 91.1% of clients reporting opiate abstinence for a 21.3% increase.

The report suggests that treatment outcomes for residential clients and outpatient clients are different, with greater change in abstinence among clients in residential treatment. Likewise, the findings suggest that clients who use self-help have more positive treatment outcomes as measured by the number of days of substance use in the past 30 days.

Self-reported arrests also decreased. Specifically, the percent of clients who reported arrests in the past 12 months was reduced by 51.2%. Arrests for drug charges decreased by 59.1%. While arrests reported by follow-up clients remain a concern, continued legal involvement is not unexpected among individuals with serious substance abuse problems. For example, a national substance abuse outcome study found that 19.0% of 435 methadone patients who were followed 12 months after treatment discharge were in prison (Simpson, Joe, & Rowan-Szal, 1997).

Mental health symptoms and emotional difficulties also were reduced from intake to follow-up. For example, the number of clients reporting serious depression was reduced by 15.9%, the number reporting serious anxiety by 7.0%, suicidal thoughts by 42.1% and suicide attempts by 76.7%. Self-reported health status also improved after treatment with about a 38.7% increase in the number of the clients reporting their health as excellent and the same percent reporting their health as very good.

In conclusion, clients receiving substance abuse treatment in Kentucky's publicly funded programs experienced significant reductions in substance use, improved ratings of their health and mental health, decreased criminal activity, and increased employment. All of these changes resulted in decreases in crime costs to victims and overall costs to the public. **These changes 12 months after treatment can be estimated as savings of \$4.03 for every \$1.00 spent on treatment in Kentucky.** These cost offsets are comparable to national studies which have reported savings ranging from \$4.00 - \$5.00 for every \$1.00 spent on treatment (Chinman, Imm, & Wandersman, 2004).

## REFERENCES

- Babor, T.F., Stephens, R.S., & Marlatt, A. (1987). Verbal report methods in clinical research on alcoholism: Response bias and its minimization. *Journal of Studies on Alcoholism, 48*, 410-424.
- Bradburn, N.M. (1983). Response effects. In P.E. Rossi & J.D. Wright, (Eds.), *Handbook of survey research* (pp. 289-328). New York, NY: Academic Press.
- Carroll, K.M. (1995). Methodological issues and problems in the assessment of substance use. *Psychological Assessment, 7*, 349-358.
- Chinman, M., Imm, P., & Wandersman, A. (2004). *Getting to outcomes 2004*. Santa Monica, CA: RAND Corporation.
- Del Boca, F.K., & Noll, J.A. (2000). Truth or consequences: The validity of self report data in health services research on addictions. *Addiction, 95*, 347-360.
- Egertson, J.A., Fox, D.M., & Leshner, A.I. (1997). *Treating drug abusers effectively*. Malden, MA: Blackwell Publishers, Inc.
- Flynn, P.P., Kristiansen, P.L., Porto, J.V., & Hubbard, R.L. (1999). Costs and benefits of treatment for cocaine addiction in DATOS. *Drug and Alcohol Dependence, 57*, 167-174.
- French, M.T. (1995). Economic evaluation of drug abuse treatment programs: Methodology and findings. *American Journal of Drug and Alcohol Abuse, 21*, 111-135.
- French, M.T., & Martin, R.F. (1996). The costs of drug abuse consequences: A summary of research findings. *Journal of Substance Abuse Treatment, 13*, 453-466.
- French, M.T., Mauskopf, J.A., Teague, J.L., & Roland, J. (1996). Estimating the dollar value of health outcomes from drug abuse interventions. *Medical Care, 34*, 890-910.
- French, M.T., Zarkin, G.A., Hubbard, R.L., & Rachal, J.V. (1991). The impact of time in treatment on the employment and earnings of drug abusers. *American Journal of Public Health, 81*, 904-907.
- Gerstein, D., Johnson, R.A., Harwood, H.J., Fountain, D., Suter, N., & Malloy, K. (1994). *Evaluating recovery services: The California drug and alcohol treatment assessment (CALDATA)*. Sacramento: CA. State of California Department of Alcohol and Drug Programs.
- Gossop, M., Marsden, J., Stewart, D., & Rolfe, A. (1999). Treatment retention and 1 year outcomes for residential programmes in England. *Drug and Alcohol Dependence, 57*, 89-98.

- Holroyd, K.A., O'Donnell, F.J., Stensland, M., Lipchik, G.L., Cordingley G.E., & Carlson, B.W. (2001). Management of chronic tension-type headache with tricyclic antidepressant medication, stress management therapy, and their random combination. *JAMA*, *285*, 2208-2214.
- Hubbard, R.L., Craddock, S.G., Flynn, P.M., Anderson, J., & Etheridge, R.M. (1997). Overview of 1-year follow-up outcomes in the Drug Abuse Treatment Outcome Study (DATOS). *Psychology of Addictive Behavior*, *11*, 261-278.
- Hubbard, R.L., Marsden, M.E., Rachal, J.V., Harwood, H.J., Cavanaugh, E.R., & Ginzburg, H.M. (1989). *Drug abuse treatment: A national study of effectiveness*. Chapel Hill, NC: University of North Carolina Press.
- Humphreys, K., & Weisner, C. (2000). Use of exclusion criteria in selecting research subjects and its effect on the generalizability of alcohol treatment outcome studies. *American Journal of Psychiatry*, *157*, 588-594.
- Kentucky Jailers Association. (2004). *Preliminary study related to cost of incarceration in Kentucky county jails via e-mail survey, October 6, 2003*. Retrieved May 21, 2004 from <http://www.kyjailers.com/info/CosttoIncarcerateinaKentuckycountyjail.htm>
- Leon, S.C., Kopta, S.M., Howard, K.I., & Lutz, W. (1999). Predicting patients' responses to psychotherapy: Are some more predictable than others? *Journal of Consulting and Clinical Psychology*, *67*, 698-704.
- Leshner, A.I. (1997). Addiction is a brain disease, and it matters. *Science*, *278*, 45-47.
- Leukefeld, C.G., & Leukefeld, S. (1999). Primary socialization theory and a bio/psycho/spiritual practice model for substance use. *Substance Use and Misuse*, *34*, 983-991.
- Logan, TK, Hoyt, W.H., McCollister, K.E, French, M.T., Leukefeld, C. S., & Minton, L. (2004). Economic evaluation of drug court: Methodology, results, and policy implications. *Evaluation and Program Planning*, *27*, 381-396.
- McCarty, D., McGuire, T.G., Harwood, H.J., & Field, T. (1998). Using state information systems for drug abuse research. *American Behavioral Scientist*, *41*, 1090-1106.
- McLellan, A.T., Kushner, H., Metzger, D., Peters, R., Smith, I., Grissom, G., Pettinati, H., & Argeriou, M. (1992). The fifth edition of the Addiction Severity Index. *Journal of Substance Abuse Treatment*, *9*, 199-213.
- McLellan, A.T., Lewis, D.C., O'Brien, C.P., & Kleber, H.D. (2000). Drug dependence, a chronic medical illness: Implications for treatment, insurance, and outcomes evaluation. *JAMA*, *284*, 1689-1695.

- Miller, T., Cohen, M., & Wiersema, B. (1996) *Victim costs and consequences: A new look*. (NCJ-155282) Washington, DC: National Institute of Justice.
- Miller, T., Galbraith, M.S., & Levy, D.T. (1996). *Costs of alcohol-connected violent crime*. Substance Abuse and Mental Health Services Administration, Center on Substance Abuse Prevention. Rockville, MD: U.S. Government Printing Office.
- Mokdad, A.H., Bowman, B.A., Ford, E.S., Vinicor, F., Marks, J.S., & Koplan, J.P. (2001). The continuing epidemics of obesity and diabetes in the United States. *JAMA*, *286*, 1195-1200.
- National Institute on Drug abuse (NIDA) and the National Institute on Alcoholism and Alcohol abuse (NIAAA). (1997). *The Economic costs of alcohol and drug abuse in the United States – 1992*. Retrieved August 30, 2004 from <http://www.health.org/govstudy/bkd265/Chapter1.aspx#1.10>
- Office of National Drug Control Policy (ONDCP). (2001). *The Economic costs of drug abuse in the United States - 1992-1998*. Retrieved August 30, 2004 from [http://www.whitehousedrugpolicy.gov/publications/pdf/economic\\_costs98.pdf](http://www.whitehousedrugpolicy.gov/publications/pdf/economic_costs98.pdf)
- Pedhazur, E.J., & Schmelkin, L.P. (1991). *Measurement, design, and analysis: An integrated approach*. Mahwah, NJ: Lawrence Erlbaum Associates, Publishers.
- Pereira, M.A., Jacobs, D.R., Van Horn, L., Slattery, M.L., Kartashov, A.I., & Ludwig, D.S. (2002). Dairy consumption, obesity, and the insulin resistance syndrome in young adults. *JAMA*, *287*, 2081-2089.
- Rutherford, M.J., Cacciola, J.S., Alterman, A.I., McKay, J.R., & Cook, T.G. (2000). Contrasts between admitters and deniers of drug use. *Journal of Substance Abuse Treatment*, *18*, 343-348.
- Simpson, D.D., Joe, G.W., & Broome, K.M. (2002). A national 5-year follow-up of treatment outcomes for cocaine dependence. *Archives of General Psychiatry*, *59*, 538-544.
- Simpson, D.D., Joe, G.W., & Rowan-Szal, G.A. (1997). Drug abuse treatment retention and process effects on follow-up outcomes. *Drug and Alcohol Dependence*, *47*, 227-235.
- Swearingen, C., Moyer, A., & Finney, J. (2003). Alcoholism treatment outcome studies, 1970-1998: An expanded look at the nature of the research. *Addictive Behaviors*, *28*, 415-436.
- Zarkin, G.A., French, M.T., Anderson, D.W., & Bradley, C. J. (1994) A conceptual framework for the economic evaluation of substance abuse interventions. *Evaluation and Program Planning*, *17*, 409-418.