



# ADOLESCENT KTOS FOLLOW-UP REPORT 2012



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## EXECUTIVE SUMMARY

This report presents information on adolescent clients (ages 12 – 17 years old) who attended publicly-funded substance abuse treatment programs in Kentucky between July 1, 2008 and June 30, 2010. The report is prepared by the University of Kentucky Center on Drug and Alcohol Research (UK CDAR) on behalf of the Department for Behavioral Health, Developmental and Intellectual Disabilities (DBHDID), Division of Behavioral Health. The 2012 Adolescent Kentucky Treatment Outcome Study (AKTOS) follow-up report presents data collected from 149 youth who completed an intake survey between July 1, 2008 and June 30, 2010, and then a follow-up survey approximately 12 months later. The follow-up rate for this study was 86.6%.

This study complements the goals of a SAMHSA/CSAT grant to the Kentucky Division of Behavioral Health to enhance substance abuse services for adolescents and examines key national outcome measures: substance use abstinence, mental health problems, educational attainment, legal involvement, and recovery support. Unlike controlled clinical trials studying a specific treatment approach, this naturalistic study examines treatment as it is provided within the constraints of actual day-to-day practice and includes wide variation in terms of client severity and the number of services clients received.

### ADOLESCENT KTOS CLIENTS AT INTAKE

The majority of the Adolescent KTOS follow-up sample were male (63.1%) and white (86.6%). The sample was predominately older adolescents: 70.5% of clients were 16 or 17 years old. About three-fourths of adolescents (76.5%) reported that their primary caregiver was a parent. Most clients were enrolled in school at intake and the majority of clients enrolled in school (69.5%) had a C average or lower on their last report card. Over half of the clients (56.4%) reported that they had experienced physical abuse at some time in their lives. For girls, the perpetrators of physical abuse were most commonly peers and adult family members, whereas for boys, the

perpetrators were most commonly peers. The majority of boys (69.1%) and girls (63.6%) self-reported experiencing a mental health issue in the past 12 months, with cognitive difficulties, trouble controlling violent behavior, and serious anxiety or tension being the most prevalent. Over half of the adolescents (63.8% of the boys and 54.5% of the girls) were referred to substance abuse treatment by the criminal justice system. Over one-third of the sample (38.3%) was on probation at intake. The majority of boys (58.5%) had been arrested in the 12 months before intake, while significantly fewer girls (41.8%) reported arrests in the past 12 months. These intake data reveal that youth who enter treatment in Kentucky have a wide range of co-occurring problems.

Most Adolescent KTOS clients reported tobacco (96.6%), alcohol (97.3%), and illicit drug use (96.6%) in their lifetime. The vast majority of clients reported using tobacco (94.0%), alcohol (87.9%), and marijuana (88.6%)—the most used drug—in the 12 months before intake. Significantly more boys than girls reported lifetime and past-12-month use of marijuana. It is notable that the majority of clients had used non-prescribed tranquilizers (57.0%) and opiates (57.7%) in their lifetime.

### ADOLESCENT KTOS CLIENTS AT FOLLOW-UP

Overall, the picture is positive at follow-up for adolescents who participate in substance abuse treatment.

- Adolescents increased abstinence from alcohol and drug use:
  - 35.6% of clients were abstinent from alcohol during the 12-month follow-up period, which was a significant increase of 194.4%;
  - 43.6% of clients were abstinent from illicit drugs during the 12-month follow-up period, which was a significant increase of 282.4%; and
  - Abstinence from illicit drugs during the 12-month follow-up period was higher for girls than for boys.
- Almost all clients reported abstinence from the

following substances in the 30 days before follow-up:

- Tranquilizers, sedatives, benzodiazepines,
  - Opiates,
  - Cocaine,
  - Hallucinogens,
  - Amphetamines,
  - Non-prescribed methadone, and
  - Inhalants.
- The number of clients who reported the following mental health problems decreased significantly from intake to follow-up:
    - 68.8% decrease for hallucinations; and
    - 50.0% decrease for trouble controlling violent behavior.
  - Adolescents reported improvements in grades in school; grade point average (GPA) increased by 19.0%.
  - There were stable high rates of school enrollment among those with less than a high school diploma or GED (95.7% at intake and 90.6% at follow-up).
  - The number of adolescents who reported being arrested for any type of offense decreased significantly by 23.1%.
    - Also, there were significant decreases in the number of clients who reported arrests for status offenses (decreased by 76.5%) and property offenses (decreased by 62.5%).
  - The number of adolescents who reported past-30-day incarceration decreased significantly.
  - Adolescents' ratings of life satisfaction were significantly higher at follow-up than at intake.
  - Even when taking a conservative and short-sighted view of the costs to society that were reduced from intake to follow-up and taking into account the cost of treatment, there was a \$1.56 return on investment. This return on investment calculation does not take into account the gain in human capital that can be achieved when a substance using adolescent reduces or abstains from substance use.

Nonetheless, other findings indicate challenges to attaining positive outcomes for adolescents:

- The majority of clients reported tobacco use in the 30 days before follow-up (81.6%).
- The majority of clients (69.1%) were persistent smokers (i.e., used tobacco at both intake and follow-up), and among persistent smokers, the average number of days they smoked in the past 30 days significantly increased from intake to follow-up.
- Tobacco use during the 12-month follow-up period was associated with alcohol and drug use at follow-up.
- No change was found in the number of days of school adolescents missed for a variety of reasons.
- No change was found in the number of clients who reported being incarcerated in the past 12 months.
- No change was found in adolescents' perceptions of risk associated with substance use.



## INTRODUCTION

The 2012 Adolescent KTOS Follow-Up Report examines outcomes among youth who participated in state-funded substance abuse treatment (including outpatient, intensive outpatient, residential, or case management services) in Kentucky between July 1, 2008 and June 30, 2010 and completed a follow-up survey approximately 12 months later. This study does not focus on any single clinical approach or modality of care and does not impose any research conditions other than a consent process for clients who are willing to participate in follow-up interviews. These findings represent outcomes from “real world” treatment environments among youth with a wide range of co-occurring disorders, with intake data collected from the general population of youth seeking treatment in one of the 14 Community Mental Health Centers.

## METHOD

Until June 2009, intake data were collected by a clinician or staff person at the treatment center using a personal digital assistant (PDA), which was loaded with the Adolescent KTOS data collection program. Beginning in July 2009, clinicians used a web-based survey in which the identifying data are encrypted and synchronized to the master database at UK CDAR using a secure server. After intake data were collected, clients were asked if they would like to volunteer to participate in the 12-month follow-up study. Adolescents who were interested in participating in the follow-up study gave consent to be contacted by UK CDAR project staff members, who conduct follow-up surveys approximately 12 months later. Follow-up surveys were conducted via telephone using measures similar to the ones used at baseline. UK CDAR faculty conducted monthly meetings with follow-up interviewers to monitor progress with completed interviews, to ensure consistent application of interview techniques and to ensure goals were met.

A total of 452 adolescents completed intake surveys between July 1, 2008 and June 30, 2010, and 247 adolescents (54.6%) consented to being contacted for a follow-up survey approximately 12 months later. Of these 247 cases, 184 were selected to be included in the follow-up sample. Sixty-three adolescents who had agreed to be contacted for the follow-up survey were not selected into the follow-up sample for two reasons: 1) several cases were not selected into the follow-up sample because the individual had multiple intake surveys within the two fiscal years included in this report and so the second or third survey was deleted from the sample; 2) the locator record for the case had no valid addresses or phone numbers listed. At the time of follow-up, an additional 12 adolescents were not eligible for completing the follow-up survey because they were incarcerated or living in other controlled environments. Thus, 172 adolescents were eligible for follow-up surveys, and follow-up surveys were completed with 149 of these clients, for an overall follow-up rate of 86.6% (see Appendix A for more details). Appendix B compares adolescents who completed a follow-up survey with those who did not complete a follow-up survey. Few differences were found between adolescents who completed an intake survey but not a follow-up survey, and adolescents who completed both intake and follow-up surveys.

The data collection instrument for this study builds on the Addiction Severity Index (ASI) (McLellan, Kushner, Metzger, Peters, Smith, Grissom, Pettinati, & Argeriou, 1992) and uses selected items from the Center for Substance Abuse Treatment (CSAT) Government Performance Reporting Act (GPRA) (Mulvey, Atkinson, Avula, & Luckey, 2005). Survey data were collected at intake either by clinicians using a PDA or a web-based data collection tool to enter client responses. Clinicians asked clients about their interest in participating in follow-up interviews and, if they were interested, clinicians provided an informed consent process for the youth. Clients signed the consent forms on the PDA or web-based tool. Clinician-collected interview data were encrypted and stored on secure servers at UK CDAR. Locator data, used to contact adolescents for the follow-up survey, are kept separately from clinical information and are maintained in encrypted form until opened for use.

In addition to the intake and follow-up interviews, service utilization and diagnostic data were obtained from the state's service event files that are used to report to the federal Treatment Episode Data Set (TEDS). Clients consented to the use of these data.

#### *Data Analysis Plan*

This report presents not only differences in the absolute numbers and percentages of clients' reported use of substances, but also a calculation of the rate of change, a measure often used by policymakers. The percent of change represents the *relative* change in a variable over time. It is essentially a *rate* of change calculation just like the one that people use to calculate the percent of raise they might get with a promotion. To calculate the percent change in a variable from intake to follow-up, we first subtract the value at time 1 (e.g. intake) from the value at time 2 (follow-up), then divide by the value at time 1 (e.g., intake) and multiply by 100. For example, let's say 75 clients reported using marijuana at intake and this represented 50.0% of all clients in the follow-up sample (n = 150). At follow-up, 30 clients, or 20.0% of the 150 reported using marijuana. The absolute *difference* between the percentage at intake and follow-up is 30.0%, but the rate of change is 60%; that is, there was a 60% decrease in the number of clients who used marijuana:  $((30 - 75)/75)100 = -60.0$ . A positive percent change corresponds to an increasing trend, a negative percent change to a decreasing trend. For this study and sample size, change was presented as significant if it met a p value of < .05. For completeness, percent change is presented even when the change is not statistically significant; however in these cases, differences in percentages from intake to follow-up should be read as artifactual or random differences rather than a pattern of significant change.

Multivariate analysis was conducted to take a closer look at alcohol and drug use at follow-up. Variables included in the analyses were demographics, living with parents, substance use at intake, tobacco use during follow-up, referral to treatment by the criminal justice system, and mental health problems/diagnoses. The tables presenting the results include only the variables that were significantly associated with alcohol and drug use at follow-up.

## SATISFACTION WITH SUBSTANCE ABUSE TREATMENT

One key element in the evaluation of using public funds to address health or social problems is the satisfaction clients feel with their services. In health and behavioral health studies, consumer satisfaction ratings tend to skew toward high satisfaction and thus must be interpreted carefully (Waxman, 1996). However, higher levels of satisfaction are generally associated with positive treatment outcomes (Waxman, 1996).

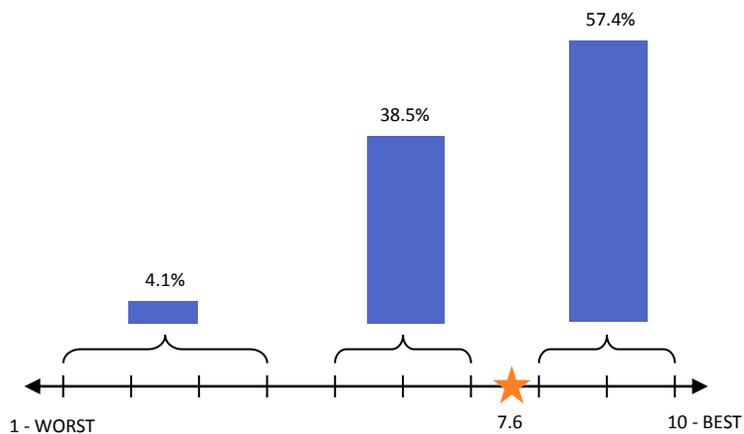
Almost all adolescent clients spoke highly of their experience in treatment (Table 1). Ninety-eight percent felt they were treated with respect and 95.5% agreed the staff explained their rights to them as a client. Over 97% understood what was expected of them and 93.2% felt they received the services they needed to get better. Over 92% felt better about themselves as a result of substance abuse treatment.

TABLE 1. PERCENT OF CLIENTS AT FOLLOW-UP WHO AGREED OR STRONGLY AGREED WITH THE FOLLOWING STATEMENTS ABOUT TREATMENT (n = 149)

	PERCENT
"You were treated with respect"	98.0%
"Staff explained your rights as a client"	95.5%
"The facility was clean"	97.1%
"You understood your treatment plan"	96.1%
"You understood what was expected of you during treatment"	97.1%
"You received the services you needed to help you get better"	93.2%
"You feel better about yourself as a result of treatment"	92.3%

On a scale of 1 being the worst and 10 being the best, clients rated their substance abuse treatment program experience on average as 7.6 (See Figure 1). Over half of clients (57.4%) gave a rating between 8 and 10.

FIGURE 1. RATING OF SUBSTANCE ABUSE TREATMENT EXPERIENCE (n = 149)



## DESCRIPTION OF 2012 ADOLESCENT KTOS FOLLOW-UP SAMPLE AT INTAKE

### DEMOGRAPHICS

The majority of the Adolescent KTOS follow-up sample was male (63.1%) (see Table 2). The average age of clients was 16 years old, with 70.5% being 16 or 17 years old. The majority of clients were white (86.6%) and 10.1% were African American. Only one adolescent reported being married at intake. Three-fourths of the clients (76.5%) reported that their biological/adoptive parents were their primary caregivers at intake, and 63.4% were living with their parent or guardian at intake.

TABLE 2. DEMOGRAPHIC CHARACTERISTICS OF THE FOLLOW-UP SAMPLE AT INTAKE (n = 149)

	PERCENT
<b>GENDER</b>	
Male	63.1%
Female	36.9%
<b>MEAN AGE</b>	
	16.0 years
<b>AGE DISTRIBUTION</b>	
12	0.7%
13	2.0%
14	4.7%
15	22.1%
16	34.9%
17	35.6%
<b>RACE</b>	
White	86.6%
Black/African American	10.1%
Multiracial	2.0%
Other race/ethnicity (e.g., Native American, Hispanic, Asian, other)	1.3%
<b>MARITAL STATUS</b>	
Never married	98.6%
Married	0.7%
Cohabiting	0.7%
<b>PRIMARY CAREGIVER</b>	
Biological or adoptive parents	76.5%
Grandparent	10.1%
Other family (including kinship foster care)	4.7%
Foster parent, non-kinship	4.7%
State agency/DCBS	2.7%
No caregiver, emancipated	1.3%
<b>CURRENT LIVING SITUATION<sup>a</sup></b>	
Living with parent/guardian	63.4%
Living with someone else	15.3%
Living in foster care	3.8%
Living in residential treatment/group home/inpatient	15.3%
Living independently	1.5%
Staying in shelter	0.8%

a—This question was not asked in the web-based survey, thus n = 131 for this item.

Most clients were in 9<sup>th</sup>, 10<sup>th</sup>, or 11<sup>th</sup> grade and most attended a public or private school (see Table 3). Nonetheless, one in five reported that they were homeschooled, or in an alternative, homebound, or day treatment school setting. A sizeable minority (37.4%) had repeated a grade in school. The majority of the sample (69.5%) had a C average or lower on their last report card, with 30.5% reporting a grade average of A or B on their last report card. Clients who reported not being enrolled in school at intake had completed an average of 10.3 years of education.

TABLE 3. EDUCATIONAL LEVEL AND ACADEMIC FACTORS AT INTAKE (n = 149)

	PERCENT OR MEAN
<b>HIGHEST LEVEL OF EDUCATION COMPLETED</b>	
6 <sup>th</sup> -8 <sup>th</sup> grade	22.8%
9 <sup>th</sup> -11 <sup>th</sup> grade	72.5%
High school graduate or GED	4.7%
Among those not enrolled in school, highest number of years of education (n = 6), Mean number of years of school completed	10.3 years
Among those not enrolled in school and with fewer than 12 years of education (n = 6), Has a GED	0.0%
<b>CURRENT TYPE OF SCHOOLING</b>	
None	4.0%
Public or private school	69.1%
Homeschool, alternative, homebound, day treatment	20.1%
GED classes	6.7%
Officially withdrawn	0.0%
<b>CURRENTLY ENROLLED IN A JOB-TRAINING PROGRAM</b>	
No	93.3%
Enrolled part-time	6.0%
Enrolled full-time	0.7%
<b>GRADE AVERAGE ON THE LAST REPORT CARD</b>	
	n = 141 <sup>a</sup>
A (Excellent)	5.0%
B (Above average)	25.5%
C (Average)	44.7%
D (Below average)	15.6%
F or E (Failing)	9.2%
<b>MEAN GRADE POINT AVERAGE ON THE LAST REPORT CARD</b>	
	2.0
<b>REPEATED A GRADE IN SCHOOL</b>	
	n = 131 <sup>b</sup>
Yes	37.4%
<b>TOTAL MEAN NUMBER OF DAYS OF SCHOOL MISSED IN THE PAST 90 DAYS</b>	
	15.5
<b>NUMBER OF DAYS OF SCHOOL MISSED FOR THE FOLLOWING REASONS:</b>	
Skipped school	3.8
Detention	3.7
Suspension	2.4
Expelled	0.3
Due to involvement with the juvenile justice system or social services	3.0
Other reasons (including illness, medical appointments)	3.6

a—Excluding 10 cases that reported homeschooling, homebound, or no schooling.

b—Excluding 18 cases that reported the following schooling: homebound, homeschool, or GED classes.

## LIFETIME INTERPERSONAL VICTIMIZATION

Victimization experiences, including child abuse, sexual victimization, and emotional and physical bullying by peers have been associated with substance use and abuse among adolescents (Kilpatrick et al., 2003; Menard, 2002; Tharp-Taylor et al., 2009). Table 4 presents the percentage of male and female clients who reported ever experiencing emotional, physical, and sexual abuse in their lifetime, as well as the type of perpetrator for those clients who experienced each type of abuse. Because of the smaller number of individuals in the sample in FY 2009 and 2010, the numbers of boys and girls who reported different types of perpetrators are small in some cases and should be viewed with caution. For example, only two boys and 23 girls reported that they had experienced sexual abuse in their lifetime.

Over twice as many girls (60.0%) as boys (26.6%) reported that they had experienced emotional abuse in their lifetime. For boys and girls, the most commonly reported perpetrators were peers followed by adult family members. In addition, 16.0% of girls and 9.1% of boys reported the perpetrator was an intimate partner.

The majority of clients reported a lifetime history of physical abuse, with no significant difference between the sexes. Peers were the most frequently reported perpetrators of physical violence. Nearly one-half of girls (47.1%) who experienced physical abuse reported the abuse was perpetrated by an adult family member compared to only 18.0% of boys. Unlike with emotional abuse, similar percentages of boys and girls reported that the physical abuser was an intimate partner.

Significantly more girls than boys reported experiencing sexual abuse in their lifetime (41.8% vs. 2.1%). Because only two boys reported sexual abuse, data on the perpetrators are not presented in Table 4. Nearly half of the 23 girls who had experienced lifetime sexual abuse reported that the perpetrator was an adult family member (47.8%) or an adult who was not an adult family member or intimate partner (47.8%).

We also examined the percentages of boys and girls who reported experiencing multiple types of victimization. Significantly more girls than boys reported experiencing both emotional and physical abuse in their lifetime (43.6% vs. 18.1%), emotional and sexual abuse (36.4% vs. 0.0%), and physical and sexual abuse in their lifetime (32.7% vs. 0.0%). Finally, about one-fourth of girls reported experiencing emotional, physical, and sexual abuse in their lifetime, while no boys reported experiencing all three major categories of victimization. Even though these are relatively unsophisticated measures of polyvictimization, it shows that girls in the Adolescent KTOS sample are more likely to experience multiple types of victimization.

TABLE 4. PERCENT OF CLIENTS REPORTING ANY LIFETIME INTERPERSONAL VICTIMIZATION AT INTAKE (n = 149)

	<b>BOYS n = 94</b>	<b>GIRLS n = 55</b>
<b>EMOTIONAL ABUSE***</b>	26.6%	60.0%
Of those who reported any emotional abuse, the percentage of clients who reported that the abuse was perpetrated by:	n = 25	n = 33
Adult family member	36.0%	36.4%
Intimate partner	16.0%	9.1%
Other adult who is not a family member or intimate partner	20.0%	15.2%
Peer	72.0%	78.8%
Sibling	24.0%	12.1%
Someone else	4.0%	0.0%
<b>PHYSICAL ABUSE</b>	53.2%	61.8%
Of those who reported any physical abuse, the percentage of clients who reported that the abuse was perpetrated by:	n = 50	n = 34
Adult family member**	18.0%	47.1%
Intimate partner	22.0%	20.6%
Other adult who is not a family member or intimate partner	24.0%	23.5%
Peer	74.0%	58.8%
Sibling	16.0%	20.6%
Someone else	0.0%	0.0%
<b>SEXUAL ABUSE***</b>	2.1%	41.8%
Of those who reported any sexual abuse, the percentage of clients who reported that the abuse was perpetrated by:	n = 2	n = 23
Adult family member	--	47.8%
Intimate partner	--	4.3%
Other adult who is not a family member or intimate partner	--	47.8%
Peer	--	21.7%
Sibling	--	0.0%
Someone else	--	0.0%
<b>EMOTIONAL AND PHYSICAL ABUSE**</b>	18.1%	43.6%
<b>EMOTIONAL AND SEXUAL ABUSE***</b>	0.0%	36.4%
<b>PHYSICAL AND SEXUAL ABUSE***</b>	0.0%	32.7%
<b>EMOTIONAL, PHYSICAL, AND SEXUAL ABUSE***</b>	0.0%	27.3%

\*p < .05, \*\*p < .01, \*\*\*p < .001.

## MENTAL HEALTH

The majority of adolescents in substance abuse treatment have comorbid mental disorders, such as mood disorders, attention deficit hyperactivity disorder (ADHD), and conduct disorder (Grella et al., 2001). Recovery is complicated by mental disorders, and different types of mental disorders impact recovery differentially. Thus, it is important for substance abuse treatment outcome evaluations to examine mental health pre- and post-treatment.

Table 5 presents the percentage of boys and girls who self-reported mental health problems in their lifetime and in the 12 months before intake. The most commonly reported problems for males and females were trouble controlling violent behavior, cognitive difficulties (trouble understanding, concentrating, and remembering), serious anxiety or tension, and serious depression. The only statistically significant difference in the percentage of boys and girls experiencing mental health problems at intake was that more girls reported having suicidal thoughts in their lifetime than boys. The majority of boys and girls reported at least one type of mental health problem in their lifetime (78.8% and 81.8%, respectively) and in the 12 months before intake (69.1% and 63.6%, respectively).

TABLE 5. ADOLESCENT SELF-REPORTED MENTAL HEALTH PROBLEMS<sup>a</sup> AT INTAKE (n = 149)

	LIFETIME		PAST 12 MONTHS	
	Boys	Girls	Boys	Girls
Serious depression	40.4%	54.5%	29.8%	34.5%
Serious anxiety or tension	42.6%	54.5%	36.2%	40.0%
Hallucinations	17.0%	10.9%	12.8%	7.3%
Cognitive difficulties	62.8%	49.1%	44.7%	38.2%
Trouble controlling violent behavior	42.6%	49.1%	33.0%	34.5%
Suicidal thoughts	12.8%	38.2%***	6.4%	14.5%
Suicide attempts	9.6%	18.2%	1.1%	7.3%
Any of the above mental health problems	78.7%	81.8%	69.1%	63.6%
Prescribed medication for psychological or emotional problems	29.8%	45.5%	22.3%	30.9%

a—Mental health problems not due to alcohol or drug use.

\*p < .05, \*\*p < .01, \*\*\*p < .001.

## LEGAL STATUS

Over half (60.4%) of the Adolescent KTOS follow-up clients were referred to substance abuse treatment by the criminal justice system, 8.1% were referred by a state protective agency, and only 1.3% were referred based upon a DUI. Table 6 shows the percentage of boys and girls who were referred to substance abuse treatment by the criminal justice system, because of a DUI charge, or by a state protective agency. There were no significant differences by gender. Only one of the female clients was admitted to treatment because of pregnancy. In addition, 21.3% of boys and 32.7% of girls were in Drug Court. About two in five boys (43.6%) and 29.1% of girls were on probation at intake.

TABLE 6. REFERRAL TO SUBSTANCE ABUSE TREATMENT AND LEGAL STATUS AT INTAKE (n = 149)

	<b>BOYS n = 94</b>	<b>GIRLS n = 55</b>
<b>ADMISSION/REFERRAL REASON</b>		
Criminal justice system	63.8%	54.5%
DUI charge	2.1%	0.0%
State protective agency	6.4%	10.9%
Among female clients (n = 55), the percentage whose admission was prompted by pregnancy	--	1.8%
<b>LEGAL STATUS</b>		
In Drug Court	21.3%	32.7%
On probation	43.6%	29.1%

Over half of the adolescents (52.3%) reported having been arrested in the 12 months prior to intake. Significantly more boys reported an arrest in the past 12 months compared to girls (58.5% vs. 41.8%) (see Table 7). About one in four boys (27.9%) and 15.1% of girls had been arrested on drug charges in the 12 months before intake. A small number of boys and no girls reported being arrested for a DUI offense. Significantly more boys reported having been arrested for a property crime compared to girls (17.4% vs. 1.9%). Similar percentages of boys and girls reported arrests for crimes against persons. About one in ten boys (11.6%) and 5.7% of girls reported an arrest for probation violation. About one in ten boys (10.5%) and 15.1% of girls reported an arrest for a status offense. The type of offense that was reported by the most girls was the category of other offenses, which includes offenses such as public intoxication, disorderly conduct, trespassing, criminal mischief, and terroristic threatening.

TABLE 7. PERCENT OF CLIENTS WITH SELF-REPORTED ARRESTS IN THE 12 MONTHS BEFORE INTAKE (n = 149)

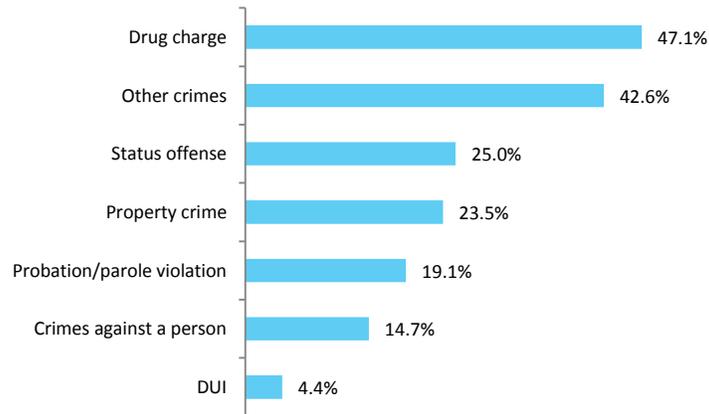
	<b>BOYS n = 94</b>	<b>GIRLS n = 55</b>
<b>ANY CHARGE*</b>	58.5%	41.8%
Of those with an arrest,	n = 55	n = 23
Mean number of arrests	2.5	2.4
	n = 86 <sup>a</sup>	n = 53 <sup>a</sup>
<b>DRUG CHARGE</b>	27.9%	15.1%
<b>DUI</b>	3.5%	0.0%
<b>PROPERTY CRIME**</b>	17.4%	1.9%
<b>CRIMES AGAINST A PERSON</b>	7.0%	7.5%
<b>PROBATION VIOLATION</b>	11.6%	5.7%
<b>STATUS OFFENSES (TRUANCY, OUT OF CONTROL, RUNAWAY)</b>	10.5%	15.1%
<b>OTHER CRIMES</b> (e.g. contempt, criminal mischief, disorderly conduct, failure to comply with court order, public intoxication, resisting arrest, trespassing)	24.7%	20.9%

a—Data on arrests for specific offenses were missing for a total 10 cases: 8 boys and 2 girls.

\*p < .05, \*\*p < .01, \*\*\*p < .001.

Because the number of boys and girls arrested for each type of offense was small for some offenses, data will be presented for boys and girls together (see Figure 2). Of those adolescents who reported an arrest in the past 12 months at intake, 47.1% were arrested for drug charges, followed by other crimes (42.6%), status offenses (25.0%), and property crimes (23.5%).

FIGURE 2. OF THOSE CLIENTS ARRESTED IN THE PAST 12 MONTHS (n = 68)<sup>a</sup>,  
THE PERCENT THAT REPORTED BEING ARRESTED FOR VARIOUS TYPES OF CRIMINAL OFFENSES



a—Data on arrests for specific offenses were missing for 10 cases.

Of the entire follow-up sample, 38.3% were incarcerated in the 12 months before substance abuse treatment intake. Significantly more boys (44.7%) than girls (27.3%) reported that they were incarcerated in the 12 months before intake (see Table 8). Among boys who were *incarcerated* in the 12 months before intake (n = 42), they reported spending an average of 37.2 days incarcerated. Among girls who were *incarcerated* in the 12 months before intake (n = 15), they reported spending an average of 18.9 days incarcerated. Among the 23 boys who reported being *incarcerated* in the 30 days before intake, they reported spending an average of 16.0 days incarcerated. Because only 5 girls reported being *incarcerated* in the 30 days before intake, the mean is not presented. Of those who reported *being arrested* in the 12 months before intake, 69.1% of boys and 47.8% of girls reported they spent at least one day in detention or jail for an average of 27.2 days for boys and 10.7 days for girls. Girls reported significantly fewer mean days of incarceration in the past 12 months than boys, among those adolescents who reported arrests in the 12 months before intake. Among boys who reported being convicted in the 12 months before intake, they reported an average of 1.8 convictions. Among girls who reported being convicted in the 12 months before intake, they reported an average of 2.1 convictions.

TABLE 8. SELF-REPORTED INCARCERATION HISTORY AT INTAKE

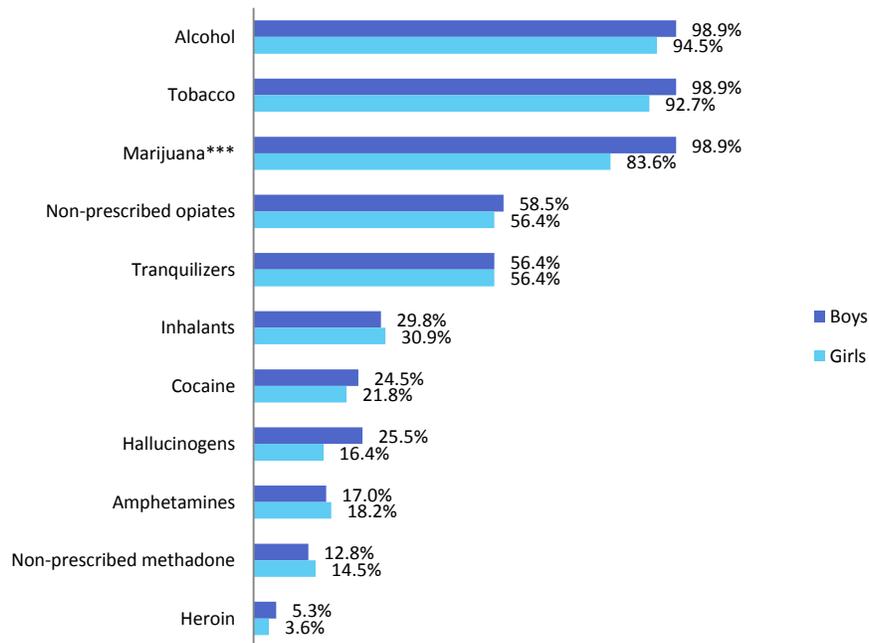
	PAST 12 MONTHS		PAST 30 DAYS	
	BOYS	GIRLS	BOYS	GIRLS
<b>OF THE ENTIRE SAMPLE (n = 149)</b>	n = 94	n = 55	n = 94	n = 55
% that were incarcerated at least one day	44.7%	27.3%*	24.5%	9.1%*
<b>OF THOSE INCARCERATED</b>	n = 42	n = 15	n = 23	n = 5
Mean # of days incarcerated	37.2	18.9	16.0	--
<b>OF THOSE ARRESTED IN THE PAST 12 MONTHS (n = 78)</b>	n = 55	n = 23	n = 55	n = 23
% spending at least one day incarcerated	69.1%	47.8%	40.0%	17.4%
Mean # of days incarcerated	27.2	10.7*	6.4	1.9*
<b>OF THOSE WITH CONVICTIONS IN THE PAST 12 MONTHS (n = 47):</b>	n = 33	n = 14		
Mean # of convictions	1.8	2.1		

\*p < .05, \*\*p < .01, \*\*\*p < .001.

## SUBSTANCE USE

Almost all Adolescent KTOS clients reported tobacco, alcohol, and/or illicit drug use in their lifetime. Tobacco and alcohol are illegal for adolescents and reported use of these substances was very high: 98.9% of boys and 94.5% of girls had used alcohol in their lifetime (see Figure 3). Similarly, 98.9% of boys and 92.7% of girls had used tobacco in their lifetime. The illicit drug that was most commonly reported by adolescents was marijuana: 98.9% of boys and 83.6% of girls. Significantly more boys reported using marijuana in their lifetime compared to girls. It is notable that more than half of boys and girls had used tranquilizers and opiates in their lifetime. It is also interesting that more adolescents reported using inhalants in their lifetime than cocaine, hallucinogens, amphetamines, methadone, or heroin.

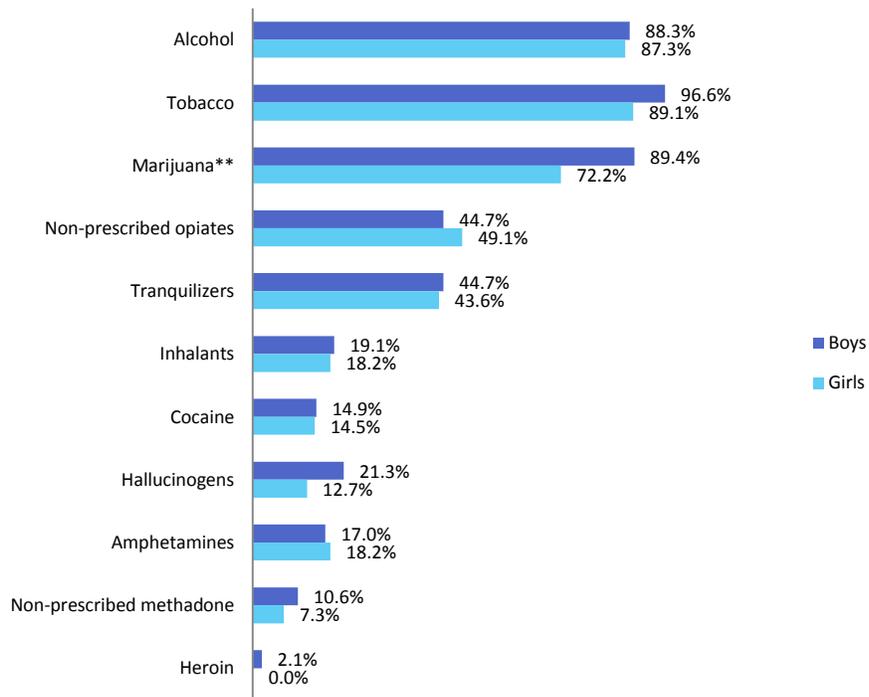
FIGURE 3. PERCENT OF CLIENTS REPORTING USE OF SUBSTANCES IN THEIR LIFETIME (n = 149)



\*p < .05, \*\*p < .01, \*\*\*p < .001.

The majority of boys and girls reported using tobacco, alcohol, and marijuana in the 12 months before intake (see Figure 4). Similar to the findings for lifetime marijuana use, significantly more boys (89.4%) than girls (72.7%) reported using marijuana in the 12 months before intake. Fewer than one-half of boys (44.7%) and girls (49.1%) reported using opiates in the 12 months before intake. Past-12-month tranquilizer use was reported by 44.7% of boys and 43.6% of girls. Nearly one in five boys and girls reported using inhalants in the past 12 months. Past-12-month hallucinogen use was reported by 21.3% of boys and 12.7% of girls.

FIGURE 4. PERCENT OF CLIENTS REPORTING USE OF SUBSTANCES IN THE 12 MONTHS BEFORE INTAKE (n = 149)



\*p < .05, \*\*p < .01, \*\*\*p < .001.

## RISK AND PROTECTIVE FACTORS FOR SUBSTANCE USE RECOVERY

Youth risk factors that might pose barriers to substance use recovery were recorded at intake (see Table 9). The risk of having a brain injury is high among adolescents (Faul et al., 2010), and a brain injury may increase the risk of substance use (Corrigan et al., 1995; Kreutzer et al., 1996). Fewer than one-third of boys (30.9%) and 21.8% of girls reported having a head injury that caused loss of consciousness or hospitalization in their lifetime.

There were no significant differences between boys and girls in the percentage reporting living with someone with an alcohol or drug problem at intake. About one in ten boys (10.6%) and 9.1% of girls reported living with someone with an alcohol problem. Six percent of boys and 9.1% of girls reported living with someone with a drug problem.

Adolescents' perceptions of risk of harm associated with substances varied by type of substance. Just over one-fourth of boys (28.7%) and nearly one-third of girls (32.7%) reported a perception of no-or-slight risk associated with tobacco use. Over half of boys (59.3%) and a little less than half of girls (47.3%) perceived no-or-slight risk associated with alcohol use (1 to 2 drinks daily). Significantly more boys (66.0%) than girls (46.3%) perceived no-or-slight risk from marijuana use. Smaller percentages of adolescents perceived no-or-slight risk from using amphetamines, tranquilizers, or painkillers (see Table 9).

TABLE 9. RISK FACTORS FOR SUBSTANCE USE RECOVERY AT INTAKE

RISK FACTORS FOR RECOVERY	BOYS	GIRLS
<b>HEALTH</b>		
Lifetime history of head injury (with loss of consciousness or hospitalization)	30.9%	21.8%
Current		
<b>SOCIAL EXPOSURE TO SUBSTANCE USE</b>		
Of those who did not live in a controlled environment:	n =66	n = 44
Lives with someone with a current alcohol problem	10.6%	9.1%
Lives with someone with a current drug problem	6.1%	9.1%
<b>PERCEPTION OF HARM ASSOCIATED WITH SUBSTANCE USE</b>		
<i>Percent of adolescents reporting “no or slight risk” with use of:</i>		
Tobacco	28.7%	32.7%
Alcohol (daily use of 1 to 2 drinks)	59.3%	47.3%
Marijuana**	66.0%	46.3%
Amphetamines	1.1%	5.7%
Painkillers	8.9%	9.3%
Tranquilizers	14.3%	11.3%

\*p < .05, \*\*p < .01, \*\*\*p < .001.

The intake survey also asks about protective factors that may support the youth in their recovery process. About one in five clients had attended AA/NA mutual help meetings in the 30 days before intake (see Table 10). For the 22 boys who reported attending AA/NA mutual help meetings in the past 30 days, they reported attending on average 5.3 meetings. Among the 11 girls who reported attending AA/NA mutual help meetings, they reported attending an average of 9.2 meetings. A smaller number of adolescents reported that they had attended faith-based mutual help recovery groups in the 30 days before intake: 10.6% of boys and 10.9% of girls. The majority of clients reported having supportive interactions with family and friends with regard to their recovery process, with no difference between boys and girls.

TABLE 10. PROTECTIVE FACTORS FOR SUBSTANCE USE RECOVERY AT INTAKE

PROTECTIVE FACTORS FOR RECOVERY	BOYS	GIRLS
<b>MUTUAL HELP GROUP ATTENDANCE</b>		
Attended AA/NA mutual help group meetings in the past 30 days	23.7%	20.0%
Of those who used mutual help groups in the past 30 days	(n = 22)	(n = 11)
Mean # of times attended in the 30 days before intake	5.3	9.2
Had contact with AA or NA sponsor in the past 30 days	4.5%	18.2%
<b>FAITH-BASED MUTUAL HELP GROUP ATTENDANCE</b>		
Attended faith-based mutual help recovery group meetings in the past 30 days	10.6%	10.9%
Had interactions with family or friends who were supportive of recovery	95.7%	90.9%

Clients reported a wide range of supportive people in their lives at intake to whom they turn when having trouble (see Figure 5). This question was not included on the web survey version in FY 2010; therefore, only 100 adolescents provided responses to this question. Just under half of clients (46.0%) said that they turned to family members. Over one-fourth (27.0%) turned to friends. About one in ten adolescents (10.0%) said that they turned to an intimate partner and about one in ten (11.0%) said that they had no one to turn to when they were having trouble.

When asked who or what would be most useful for recovery, 41.6% of youth felt that support from family or friends would be most useful to their recovery (see Figure 6).

FIGURE 5. PERCENT OF CLIENTS REPORTING WHOM THEY TURN TO WHEN HAVING TROUBLE (n = 100)

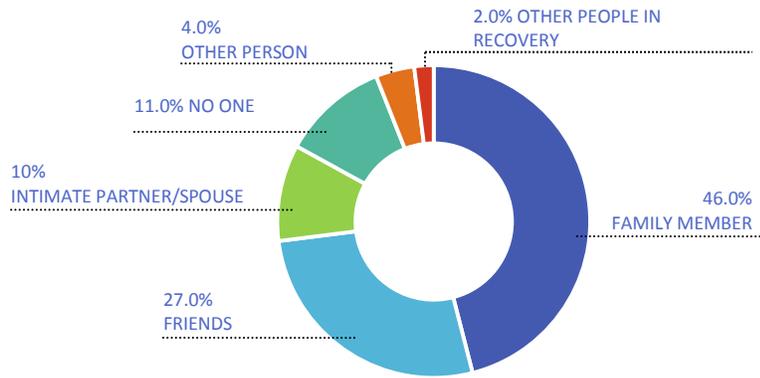
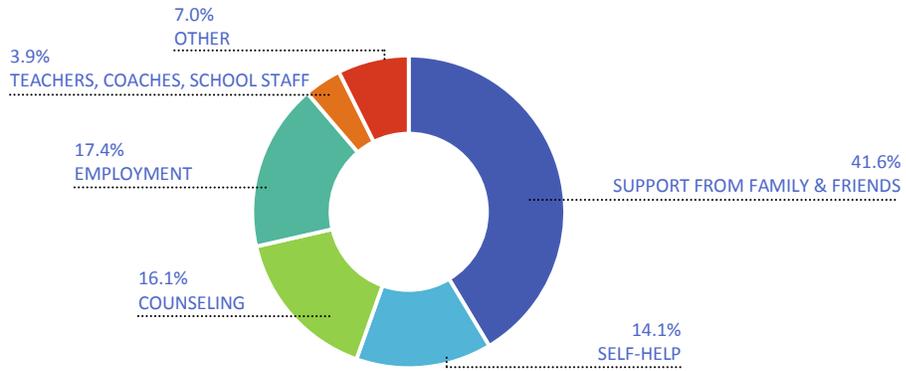


FIGURE 6. PERCENT OF CLIENTS REPORTING ELEMENTS MOST USEFUL FOR ADDICTION RECOVERY



# SUBSTANCE USE OUTCOMES: CHANGE FROM INTAKE TO FOLLOW-UP

## SELF-REPORTED SUBSTANCE USE IN THE PAST 12 MONTHS

In the previous Adolescent KTOS Bi-Annual Reports, we have presented data on adolescents’ past-30-day abstinence from tobacco, alcohol, and drugs. In this report, we will present data on past-12-month abstinence in addition to data on past-30-day abstinence. Adolescents’ substance use may be less frequent than adults for a variety of reasons: they may not have progressed from experimentation to abuse or dependence, and their access to substances may be more limited than adults’ access for a variety of reasons, such as less income, more supervision by others, and so forth. For these reasons, it may be important to look at a longer timeframe when examining substance use post-treatment. Adolescents’ self-reported use of substances in the 12 months before intake and follow-up will be presented in this section, followed by a section that presents adolescents’ self-reported past-30-day use of substances at intake and follow-up.

For ease in interpreting the data, percent change is presented in charts. **Bars in charts that are solid represent statistically significant percent change, while bars that are not filled in with color represent percent change that is not statistically significant.** For example, in Figure 7, none of the bars are filled in with color, meaning that the percent change was not statistically significant, whereas in Figure 8 all of the bars are filled in with color, meaning the percent change for boys and girls separately, and for the entire sample, was statistically significant.

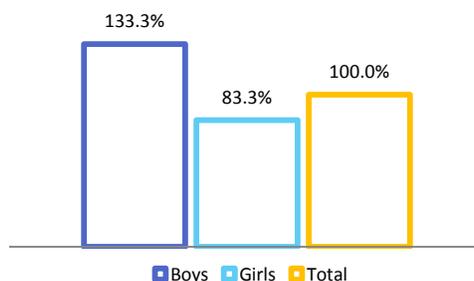
### TOBACCO, 12 MONTH USE

A small number of adolescents (6%) reported at intake that they were tobacco-abstinent in the past 12 months (see Table 11). At follow-up, the number of adolescents that were tobacco-abstinent increased to 12.1%—an increase of 100%; however this change was not statistically significant (see Figure 7).

TABLE 11. PERCENTAGE OF CLIENTS REPORTING TOBACCO ABSTINENCE IN THE PAST 12 MONTHS

	ABSTINENT AT INTAKE		ABSTINENT AT FOLLOW-UP	
	n	Valid %	n	Valid %
<b>TOBACCO</b>				
Boys (n = 94)	3	3.2%	7	7.4%
Girls (n = 55)	6	10.9%	11	20.0%
Total (n = 149)	9	6.0%	18	12.1%

FIGURE 7. PERCENT CHANGE FROM INTAKE TO FOLLOW-UP IN REPORTED TOBACCO ABSTINENCE IN THE PAST 12 MONTHS<sup>a</sup>



<sup>a</sup>—Significance established using z test for proportions; \*p < .05, \*\*p < .01, \*\*\*p < .001.

## ALCOHOL, 12 MONTH USE

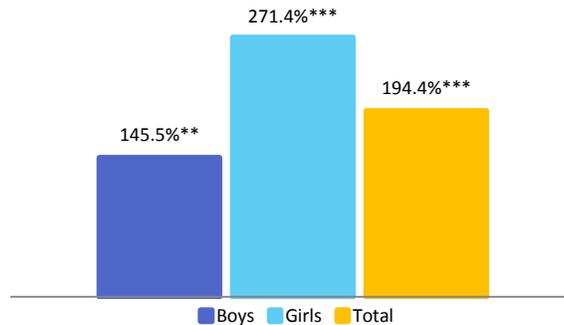
Table 12 shows that only 12.1% of adolescents reported alcohol abstinence in the 12 months before intake. At follow-up, just over one-third of adolescents reported alcohol abstinence in the past 12 months--a statistically significant increase of 194.4% (see Figure 8). The percent increase of the number of girls who were alcohol-abstinent was greater than the percent increase for boys (271.4% vs. 145.5%, respectively).

Overall, the percentage of adolescents who reported not using alcohol to intoxication increased significantly from 32.9% at intake to 47.0%--an increase of 42.9% (see Figure 9). The number of girls who reported not using alcohol to intoxication in the past 12 months increased significantly by 73.7%, from 34.5% at intake to 60.0% at follow-up.

TABLE 12. PERCENTAGE OF CLIENTS REPORTING ALCOHOL ABSTINENCE IN THE PAST 12 MONTHS

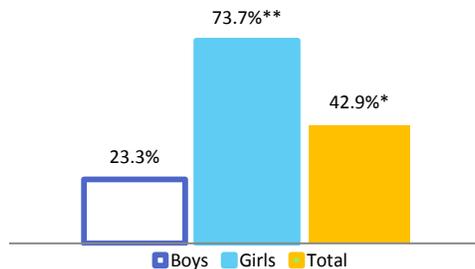
	ABSTINENT AT INTAKE		ABSTINENT AT FOLLOW-UP	
	n	Valid %	n	Valid %
<b>ALCOHOL</b>				
Boys (n = 94)	11	11.7%	27	28.7%
Girls (n = 55)	7	12.7%	26	47.3%
Total (n = 149)	18	12.1%	53	35.6%
<b>ALCOHOL TO INTOXICATION</b>				
Boys (n = 94)	30	31.9%	37	39.4%
Girls (n = 55)	19	34.5%	33	60.0%
Total (n = 149)	49	32.9%	70	47.0%

FIGURE 8. PERCENT CHANGE FROM INTAKE TO FOLLOW-UP IN REPORTED ALCOHOL ABSTINENCE IN THE PAST 12 MONTHS<sup>a</sup>



<sup>a</sup>—Significance established using z test for proportions; \*p < .05, \*\*p < .01, \*\*\*p < .001.

FIGURE 9. PERCENT CHANGE FROM INTAKE TO FOLLOW-UP IN ABSTINENCE FROM ALCOHOL INTOXICATION IN THE PAST 12 MONTHS<sup>a</sup>



<sup>a</sup>—Significance established using z test for proportions; \*p < .05, \*\*p < .01, \*\*\*p < .001.

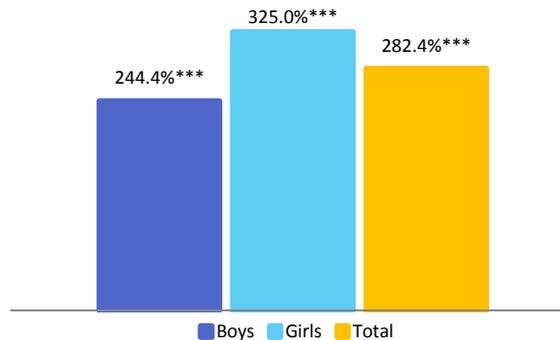
## ILLCIT DRUG, 12 MONTH USE

About 1 in 10 adolescents (11.4%) reported that they were abstinent from illicit drugs in the 12 months before intake and by follow-up, 43.6% of adolescents reported they were abstinent from illicit drugs (see Table 13), a significant increase of 282.4%. Percent increases for boys and girls were statistically significant (see Figure 10). The percentage of girls who reported being abstinent from all illicit drugs in the past 12 months increased from 14.5% at intake to 61.8% at follow-up—an increase of 325.0%. The percentage of boys who reported being abstinent from all illicit drugs in the past 12 months increased from 9.6% at intake to 33.0% at follow-up—an increase of 244.4%. Significantly more girls reported being abstinent from illicit drugs at follow-up compared to boys (61.8% vs. 33.0%).

TABLE 13. PERCENTAGE OF CLIENTS REPORTING ABSTINENCE FROM ALL ILLICIT DRUGS IN THE PAST 12 MONTHS

	ABSTINENT AT INTAKE		ABSTINENT AT FOLLOW-UP	
	n	Valid %	n	Valid %
<b>ILLCIT DRUGS</b>				
Boys (n = 94)	9	9.6%	31	33.0%
Girls (n = 55)	8	14.5%	34	61.8%
Total (n = 149)	17	11.4%	65	43.6%

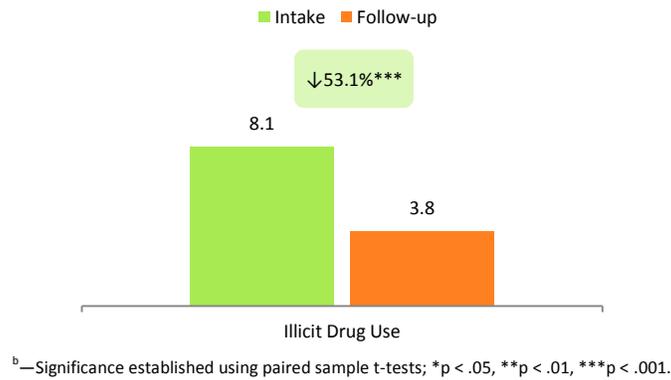
FIGURE 10. PERCENT CHANGE FROM INTAKE TO FOLLOW-UP IN REPORTED ILLICIT DRUG ABSTINENCE IN THE PAST 12 MONTHS<sup>a</sup>



<sup>a</sup>—Significance established using z test for proportions; \*p < .05, \*\*p < .01, \*\*\*p < .001.

Not only did the number of clients reporting abstinence increase from intake to follow-up, among those who used illicit drugs at intake (n = 132), the average number of months clients reported using illicit drugs decreased significantly by 53.1%, from 8.1 months at intake to 3.8 months at follow-up (see Figure 11).

FIGURE 11. REDUCTION FROM INTAKE TO FOLLOW-UP IN MEAN NUMBER OF DAYS IN THE PAST 12 MONTHS CLIENTS REPORTED USING ILLICIT DRUGS, AMONG THOSE WHO REPORTED USING ILLICIT DRUGS IN THE 12 MONTHS BEFORE INTAKE (n = 132)



## SPECIFIC DRUG USE OUTCOMES

### MARIJUANA, PAST 12 MONTH USE

Research has found that marijuana is the most commonly used substance by adolescents who participate in substance abuse treatment (Hser et al., 2001; Substance Abuse and Mental Health Services Administration [SAMHSA], 2007); Williams & Chang, 2000). Consistent with the findings of these other studies, the Adolescent KTOS study found that the most commonly reported drug at intake was marijuana.

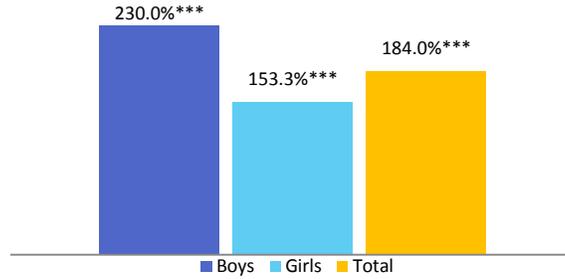
At intake, 16.8% reported marijuana abstinence in the past 12 months (see Table 15). At follow-up, 47.7% of clients reported abstinence from marijuana in the past 12 months, a significant increase of 184.0% (see Figure 12). The significant increase in percent of boys who were marijuana-abstinent was 230.0% and for girls the percent increase was 153.3%.

Significantly more girls than boys reported marijuana abstinence at follow-up. About 69.1% of girls reported marijuana abstinence at follow-up compared to 35.1% of boys.

TABLE 15. PERCENTAGE OF CLIENTS REPORTING MARIJUANA ABSTINENCE IN THE PAST 12 MONTHS

	ABSTINENT AT INTAKE		ABSTINENT AT FOLLOW-UP	
	n	Valid %	n	Valid %
<b>MARIJUANA</b>				
Boys (n = 94)	10	10.6%	33	35.1%
Girls (n = 55)	15	27.3%	38	69.1%
Total (n = 149)	25	16.8%	71	47.7%

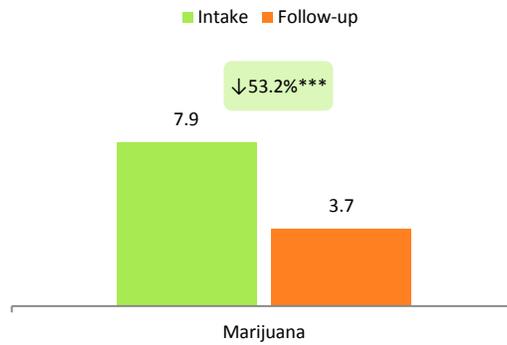
FIGURE 12. PERCENT CHANGE FROM INTAKE TO FOLLOW-UP IN REPORTED MARIJUANA ABSTINENCE IN THE PAST 12 MONTHS<sup>a</sup>



<sup>a</sup>—Significance established using z test for proportions; \*p < .05, \*\*p < .01, \*\*\*p < .001.

Among clients who reported marijuana use at intake (n = 124), the number of months clients reported using marijuana decreased by 53.2% from 7.9 months at intake to 3.7 months at follow-up (see Figure 13).

FIGURE 13. REDUCTION FROM INTAKE TO FOLLOW-UP IN MEAN NUMBER OF DAYS IN THE PAST 12 MONTHS CLIENTS REPORTED USING MARIJUANA AMONG THOSE WHO REPORTED USING MARIJUANA IN THE 12 MONTHS BEFORE INTAKE (n = 124)<sup>a</sup>



<sup>a</sup>—Significance established using paired sample t-tests; \*p < .05, \*\*p < .01, \*\*\*p < .001.

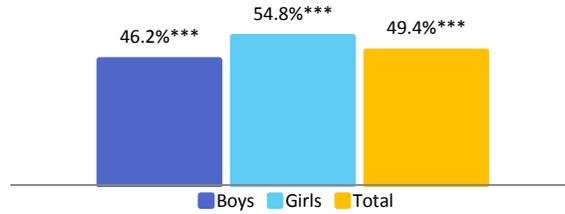
### TRANQUILIZERS/SEDATIVES/BENZODIAZEPINES, PAST 12 MONTH USE

The majority of adolescent clients reported abstaining from tranquilizers/sedatives/benzodiazepines in the 12 months before intake (55.7%) and at follow-up the percentage had increased significantly by 49.4% to 83.2% (see Table 16 and Figure 14).

TABLE 16. PERCENTAGE OF CLIENTS REPORTING TRANQUILIZER/SEDATIVE/BENZODIAZEPINE ABSTINENCE IN THE PAST 12 MONTHS

	ABSTINENT AT INTAKE		ABSTINENT AT FOLLOW-UP	
	n	Valid %	n	Valid %
<b>TRANQUILIZER, SEDATIVE, BENZODIAZEPINE</b>				
Boys (n = 94)	52	55.3%	76	80.9%
Girls (n = 55)	31	56.4%	48	87.3%
Total (n = 149)	83	55.7%	124	83.2%

FIGURE 14. PERCENT CHANGE FROM INTAKE TO FOLLOW-UP IN REPORTED TRANQUILIZER/SEDATIVE/BENZODIAZEPINE ABSTINENCE IN THE PAST 12 MONTHS<sup>a</sup>



<sup>a</sup>—Significance established using z test for proportions; \*p < .05, \*\*p < .01, \*\*\*p < .001.

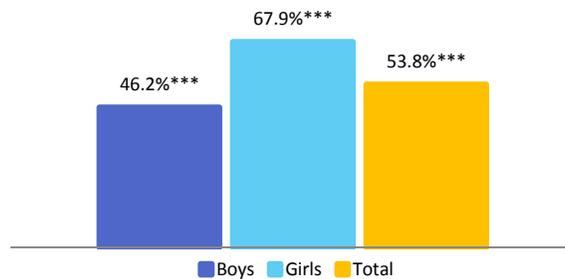
### OPIATES, PAST 12 MONTH USE

Slightly over one-half of adolescent clients (53.7%) reported abstaining from opiates (excluding methadone) in the past 12 months at intake and a significant increase of 53.8% reported opiate abstinence at follow-up (82.6%) (see Table 17 and Figure 15).

TABLE 17. PERCENTAGE OF CLIENTS REPORTING OPIATE ABSTINENCE IN THE PAST 12 MONTHS

	ABSTINENT AT INTAKE		ABSTINENT AT FOLLOW-UP	
	n	Valid %	n	Valid %
<b>OPIATES (EXCLUDING METHADONE)</b>				
Boys (n = 94)	52	55.3%	76	80.9%
Girls (n = 55)	28	50.9%	47	85.5%
Total (n = 149)	80	53.7%	123	82.6%

FIGURE 15. PERCENT CHANGE FROM INTAKE TO FOLLOW-UP IN REPORTED OPIATE ABSTINENCE IN THE PAST 12 MONTHS<sup>a</sup>



<sup>a</sup>—Significance established using z test for proportions; \*p < .05, \*\*p < .01, \*\*\*p < .001.

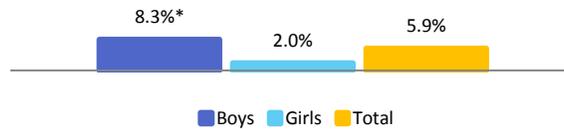
### NON-PRESCRIBED METHADONE, PAST 12 MONTH USE

At intake, 90.6% of adolescents reported they were abstinent from non-prescribed methadone in the past 12 months and by follow-up, 96.0% of clients reported they were abstinent in the past 12 months (Table 18). Because the vast majority of adolescents were methadone-abstinent in the 12 months before intake, only modest percent increases occurred in the number of boys and girls who were methadone-abstinent at follow-up (see Figure 16). The percent increase of 8.3% for boys, however, was statistically significant.

TABLE 18. PERCENTAGE OF CLIENTS REPORTING NON-PRESCRIBED METHADONE ABSTINENCE IN THE PAST 12 MONTHS

	ABSTINENT AT INTAKE		ABSTINENT AT FOLLOW-UP	
	n	Valid %	n	Valid %
<b>NON-PRESCRIBED METHADONE</b>				
Boys (n = 94)	84	89.4%	91	96.8%
Girls (n = 55)	51	92.7%	52	94.5%
Total (n = 149)	135	90.6%	143	96.0%

FIGURE 16. PERCENT CHANGE FROM INTAKE TO FOLLOW-UP IN REPORTED NON-PRESCRIBED METHADONE ABSTINENCE IN THE PAST 12 MONTHS<sup>a</sup>



<sup>a</sup>—Significance established using z test for proportions; \*p < .05, \*\*p < .01, \*\*\*p < .001.

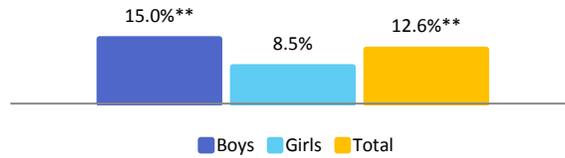
### COCAINE, PAST 12 MONTH USE

Most adolescents (85.2%) reported that they were abstinent from cocaine in the 12 months before intake (see Table 19) and there was a significant increase of 12.6% at follow-up (see Figure 17). The percentage of boys who were cocaine-abstinent increased 15.0% from intake to follow-up but this change was not statistically significant. The percent increase for girls was not statistically significant.

TABLE 19. PERCENTAGE OF CLIENTS REPORTING COCAINE ABSTINENCE IN THE PAST 12 MONTHS

	ABSTINENT AT INTAKE		ABSTINENT AT FOLLOW-UP	
	n	Valid %	n	Valid %
<b>COCAINE</b>				
Boys (n = 94)	80	85.1%	92	97.9%
Girls (n = 55)	47	85.5%	51	92.7%
Total (n = 149)	127	85.2%	143	96.0%

FIGURE 17. PERCENT CHANGE FROM INTAKE TO FOLLOW-UP IN REPORTED COCAINE ABSTINENCE IN THE PAST 12 MONTHS<sup>a</sup>



<sup>a</sup>—Significance established using z test for proportions; \*p < .05, \*\*p < .01, \*\*\*p < .001.

### AMPHETAMINES, PAST 12 MONTH USE

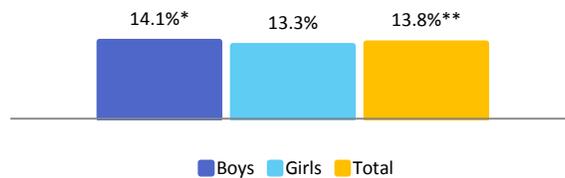
About four out of five Adolescent KTOS clients (82.6%) reported abstinence from amphetamines in the 12 months before intake. At follow-up, 94.0% reported they were abstinent from amphetamines in the past 12 months (see Table 20), a significant increase of 13.8% (see Figure 18).

TABLE 20. PERCENTAGE OF CLIENTS REPORTING ABSTINENCE FROM AMPHETAMINES IN THE PAST 12 MONTHS<sup>a</sup>

	ABSTINENT AT INTAKE		ABSTINENT AT FOLLOW-UP	
	n	Valid %	n	Valid %
<b>AMPHETAMINE</b>				
Boys (n = 94)	78	83.0%	89	94.7%
Girls (n = 55)	45	81.8%	51	92.7%
Total (n = 149)	123	82.6%	140	94.0%

<sup>a</sup>—Significance established using z test for proportions; \*p < .05, \*\*p < .01, \*\*\*p < .001.

FIGURE 18. PERCENT CHANGE FROM INTAKE TO FOLLOW-UP IN REPORTED AMPHETAMINE ABSTINENCE IN THE PAST 12 MONTHS<sup>a</sup>



<sup>a</sup>—Significance established using z test for proportions; \*p < .05, \*\*p < .01, \*\*\*p < .001.

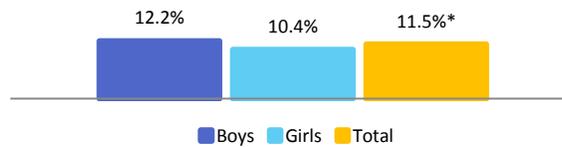
## HALLUCINOGENS, PAST 12 MONTH USE

About four out of five (81.9%) adolescents reported abstinence from hallucinogens in the 12 months before intake (see Table 21). At follow-up, 91.3% adolescents reported abstinence from hallucinogens in the past 12 months, a significant increase of 11.5% (see Figure 19).

TABLE 21. PERCENTAGE OF CLIENTS REPORTING ABSTINENCE FROM HALLUCINOGENS IN THE PAST 12 MONTHS<sup>a</sup>

	ABSTINENT AT INTAKE		ABSTINENT AT FOLLOW-UP	
	n	Valid %	n	Valid %
<b>HALLUCINOGEN</b>				
Boys (n = 94)	74	78.7%	83	88.3%
Girls (n = 55)	48	87.3%	53	96.4%
Total (n = 149)	122	81.9%	136	91.3%

FIGURE 19. PERCENT CHANGE FROM INTAKE TO FOLLOW-UP IN REPORTED HALLUCINOGEN ABSTINENCE IN THE PAST 12 MONTHS<sup>a</sup>



<sup>a</sup>—Significance established using z test for proportions; \*p < .05, \*\*p < .01, \*\*\*p < .001.

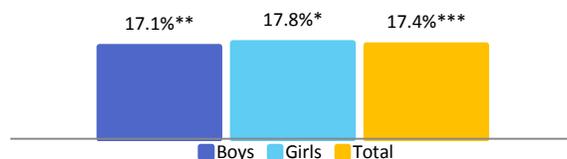
## INHALANTS, PAST 12 MONTH USE

About four out of five clients reported past-12-month abstinence from inhalants at intake. At follow-up, 95.3% of adolescents reported they were abstinent from inhalants in the past 12 months, a significant increase of 17.4% (see Table 22 and Figure 20).

TABLE 22. PERCENTAGE OF CLIENTS REPORTING INHALANT ABSTINENCE IN THE PAST 12 MONTHS

	ABSTINENT AT INTAKE		ABSTINENT AT FOLLOW-UP	
	n	Valid %	n	Valid %
<b>INHALANTS</b>				
Boys (n = 94)	76	80.9%	89	94.7%
Girls (n = 55)	45	81.8%	53	96.4%
Total (n = 149)	121	81.2%	142	95.3%

FIGURE 20. PERCENT CHANGE FROM INTAKE TO FOLLOW-UP IN REPORTED INHALANT ABSTINENCE IN THE PAST 12 MONTHS<sup>a</sup>



<sup>a</sup>—Significance established using z test for proportions; \*p < .05, \*\*p < .01, \*\*\*p < .001.

## CURRENT SUBSTANCE USE: PAST 30 DAY

### TOBACCO, 30 DAY USE

Among adolescents who were not in a controlled environment all 30 days before intake or follow-up, the majority of youth reported using tobacco in the past 30 days at intake (76.6%) and follow-up (81.6%). In other words, 23.4% abstained from tobacco at intake and 18.4% abstained from tobacco at follow-up (see Table 23). Significantly fewer boys than girls reported tobacco abstinence in the 30 days before intake (15.5% vs. 35.8%), while there was no difference between the percentage of boys and girls reporting tobacco use in the 30 days before follow-up.

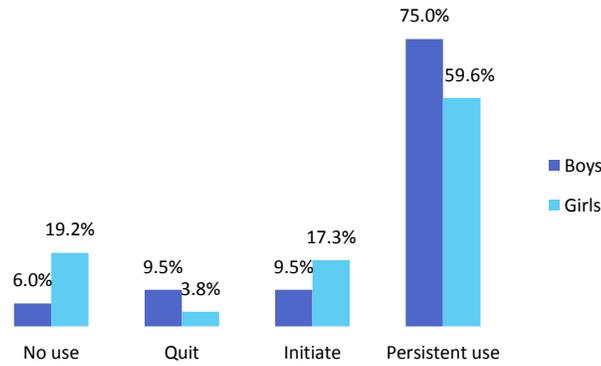
TABLE 23. PERCENTAGE OF CLIENTS REPORTING TOBACCO ABSTINENCE IN THE PAST 30 DAYS

	ABSTINENT AT INTAKE		ABSTINENT AT FOLLOW-UP	
	n	Valid %	n	Valid %
<b>TOBACCO</b>				
Boys (n = 84)	13	15.5%	13	15.5%
Girls (n = 53)	19	35.8%	12	23.1%
Total (n = 137)	32	23.4%	25	18.4%

Note. Individuals who were in a controlled environment all 30 days before the intake or follow-up survey were excluded from this analysis.

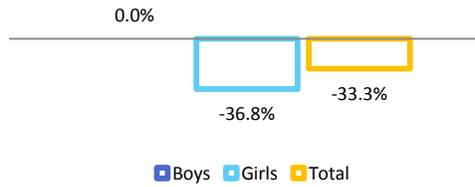
Figure 21 presents another way to look at tobacco use pre-treatment to post-treatment. The percentage of boys and girls within each category were significantly different. Only 6.0% of boys remained abstinent from tobacco products from intake to follow-up (i.e., non-smokers) while 19.2% of girls were in the no-use group. Almost one in ten boys (9.5%) and 3.8% of girls reported using tobacco at intake but were tobacco-abstinent at follow-up. About one in ten boys (9.5%) reported initiating use by follow-up, with 17.3% of girls initiating tobacco use by follow-up. It is important to note that the majority of boys (75.0%) and girls (59.6%) reported using tobacco at intake and at follow-up (i.e., persistent smokers). Significantly fewer girls were in the persistent use group compared to boys (59.6% compared to 75.0%).

FIGURE 21. PERCENTAGE OF ADOLESCENTS IN TOBACCO USE GROUPS



There was no change in the number of boys reporting tobacco abstinence from intake to follow-up. The percent change in the number of girls who were tobacco-abstinent decreased from intake to follow-up (see Figure 22), but this decrease was not statistically significant. Importantly, there was no increase in tobacco abstinence.

FIGURE 22. PERCENT CHANGE IN REPORTED TOBACCO ABSTINENCE FROM INTAKE TO FOLLOW-UP<sup>a</sup>



<sup>a</sup>—Significance established using z test for proportions; \*p < .05, \*\*p < .01, \*\*\*p < .001.

Among the clients who reported using tobacco products at intake and follow-up (i.e., persistent smokers, n = 98), the number of days of use in the past 30 days increased from intake to follow-up significantly (see Table 24). Of those who used tobacco at intake and follow-up, clients reported using on average 23.4 days out of 30 days at intake and 27.3 days out of 30 at follow-up.

TABLE 24. CHANGE IN MEAN NUMBER OF DAYS IN THE PAST 30 DAYS CLIENTS REPORTED USING TOBACCO FROM INTAKE TO FOLLOW-UP, AMONG THOSE WHO REPORTED USING TOBACCO IN THE 30 DAYS BEFORE INTAKE AND FOLLOW-UP

	INTAKE	FOLLOW-UP
<b>TOBACCO</b>		
Boys (n = 67)**	22.5 days	27.0 days
Girls (n = 31)	25.2 days	27.9 days
Total (n = 98)**	23.4 days	27.3 days

<sup>a</sup>—Significance established using paired t-test; \*p < .05, \*\*p < .01, \*\*\*p < .001.

Another way to examine frequency of tobacco use is to examine the percentage of clients who report using different numbers of days (not depicted in a figure). Of those who used tobacco at intake (n = 110), 63.6% used tobacco all 30 days and 26.4% used 1 to 15 days of the past 30 days. Of those who used tobacco at follow-up (n = 122), 83.6% used all 30 days and only 9.8% used between 1 to 15 days of the past 30 days. Thus, tobacco use escalated among smokers.

## ALCOHOL, 30 DAY USE

Table 25 shows that the majority of Adolescent KTOS clients reported alcohol abstinence at intake and follow-up (70.6% and 64.7%, respectively). There was a slight, non-significant decrease in the number of adolescents who reported alcohol abstinence at follow-up compared to intake. The pattern was similar for reported alcohol use to intoxication.

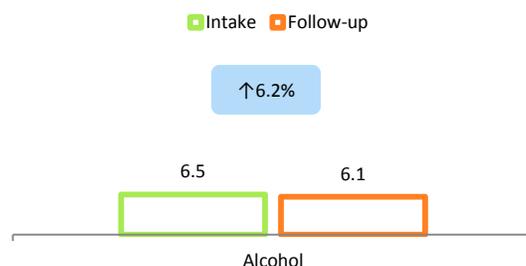
TABLE 25. PERCENTAGE OF CLIENTS REPORTING ALCOHOL ABSTINENCE IN THE PAST 30 DAYS

	ABSTINENT AT INTAKE		ABSTINENT AT FOLLOW-UP	
	n	Valid %	n	Valid %
<b>ALCOHOL</b>				
Boys (n = 84)	55	65.5%	48	57.1%
Girls (n = 52)	41	78.8%	40	76.9%
Total (n = 136)	96	70.6%	88	64.7%
<b>ALCOHOL TO INTOXICATION</b>				
Boys (n = 84)	63	75.0%	54	64.3%
Girls (n = 52)	45	86.5%	44	84.6%
Total (n = 136)	108	79.4%	98	72.1%

Note. Individuals who were in a controlled environment all 30 days before the intake or follow-up survey were excluded from this analysis.

Among those who reported alcohol use at intake and follow-up (n = 21), the average number of days clients reported using alcohol decreased slightly, but not significantly, from intake (6.5 days) to follow-up (6.1 days) (see Figure 23).

FIGURE 23. MEAN NUMBER OF DAYS IN THE PAST 30 DAYS CLIENTS REPORTED USING ALCOHOL, AMONG THOSE WHO REPORTED USING ALCOHOL IN THE 30 DAYS BEFORE INTAKE AND FOLLOW-UP (n = 21)<sup>a</sup>



Note. Individuals who were in a controlled environment all 30 days before the intake or follow-up survey were excluded from this analysis.

a—Significance established using paired sample t-tests; \*p < .05, \*\*p < .01, \*\*\*p < .001.

## ILLICIT DRUG, 30 DAY USE

Over half of the adolescent clients (56.6%) reported they were abstinent from illicit drugs in the 30 days before intake and 65.4% of adolescents reported they were abstinent from illicit drugs at follow-up (see Table 26). Significantly more girls than boys reported being abstinent from illicit drugs at intake, but at follow-up there was no significant difference in the percentage of boys and girls reporting abstinence from illicit drugs.

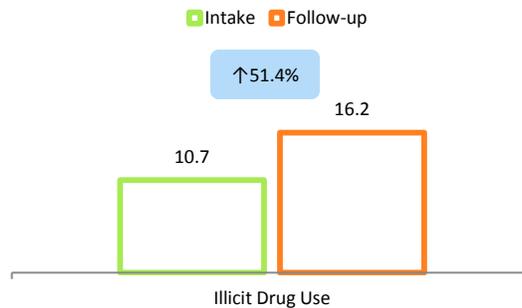
TABLE 26. PERCENTAGE OF CLIENTS REPORTING ABSTINENCE FROM ALL ILLICIT DRUGS IN THE PAST 30 DAYS

	ABSTINENT AT INTAKE		ABSTINENT AT FOLLOW-UP	
	n	Valid %	n	Valid %
<b>ILLICIT DRUGS</b>				
Boys (n = 84)	42	50.0%	51	60.7%
Girls (n = 52)	35	67.3%	38	73.1%
Total (n = 136)	77	56.6%	89	65.4%

Note. Individuals who were in a controlled environment all 30 days before the intake or follow-up survey were excluded from this analysis.

Even though the number of clients reporting abstinence from illicit drugs increased from intake to follow-up, among those who used illicit drugs at intake and follow-up (n = 25), the average number of days clients reported using illicit drugs increased by 51.4%, from 10.7 days at intake to 16.2 days at follow-up; however, this increase was not statistically significant (see Figure 24).

FIGURE 24. MEAN NUMBER OF DAYS IN THE PAST 30 DAYS CLIENTS REPORTED USING ILLICIT DRUGS, AMONG THOSE WHO REPORTED USING ILLICIT DRUGS IN THE 30 DAYS BEFORE INTAKE AND FOLLOW-UP (n = 25)<sup>a</sup>



Note. Individuals who were in a controlled environment all 30 days before the intake or follow-up survey were excluded from this analysis.  
a—Significance established using paired sample t-tests; \*p < .05, \*\*p < .01, \*\*\*p < .001.

## SPECIFIC DRUG USE OUTCOMES

### MARIJUANA, 30 DAY USE

At intake, 62.5% of Adolescent KTOS clients reported marijuana abstinence in the past 30 days (see Table 27). At follow-up, 69.9% of clients reported they were abstinent from marijuana in the past 30 days. Significantly more girls than boys reported marijuana abstinence at intake and follow-up. About 77% of girls reported marijuana abstinence in the past 30 days at intake compared to 53.6% of boys. At follow-up, 80.8% of girls and 63.1% of boys reported abstinence from marijuana in the past 30 days.

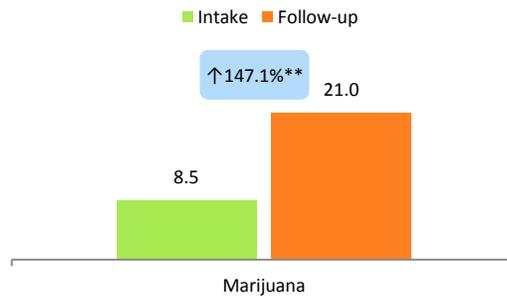
TABLE 27. PERCENTAGE OF CLIENTS REPORTING MARIJUANA ABSTINENCE IN THE PAST 30 DAYS

	ABSTINENT AT INTAKE		ABSTINENT AT FOLLOW-UP	
	n	Valid %	n	Valid %
<b>MARIJUANA</b>				
Boys (n = 84)	45	53.6%	53	63.1%
Girls (n = 52)	40	76.9%	42	80.8%
Total (n = 136)	85	62.5%	95	69.9%

Note. Individuals who were in a controlled environment all 30 days before the intake or follow-up survey were excluded from this analysis.

Among clients who reported marijuana use at intake and follow-up (n = 17), the number of days clients reported using marijuana increased by 147.1% from 8.5 days at intake to 21.0 days at follow-up (see Figure 25).

FIGURE 25. INCREASE FROM INTAKE TO FOLLOW-UP IN MEAN NUMBER OF DAYS IN THE PAST 30 DAYS CLIENTS REPORTED USING MARIJUANA AMONG THOSE WHO REPORTED USING MARIJUANA IN THE 30 DAYS BEFORE INTAKE AND FOLLOW-UP (n = 17)<sup>a</sup>



Note. Individuals who were in a controlled environment all 30 days before the intake or follow-up survey were excluded from this analysis.  
a—Significance established using paired sample t-tests; \*p < .05, \*\*p < .01, \*\*\*p < .001.

### TRANQUILIZERS/SEDATIVES/BENZODIAZEPINES, 30 DAY USE

Even though 57.0% of adolescents reported at intake that they had used tranquilizers/sedatives/benzodiazepines in their lifetime, the vast majority of clients reported abstaining from tranquilizers/sedatives/benzodiazepines in the 30 days before intake (89.0%) and the 30 days before follow-up (91.9%; see Table 28).

TABLE 28. PERCENTAGE OF CLIENTS REPORTING TRANQUILIZER/SEDATIVE/BENZODIAZEPINE ABSTINENCE IN THE PAST 30 DAYS

	ABSTINENT AT INTAKE		ABSTINENT AT FOLLOW-UP	
	n	Valid %	n	Valid %
<b>TRANQUILIZER, SEDATIVE, BENZODIAZEPINE</b>				
Boys (n = 84)	73	86.9%	76	90.5%
Girls (n = 52)	48	92.3%	49	94.2%
Total (n = 136)	121	89.0%	125	91.9%

Note. Individuals who were in a controlled environment all 30 days before the intake or follow-up survey were excluded from this analysis.

## OPIATES, 30 DAY USE

Although 57.7% of adolescents reported at intake that they had used non-prescribed opiates in their lifetime, the vast majority of clients reported abstaining from opiates (excluding methadone) in the past 30 days at intake (89.0%) and at follow-up (89.7%; see Table 29). Self-reported illicit use of prescription opiates was stable from intake to follow-up.

TABLE 29. PERCENTAGE OF CLIENTS REPORTING OPIATE ABSTINENCE IN THE PAST 30 DAYS

	ABSTINENT AT INTAKE		ABSTINENT AT FOLLOW-UP	
	n	Valid %	n	Valid %
<b>OPIATE (EXCLUDING METHADONE)</b>				
Boys (n = 84)	74	88.1%	75	89.3%
Girls (n = 52)	47	90.4%	47	90.4%
Total (n = 136)	121	89.0%	122	89.7%

Note. Individuals who were in a controlled environment all 30 days before the intake or follow-up survey were excluded from this analysis.

## NON-PRESCRIBED METHADONE, 30 DAY USE

At intake, all clients reported being abstinent from non-prescribed methadone and at follow-up, 98.5% of clients reported being abstinent (Table 30).

TABLE 30. PERCENTAGE OF CLIENTS REPORTING NON-PRESCRIBED METHADONE ABSTINENCE IN THE PAST 30 DAYS

	ABSTINENT AT INTAKE		ABSTINENT AT FOLLOW-UP	
	n	Valid %	n	Valid %
<b>NON-PRESCRIBED METHADONE</b>				
Boys (n = 84)	84	100%	84	100%
Girls (n = 52)	52	100%	50	96.2%
Total (n = 136)	136	100%	134	98.5%

Note. Individuals who were in a controlled environment all 30 days before the intake or follow-up survey were excluded from this analysis.

## COCAINE, 30 DAY USE

Over 99% of Adolescent KTOS clients reported being abstinent from cocaine at intake (see Table 31). At follow-up, 98.5% of clients reported abstinence from cocaine.

TABLE 31. PERCENTAGE OF CLIENTS REPORTING COCAINE ABSTINENCE IN THE PAST 30 DAYS

	ABSTINENT AT INTAKE		ABSTINENT AT FOLLOW-UP	
	n	Valid %	n	Valid %
<b>COCAINE</b>				
Boys (n = 84)	83	98.8%	84	100%
Girls (n = 52)	52	100%	50	96.2%
Total (n = 136)	135	99.3%	134	98.5%

Note. Individuals who were in a controlled environment all 30 days before the intake or follow-up survey were excluded from this analysis.

### AMPHETAMINES, 30 DAY USE

Over 96% of Adolescent KTOS clients reported being abstinent from amphetamines at intake and 97.1% reported they were abstinent from amphetamines at follow-up (see Table 32).

TABLE 32. PERCENTAGE OF CLIENTS REPORTING ABSTINENCE FROM AMPHETAMINES IN THE PAST 30 DAYS

	ABSTINENT AT INTAKE		ABSTINENT AT FOLLOW-UP	
	n	Valid %	n	Valid %
<b>AMPHETAMINE</b>				
Boys (n = 84)	81	96.4%	82	97.6%
Girls (n = 52)	50	96.2%	50	96.2%
Total (n = 136)	131	96.3%	132	97.1%

Note. Individuals who were in a controlled environment all 30 days before the intake or follow-up survey were excluded from this analysis.

### HALLUCINOGENS, 30 DAY USE

Very few adolescents reported using hallucinogens in the past 30 days at either data collection point. Ninety-five percent of clients reported abstinence from hallucinogens at intake and 94.9% reported abstinence at follow-up (see Table 33).

TABLE 33. PERCENTAGE OF CLIENTS REPORTING ABSTINENCE FROM HALLUCINOGENS IN THE PAST 30 DAYS

	ABSTINENT AT INTAKE		ABSTINENT AT FOLLOW-UP	
	n	Valid %	n	Valid %
<b>HALLUCINOGENS</b>				
Boys (n = 84)	79	94.0%	79	94.0%
Girls (n = 52)	51	98.1%	50	96.2%
Total (n = 136)	130	95.6%	129	94.9%

Note. Individuals who were in a controlled environment all 30 days before the intake or follow-up survey were excluded from this analysis

### INHALANTS, 30 DAY USE

Nearly 98% percent of clients reported abstinence from inhalants at both intake and follow-up (see Table 34).

TABLE 34. PERCENTAGE OF CLIENTS REPORTING INHALANT ABSTINENCE IN THE PAST 30 DAYS

	ABSTINENT AT INTAKE		ABSTINENT AT FOLLOW-UP	
	n	Valid %	n	Valid %
<b>INHALANTS</b>				
Boys (n = 84)	83	98.8%	81	96.4%
Girls (n = 52)	50	96.2%	52	100%
Total (n = 136)	133	97.8%	133	97.8%

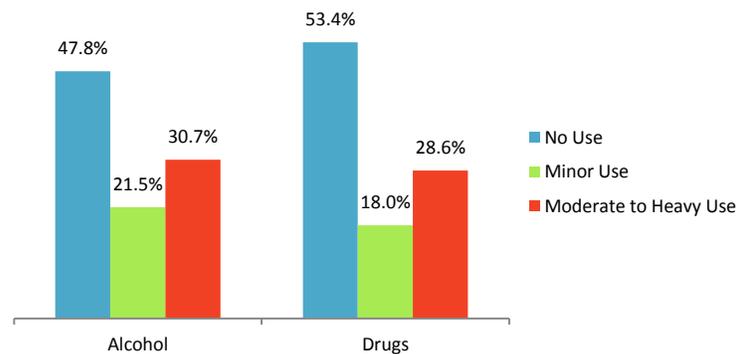
Note. Individuals who were in a controlled environment all 30 days before the intake or follow-up survey were excluded from this analysis.

## SUBSTANCE USE FROM INTAKE TO FOLLOW-UP: A CLOSER LOOK

The previous section of the report focused on changes in alcohol and drug use based on adolescents' self-reported substance use in the 12 months before intake and follow-up, as well as the 30 days before intake and follow-up. In order to better understand the recovery process, along with risk and protective factors for recovery, this section attempts to distinguish between clients who relapse and engage in alcohol or drug use sporadically and clients who engage in more sustained alcohol or drug use post-treatment.

Based on adolescents' self-reported alcohol and drug use during the 12-month follow-up period, groups were created to look for risk and protective factors for substance use post-treatment. Three groups were created to examine factors related to alcohol use (and drugs separately) during the 12-month follow-up period: (1) no use, (2) use in 1 or 2 months, and (3) use in 3 to 12 months. Figure 26 presents the percentage of clients in each group.

FIGURE 26. REPORTED ALCOHOL AND DRUG USE DURING THE 12-MONTH FOLLOW-UP PERIOD



A series of analyses was conducted to examine the relationship between demographics, academic factors, mental health, recovery supports, and criminal justice factors with alcohol and drug use during the follow-up period. The no-use and minor-use groups were compared to the moderate-to-heavy use group. Table 35 presents the factors that were significantly associated with alcohol use during the follow-up period, after controlling for other factors including alcohol use at intake.

Compared to adolescents who reported moderate-to-heavy alcohol use during the 12-month follow-up, adolescents who reported no alcohol use used tobacco significantly fewer months during the follow-up period. Compared to adolescents who reported moderate-to-heavy alcohol use during the 12-month follow-up period, adolescents who reported minor alcohol use were less likely to have been referred to treatment by the justice system.

TABLE 35. REGRESSION ANALYSIS OF ALCOHOL USE DURING THE 12 MONTH FOLLOW-UP PERIOD (n = 149)

	OR	95% CI
No use		
Number of months reported using tobacco in the 12-month follow-up period**	.844	[.760, .937]
Minor use		
Referred to treatment by the justice system**	.283	[.111, .717]

\* p < .05, \*\*p < .01, \*\*\*p < .001.

Compared to adolescents who reported moderate-to-heavy drug use during the 12-month follow-up, adolescents who reported no illicit drug use used tobacco significantly fewer months during the 12-month follow-up and were more likely to be female. Compared to adolescents who reported moderate-to-heavy drug use during the 12-month follow-up, adolescents who reported minor illicit drug use used tobacco significantly fewer months in the follow-up period and were also less likely to have been referred to treatment by the justice system (see Table 36).

TABLE 36. REGRESSION ANALYSIS OF DRUG USE DURING THE 12-MONTH FOLLOW-UP PERIOD (n = 149)

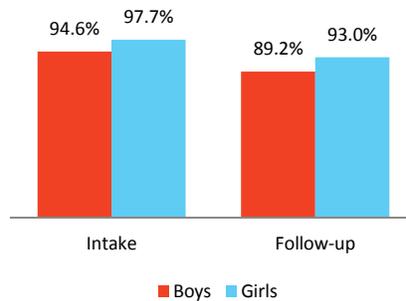
	OR	95% CI
No use		
Number of months reported using tobacco in the 12-month follow-up period**	.849	[.767, .940]
Gender [0 = Male]	.360	[.166, .783]
Minor use		
Number of months reported using tobacco in the 12-month follow-up period*	.852	[.745, .975]
Referred to treatment by justice system [0 = No]*	.211	[.058, .769]

\* p < .05, \*\*p < .01, \*\*\*p < .001.

## EDUCATION OUTCOMES

Among the adolescents who had not yet earned a high school diploma or GED by follow-up, 94.6% of boys and 97.7% of girls were enrolled in school at intake (see Figure 27). By follow-up, percentages had decreased to 89.2% for boys and 93.0% for girls; however, these changes were not statistically significant. There was no significant difference by gender for enrollment in school at either intake or follow-up (not depicted in a figure).

FIGURE 27. CHANGE FROM INTAKE TO FOLLOW-UP IN PERCENTAGE OF INDIVIDUALS REPORTING ENROLLMENT IN SCHOOL, AMONG THOSE WITH LESS THAN A HIGH SCHOOL DIPLOMA OR GED AT FOLLOW-UP<sup>a</sup> (n = 117)

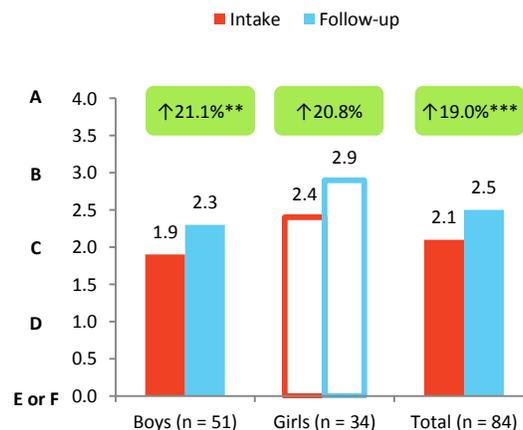


<sup>a</sup>Significance established using z-test for proportions

Looking at the clients who were not enrolled in school at intake or follow-up, no significant increase was found in the percentage of clients who were enrolled in job training: 16.7% at intake, and 2.7% at follow-up.

The grade point average (GPA) increased significantly from intake to follow-up for those clients who were in school, as well as for boys separately (see Figure 28). The increase in GPA for girls who were in school at both intake and follow-up was not statistically significant, but it is important to note that the number of paired scores was for only 34 girls. At intake, the mean GPA for all clients was 2.1 (a C) and at follow-up, the GPA was 2.5 (midpoint between a C and a B). This is an increase of 19.0% in GPA from intake to follow-up. Similar increases were found for boys and girls separately.

FIGURE 28. CHANGES IN GRADE POINT AVERAGE FROM INTAKE TO FOLLOW-UP (n=85)<sup>a</sup>

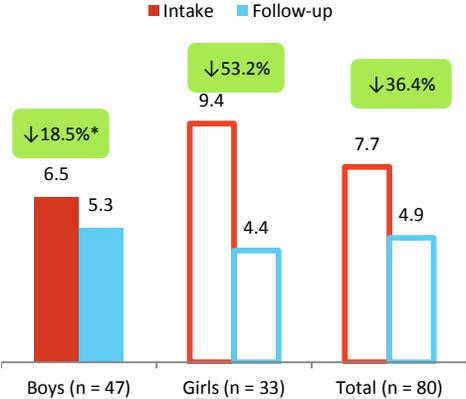


Note. Represents only those who were enrolled in school at both intake and follow-up.

<sup>c</sup>Significance established using paired samples t-test; \* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$ .

Adolescents who were enrolled in school (excluding home schooling) were asked to think about the last three months and to report the number of days they missed school for various reasons (e.g., detention, suspension, expulsion, involvement with social services, truancy, or illness). The number of days adolescents reported missing school for detention, suspension, or expulsion were added together to create a collapsed category of “missing school for disciplinary reasons.” The number of days that adolescents reported missing school for disciplinary reasons decreased from intake to follow-up, but the decrease was not statistically significant (see Figure 29).

FIGURE 29. CHANGES FROM INTAKE TO FOLLOW-UP IN NUMBER OF DAYS REPORTED MISSED FOR DISCIPLINARY REASONS (n=80)<sup>a,b</sup>



a Represents only those who were enrolled in school at both intake and follow-up.  
 b Significance established using paired samples t-test; \* $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$ .

## LEGAL INVOLVEMENT OUTCOMES

### ARRESTS

Over half of clients (52.3%) reported being arrested and charged with a criminal offense in the 12 months prior to intake. At follow-up, this number had significantly decreased by 23.1% to 40.3% (see Table 37 and Figure 30).

Significantly more boys than girls reported being arrested and charged with a criminal offense in the 12 months before intake and follow-up. The only statistically significant differences by gender for specific types of criminal offense were for drug-related offenses at intake and follow-up, and for property offenses at intake, with a larger percent of boys reporting arrests for these offenses.

TABLE 37. CHANGE IN PERCENT OF CLIENTS REPORTING ARRESTS IN THE 12 MONTHS BEFORE INTAKE TO THE 12 MONTHS BEFORE FOLLOW-UP

	INTAKE	FOLLOW-UP
<b>ANY ARRESTS<sup>a,b</sup></b>		
Boys (n = 94)	58.5%	50.0%
Girls (n = 55)	41.8%	23.6%
Total (n = 149)	52.3%	40.3%
<b>DRUG OFFENSES<sup>a,b,c</sup></b>		
Boys (n = 86)	16.3%	3.5%
Girls (n = 53)	13.2%	0.0%
Total (n = 139)	15.1%	2.2%
<b>DUI<sup>c</sup></b>		
Boys (n = 86)	3.5%	2.3%
Girls (n = 53)	0.0%	0.0%
Total (n = 139)	2.2%	1.4%
<b>PROPERTY OFFENSES<sup>b,c</sup></b>		
Boys (n = 86)	17.4%	5.8%
Girls (n = 53)	1.9%	1.9%
Total (n = 139)	11.5%	4.3%
<b>CRIMES AGAINST PERSONS<sup>c</sup></b>		
Boys (n = 86)	7.0%	2.3%
Girls (n = 53)	7.5%	3.8%
Total (n = 139)	7.2%	2.9%
<b>STATUS OFFENSES<sup>c</sup></b>		
Boys (n = 86)	10.5%	1.2%
Girls (n = 53)	15.1%	5.7%
Total (n = 139)	12.2%	2.9%
<b>PROBATION/PAROLE VIOLATIONS<sup>c</sup></b>		
Boys (n = 86)	11.6%	7.0%
Girls (n = 53)	5.7%	0.0%
Total (n = 139)	9.4%	4.3%
<b>OTHER OFFENSES<sup>c</sup></b>		
Boys (n = 86)	24.7%	25.6%
Girls (n = 53)	20.9%	13.2%
Total (n = 139)	23.4%	20.9%

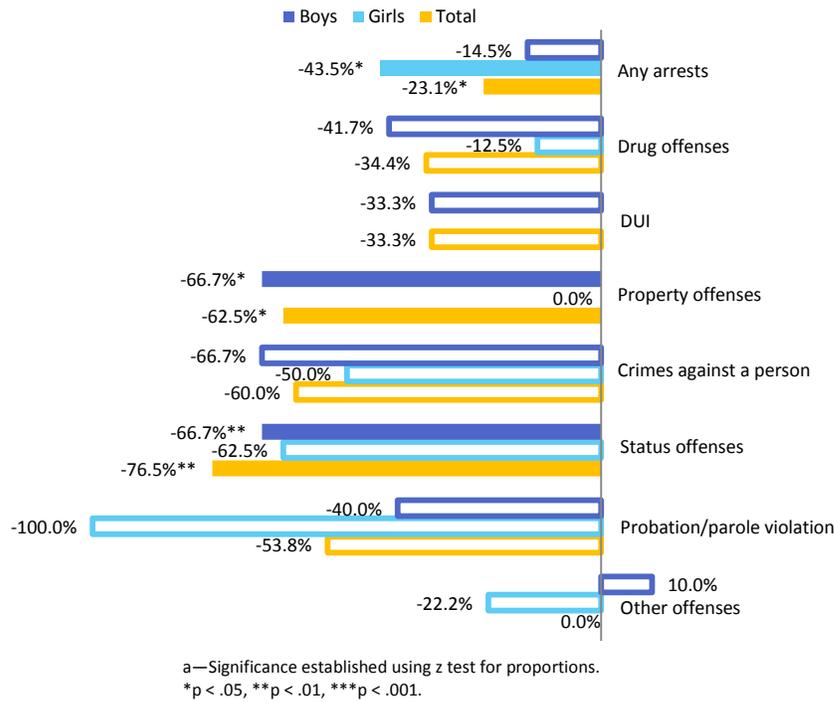
Note. Statistical significance tested with chi-square tests for gender at each time (intake, follow-up).

a—There was a statistically significant difference between genders at intake;  $p < .01$ .

b—There was a statistically significant difference between genders at follow-up;  $p < .01$ .

c—Data on types of criminal offenses were missing for 10 individuals at intake.

FIGURE 30. PERCENT OF CHANGE IN CLIENTS REPORTING ARRESTS IN THE 12 MONTHS BEFORE INTAKE TO THE 12 MONTHS BEFORE FOLLOW-UP  
(n = 149)<sup>a</sup>



## INCARCERATION

Nearly 40% of clients reported spending at least one day in jail or detention center in the 12 months before intake (see Table 38). Significantly more boys than girls reported they were incarcerated in the 12 months before intake (44.7% vs. 27.3% and follow-up (43.6% vs. 23.6%). There were no significant changes from intake to follow-up in the number of adolescents who reported being incarcerated in the past 12 months (see Figure 31).

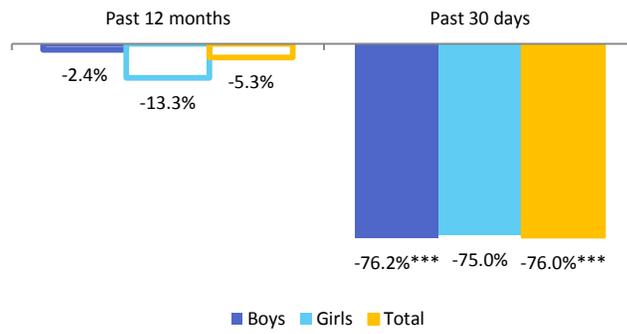
In contrast, the number of adolescents who reported they were incarcerated in the past 30 days significantly decreased from intake to follow-up (17.6% vs. 4.2%) – a decrease of 76.0% (see Figure 30). The significant decrease in the number of adolescents who were incarcerated in the past 30 days was due to the significant decrease in the number of boys who were arrested in the past 30 days, from 23.9% at intake to 5.7% at follow-up.

TABLE 38. CHANGE IN REPORTED INCARCERATION FROM INTAKE TO FOLLOW-UP

	INTAKE	FOLLOW-UP
<b>SPENT AT LEAST ONE DAY IN JAIL OR DETENTION IN THE PAST 12 MONTHS</b>		
Boys (n = 94)	44.7%	43.6%
Girls (n = 55)	27.3%	23.6%
Total (n = 149)	38.3%	36.2%
<b>SPENT AT LEAST ONE DAY IN JAIL OR DETENTION IN THE PAST 30 DAYS<sup>a</sup></b>		
Boys (n = 88)	23.9%	5.7%
Girls (n = 54)	7.4%	1.9%
Total (n = 142)	17.6%	4.2%

a—Data on incarceration in the 30 days before follow-up were missing for 7 individuals.

FIGURE 31. PERCENT CHANGE IN CLIENTS REPORTING THEY SPENT AT LEAST ONE DAY IN JAIL OR DETENTION FROM INTAKE TO FOLLOW-UP<sup>a</sup>



a—Significance established using z test for proportions; \*p < .05, \*\*p < .01, \*\*\*p < .001.

## MENTAL HEALTH OUTCOMES

At intake, the most commonly reported mental health problems were cognitive problems (trouble understanding, concentrating, and remembering), followed by serious anxiety or tension, trouble controlling violent behavior, and serious depression (see Table 39). At intake, significantly more female clients reported having attempted suicide in the past 12 months compared to male clients (7.3% vs. 1.1%).

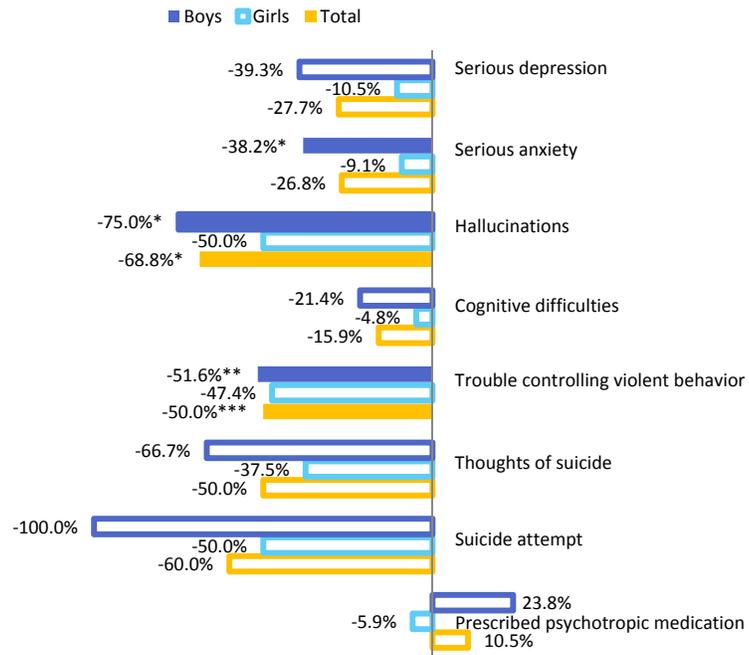
By follow-up, there were significant decreases in the number of clients who reported having trouble controlling violent behavior and hallucinations (see Figure 32). The number of adolescents that reported having trouble controlling violent behavior decreased by 50.0% and the number of adolescents that reported having hallucinations (not due to alcohol or drug use) decreased by 68.8% from intake to follow-up. None of the decreases for girls reached statistical significance, which may in part be due to the smaller number of girls included in this report compared to the last two bi-annual reports. There were no statistically significant differences in the percentage of boys and girls who reported mental health problems in the 12 months before follow-up.

TABLE 39. PERCENT OF CLIENTS REPORTING MENTAL HEALTH PROBLEMS IN THE 12 MONTHS BEFORE INTAKE TO THE 12 MONTHS BEFORE FOLLOW-UP

	INTAKE	FOLLOW-UP
<b>SERIOUS DEPRESSION</b>		
Boys (n = 94)	29.8%	18.1%
Girls (n = 55)	34.5%	30.9%
Total (n = 149)	31.5%	22.8%
<b>SERIOUS ANXIETY OR TENSION</b>		
Boys (n = 94)	36.2%	22.3%
Girls (n = 55)	40.0%	36.4%
Total (n = 149)	37.6%	27.5%
<b>HALLUCINATIONS</b>		
Boys (n = 94)	12.8%	3.2%
Girls (n = 55)	7.3%	3.6%
Total (n = 149)	10.7%	3.4%
<b>COGNITIVE PROBLEMS (TROUBLE UNDERSTANDING, CONCENTRATING, REMEMBERING)</b>		
Boys (n = 94)	44.7%	35.1%
Girls (n = 55)	38.2%	36.4%
Total (n = 149)	42.3%	35.6%
<b>TROUBLE CONTROLLING VIOLENT BEHAVIOR</b>		
Boys (n = 94)	33.0%	16.0%
Girls (n = 55)	34.5%	18.2%
Total (n = 149)	33.6%	16.8%
<b>THOUGHTS OF SUICIDE</b>		
Boys (n = 94)	6.4%	2.1%
Girls (n = 55)	14.5%	9.1%
Total (n = 149)	9.4%	4.7%
<b>SUICIDE ATTEMPT<sup>a</sup></b>		
Boys (n = 94)	1.1%	0.0%
Girls (n = 55)	7.3%	3.6%
Total (n = 149)	3.4%	1.3%
<b>PRESCRIBED PSYCHOTROPIC MEDICATION</b>		
Boys (n = 94)	22.3%	27.7%
Girls (n = 55)	30.9%	29.1%
Total (n = 149)	25.5%	28.2%

a—Statistically significant difference between genders *at intake* ( $p < .05$ ); statistical significance by gender tested with chi square test.

FIGURE 32. PERCENT CHANGE IN CLIENTS REPORTING MENTAL HEALTH PROBLEMS IN THE 12 MONTHS BEFORE INTAKE TO THE 12 MONTHS BEFORE FOLLOW-UP<sup>a</sup>

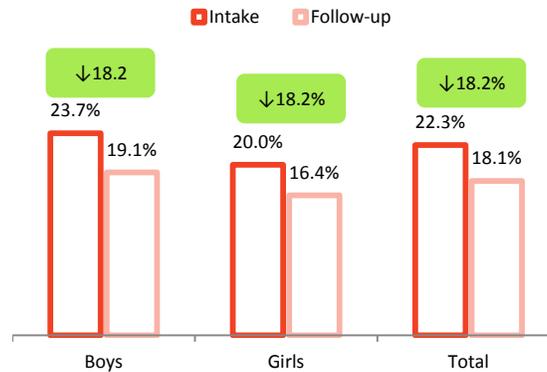


a—Significance established using z test for proportions.  
 \*p < .05, \*\*p < .01, \*\*\*p < .001.

## CHANGES IN RISK AND PROTECTIVE FACTORS FOR SUBSTANCE USE RECOVERY AT FOLLOW-UP

At intake, 22.3% of clients reported attending AA or NA mutual help meetings in the past 30 days. At follow-up, the percent of clients who had attended AA or NA meetings in the past 30 days decreased slightly to 18.1%. The percent decrease was not statistically significant at 18.2% (see Figure 33).

FIGURE 33. PERCENTAGE OF CLIENTS WHO REPORTED ATTENDING MUTUAL HELP GROUPS IN THE 30 DAYS BEFORE INTAKE AND FOLLOW-UP BY GENDER (n = 149)<sup>a</sup>

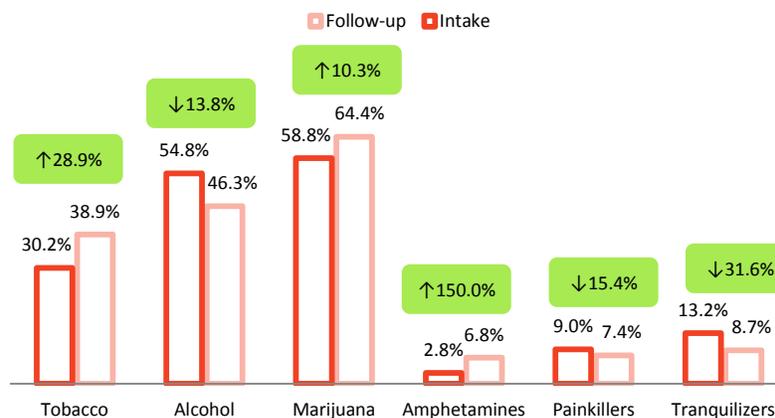


<sup>a</sup>—Significance established using z test for proportions.  
\*p < .05, \*\*p < .01, \*\*\*p < .001.

At intake and follow-up, most clients believed there was some risk of harm associated with substance use. It is important, however, to examine individuals who report perceptions of no-or-slight risk associated with the use of substances, as this is linked to initiation of substance use and to relapse (Johnston et al., 2004; Song et al., 2009).

None of the changes in the percentage of adolescents who reported they perceived no-or-slight risk associated with different classes of substances were statistically significant (see Figure 34). Somewhat troubling is the fact that at both intake and follow-up, the majority of adolescents perceived no-or-slight risk from using marijuana. In fact, even higher percentages of clients perceived no-or-slight risk from marijuana use than from tobacco use or daily use of alcohol.

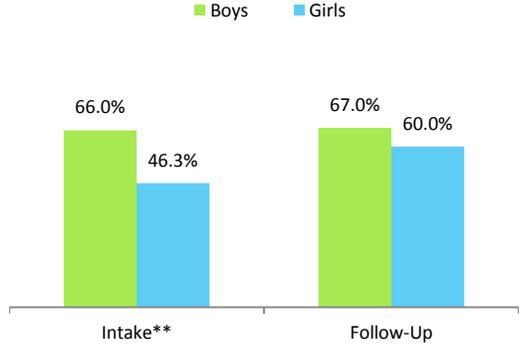
FIGURE 34. PERCENT CHANGE FROM INTAKE TO FOLLOW-UP IN PERCEPTION OF NO-OR-SLIGHT RISK OF HARM ASSOCIATED WITH VARIOUS SUBSTANCES<sup>a</sup>



<sup>a</sup>—Significance established using z test for proportions.  
\*p < .05, \*\*p < .01, \*\*\*p < .001.

At intake, boys and girls differed significantly in their perceptions of harm associated with use of marijuana: more boys than girls perceived no-or-slight risk from marijuana use (see Figure 35). No differences were found at follow-up (see Figure 34) and no significant differences were found between male and female clients in perceptions of harm associated with using the other substances.

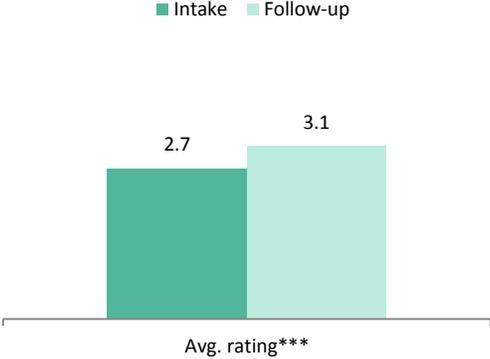
FIGURE 35. CHANGE IN PERCEPTION OF NO-OR-SLIGHT RISK FROM MARIJUANA USE FROM INTAKE TO FOLLOW-UP BY GENDER



\*p < .05, \*\*p < .01, \*\*\*p < .001.

At intake and follow-up, adolescents were asked to rate their level of satisfaction with their lives. Ratings ranged from 0 -- Not at all, 1--Slightly, 2--Moderately, 3--Considerably, to 4--Extremely. Adolescents' ratings of their satisfaction with their lives increased significantly from intake to follow-up. Figure 36 shows the mean ratings at intake (2.7) and follow-up (3.1).

FIGURE 36. CHANGE FROM INTAKE TO FOLLOW-UP IN RATING OF SATISFACTION WITH LIFE



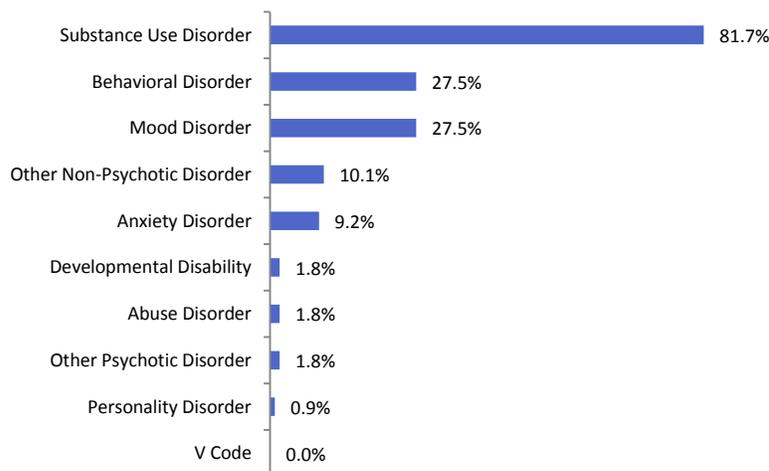
\*p < .05, \*\*p < .01, \*\*\*p < .001.

## CLINICAL SERVICE INFORMATION

Using the clinical service event data provided by community mental health centers (CMHC) to the Department for Behavioral Health, Developmental and Intellectual Disabilities (DBHDID), DSM-IV diagnostic and service event information was accessed for adolescent clients. The clinical service event data set is managed by the University of Kentucky Institute for Pharmaceutical Outcomes and Policy (UK IPOP). Forty clients (26.8% of the Adolescent KTOS follow-up sample) had no services or diagnoses in the data set during the time period under review. Thus, diagnostic and service event data were available for 109 follow-up clients. Two reasons for not being able to match clients' data from the Adolescent KTOS surveys and the UK IPOP data are (1) incorrectly entered social security numbers, and (2) data not entered by the CMHC. In contrast to the service event data presented in previous AKTOS reports, we were able to obtain data on services that were paid for by a private payer for this report

Figure 37 below shows the percentage of clients diagnosed with various categories of mental health disorders. There were no significant differences by gender, thus, the results are presented for the entire sample. Clients can have multiple diagnoses, for example, alcohol dependence and cannabis abuse. Four out of five clients (81.7%) were diagnosed as having a substance use disorder (abuse or dependence). Just over one-fourth of clients (27.5%) had a behavioral disorder diagnosis (impulse-control disorder, conduct disorder, disruptive behavior disorder, oppositional defiant disorder, ADHD), 27.5% had a mood disorder (such as depression or non-psychotic bipolar disorder), 10.1% were diagnosed with "other non-psychotic disorder," and 9.2% had a diagnosis of anxiety disorder (such as generalized anxiety, panic disorder, or obsessive-compulsive disorder). Behavioral, mood, other non-psychotic, anxiety, other psychotic, and personality disorders were combined into one category to examine substance use and comorbid psychiatric disorders: 39.4% of the clients had diagnoses in their records indicating comorbid substance use disorders and other psychiatric disorders (not depicted in a figure).

FIGURE 37. DSM-IV DIAGNOSES FOR ADOLESCENT KTOS CLIENTS IN TREATMENT DURING FY 2009 AND FY 2010 (n=109)



The 109 Adolescent KTOS follow-up clients received a total of 6,187 services between baseline and follow-up. Bluegrass regional Community Mental Health Center (CMHC) clients received the highest regional total of services, while Pathways regional CMHC had the highest average number of services per client (see Table 40).

TABLE 40. DISTRIBUTION OF SERVICES REPORTED BY CMHC REGIONS FOR CLIENTS IN TREATMENT DURING FY 2009 AND FY 2010 (n = 149)

	TOTAL NUMBER OF SERVICES	N	AVERAGE NUMBER OF SERVICES PER CLIENT
Four Rivers	9	2	14.5
Pennyroyal	17	1	17.0
River Valley	51	17	23.8
Lifeskills	8	1	8
Communicare	0	0	0
Seven Counties	0	0	0
NorthKey	3	1	3
Comprehend	75	4	31.3
Pathways	1114	18	200.6
Mountain	187	3	62.3
Kentucky River	0	0	0
Cumberland River	0	0	25
Adanta	769	30	44.3
Bluegrass	1581	32	14.8
TOTAL	6,187	109	56.8

Most clients (82.6%) received individual therapy services, 48.6% received group therapy, 19.3% received substance abuse-related case management services, 18.3% received evaluation and diagnostic services, 11.9% received substance abuse residential services, 11.0% received psychiatric individual therapy, and 10.1% received other services that were not accounted for in the other presented categories, such as miscellaneous services, outreach, and so forth (see Figure 38). Fewer than 10% of the cases had the following services in the client-level Treatment Episode Data Set (TEDS): case management services, residential crisis services, intensive outpatient, therapeutic foster family, non-residential crisis, and residential services.

FIGURE 38. PERCENT OF CLIENTS RECEIVING EACH CATEGORY OF TREATMENT FOR THOSE RECEIVING SERVICES (n = 109)

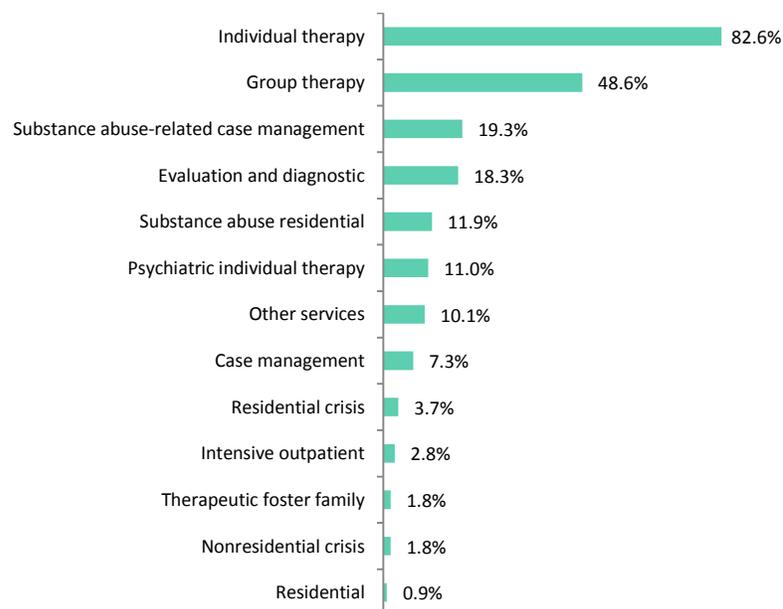


Figure 39 shows the average number of services for each type of service among those clients who received at least one of those service types. Services that fewer than 5% of adolescents received are not presented in Figure 39. An average of 104.9 days of substance abuse residential treatment services and 16.8 group therapy services were provided.

FIGURE 39. AMONG CLIENTS RECEIVING AT LEAST ONE SERVICE IN THE CATEGORY, MEAN NUMBER OF CLINICAL SERVICES

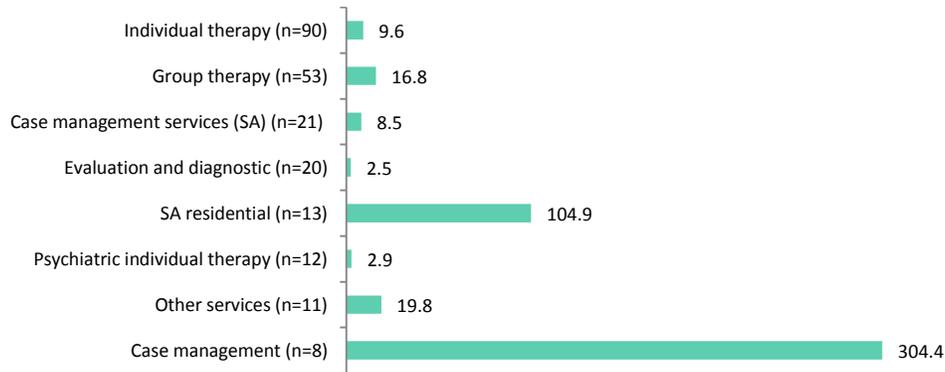
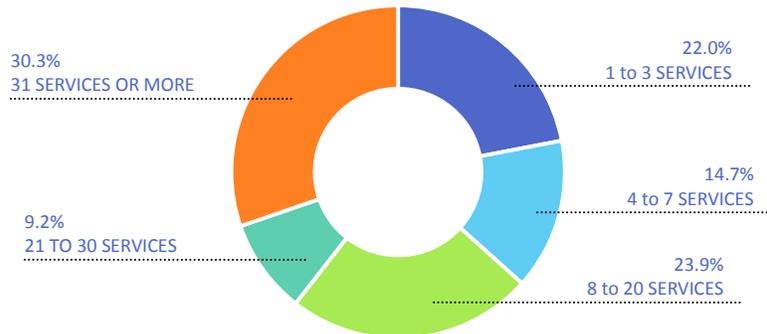


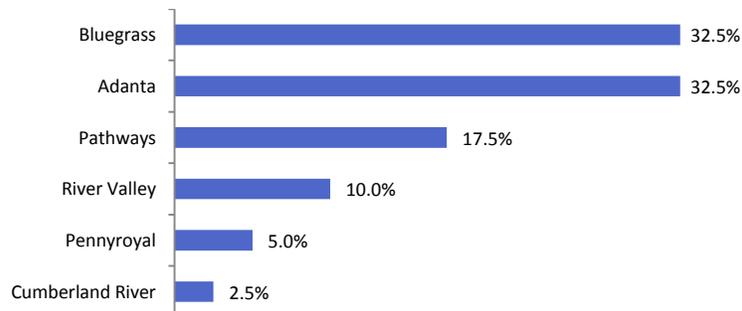
Figure 40 shows the range of the number of clinical services received by Adolescent KTOS clients. Considering only the 109 clients with diagnostic and/or service event data, 28.5% received 3 or fewer services, 19.9% received 4 to 7 services, 24.5% received 8 to 20 services, 9.2% received 12 to 30 services, and 21.1% received 31 or more services.

FIGURE 40. RANGE OF THE NUMBER OF CLINICAL SERVICES RECEIVED BY EACH CLIENT (n = 109)



As mentioned previously, 40 Adolescent KTOS clients did not have matching data for clinical services or diagnostic information. The following figures show a regional distribution of clients with no matching data for clinical services (Figure 41). Bluegrass and Adanta (n = 13, 32.5%) contributed the most cases with no matching data on clinical services, followed by Pathways (n = 7, 17.5%).

FIGURE 41. PERCENTAGE OF ADOLESCENT KTOS CLIENTS WITH NO DATA ON CLINICAL SERVICES BY CMHC REGION (n = 40)



## COST OF SUBSTANCE USE AND TREATMENT

The costs and cost savings of substance abuse treatment are very important in assessing treatment outcomes. Treatment and interventions for any public health problems cost taxpayers; therefore the benefits to society of substance abuse treatment must be weighed against the costs of funding that treatment. Information about whether a program actually saves taxpayer dollars after an initial investment is useful for future funding decisions.

When considering the cost of substance abuse treatment, especially for adolescents, both sides of the “coin,” so to speak, must be considered. On one hand, substance abuse treatment for adolescents is expensive. On the other hand, the cost to society of adolescent substance abuse is substantial. Cost offset analyses often focus on short-term costs such as the cost of substance abuse the year before and the year after treatment. However, when considering adolescents, it is even more important to consider longer term costs because research shows that tobacco, alcohol, and drug use in adolescents often leads to a lifetime of continued use and other significant problems in adulthood, such as lower education, unemployment, underemployment, chronic health problems, mental health disorders, impaired social functioning, and involvement in the criminal justice system (Fergusson et al., 2002; King et al., 2006; McCambridge et al., 2011; Newcomb et al., 1993; Ryan, 2010; Swendsen et al., 2012; White et al., 1998). Thus, treating substance abuse problems during the formative years may substantially impact long-term societal costs in health care, mental health care, public and social service programs, employment, and the criminal justice system. What is sometimes overlooked is that treating adolescent substance abuse can also increase human capital by improving education, employment, and other less tangible qualities, such as the quality of relationships and parenting, for the adolescents who grow into tomorrow’s adults.

Below are some very general estimates of the cost and cost offsets for adolescent substance abuse treatment in Kentucky. A number of limitations to the estimates must be mentioned. First, this study was not designed to carefully consider the full spectrum of costs even in the short term (the year before and the year after treatment) or in the long term. Thus, we relied on estimates of the costs of alcohol and drug use among adolescents from a study that pooled data from 148 treatment evaluations (Dennis et al., 2011). Even though these estimates are based on a large number of adolescents from diverse treatment modalities in many geographic areas, the costs may not be an accurate reflection of the costs of substance use for adolescents in AKTOS. Second, even though we acknowledge that longer-term costs and benefits are important to consider when evaluating the cost savings of publicly funded substance abuse treatment, there are no published studies that examine the avoided costs for the long-term to apply to our study. Third, not all adolescents who received publicly funded substance abuse treatment in Kentucky are represented in the AKTOS sample, so the estimated benefit-to-cost ratio could be higher or lower if applied to all adolescents.

### THE COST OF TREATMENT

Clinical service event data provided by community mental health centers (CMHC) to the Department for Behavioral Health, Developmental and Intellectual Disabilities (DBHDID) was matched to baseline and follow-up survey data for 109 adolescents (as discussed in the Clinical Service Information section of this report). Services included: (a) medical and non-medical detoxification, (b) outpatient counseling, (c) group therapy, (d) intensive outpatient, (e) case management, (f) crisis stabilization, and (g) residential treatment.

Rates for state-funded services in FY 2010 were provided by the Kentucky Department of Behavioral Health, Developmental and Intellectual Disabilities. These rates were used to calculate the cost of treatment from intake to follow-up for the 109 adolescents with matching clinical service data. Services paid for by private payer sources (e.g., private insurance, employee assistance programs, self-pay) were not included in the cost calculations. After calculating

the costs of treatment, outliers were identified and the highest 5% of values were recoded to the value for the 95<sup>th</sup> percentile, \$28,202. Once the cost of treatment was recoded, the mean cost was \$3,430 per person (see Table 41).

## THE COST OF ALCOHOL AND DRUG ABUSE

Limited research has looked at the estimated costs of substance use for adolescents. However, one study by Dennis and colleagues (2011) examined data from 16,915 adolescents in various modalities of substance abuse treatment, pooling data from 148 local evaluations conducted from 1997 to 2009. One purpose of this study was to estimate the costs of substance use for adolescents. The research study used 18 items from the Global Appraisal of Individual Needs (GAIN) to measure the types of services and number of times adolescents used those services in the 90 days before treatment and the 90 days before 12-month follow-up. The types of services included were inpatient hospital stays, emergency room visits, outpatient office visits, days of missed school, arrests, days on probation, days on parole, days in detention or jail, and days spent in different types of substance abuse treatment. Unit costs were then assigned to each service and converted to 2009 dollars. Calculating all the costs, the study found that the adolescents averaged \$3,908 in costs to society in the 90 days before intake.

Because not all of these 18 items were included in the AKTOS intake survey, the Dennis et al. (2011) estimate for the costs to society were used and applied to the AKTOS sample. Furthermore, because the timeframe for data collection in AKTOS was a 30 day period rather than a 90 day period the cost of \$3,908 (estimated by Dennis for a 90 day period) was divided by 3 to obtain an estimated monthly cost of \$1,303 for each Kentucky adolescent in the AKTOS sample for this report. This value was then multiplied by the number of months adolescents reported using alcohol and drugs in the 12 months before intake and the 12 months before follow-up. The difference between these values was then calculated to estimate the difference in costs of substance abuse for the year before and the year after treatment. In other words, as the number of months adolescents used alcohol and drugs decreased from intake to follow-up, so did the costs to society. To calculate the benefit (in other words, avoided costs to society)-to-cost ratio, the difference in costs to society from intake to follow-up was divided by the cost for substance abuse treatment. Estimates suggest that for every \$1.00 spent on treatment, the avoided cost to society is \$1.56 (see Table 41).

Table 41. BENEFIT-COST ANALYSIS FOR SUBSTANCE ABUSE TREATMENT FOR ADOLESCENTS IN THE FOLLOW-UP SAMPLE

AVERAGE PER ADOLESCENT AKTOS CLIENT	SUBSTANCE USE AT INTAKE	SUBSTANCE USE AT FOLLOW-UP
Number of months of use	9.2	5.1
30 day cost to society for substance use	\$1,303	\$1,303
Cost of substance use	\$12,134	\$6,790
Difference in cost of substance use from intake to follow-up		\$5,344
Cost of treatment		\$3,430
Benefit-to-cost ratio		<b>\$1.56</b>

## SUMMARY AND RECOMMENDATIONS

The 149 youth who completed both intake and follow-up interviews for the 2009-2010 Adolescent KTOS Follow-Up Study came into treatment with significant problems. These included “C” average or lower grades (69.5%), a lifetime history of victimization (69.1%), mental health problems like depression, anxiety, and trouble controlling violent behavior in the past year (67.1%), and over half (60.4%) were referred to treatment by the criminal justice system.

Youth reported high satisfaction with treatment providers, and the outcomes data show significant increases in abstinence. The follow-up findings show that only 12.1% of adolescents reported that they had abstained from alcohol in the 12 months before intake. By follow-up, the number of adolescents who reported they had abstained from alcohol increased by 194.4% to 35.6%. A total of 43.6% of adolescents reported that they had abstained from drugs for the 12 months before follow-up, compared to only 11.4% that had abstained from drugs in the 12 months before intake, which was a significant increase of 282.4%. How do these findings compare to other substance abuse treatment outcome studies with one-year follow-up surveys for adolescents? Other studies have found abstinence rates ranging from 14% to 54% at one year follow-up, with most of these studies finding 12-month abstinence rates from 30% to 40% (Williams & Chang, 2000).

The findings for tobacco use were not as positive as the findings for alcohol and drug use. In the Adolescent KTOS Follow-Up sample, at intake about three out of four youth (76.6%) used tobacco. By follow-up, the percentage of adolescents who reported past-30-day use of tobacco had increased slightly, but not significantly, to 81.6%. Cigarette smoking among adolescents increases the risk of other drug use (Centers for Disease Control and Prevention [CDC], 1994) and the risk of nicotine addiction. In fact, of all addictions to substances, nicotine addiction is the one most likely to occur in adolescence (CDC, 1994). In 2007 and 2008, Kentucky had the nation’s highest rate of smoking among adolescents: 14.5% (Substance Abuse and Mental Health Services Administration [SAMHSA], 2010). In the Adolescent KTOS sample, 75.0% of boys and 59.6% of girls were persistent tobacco users, meaning that they reported using tobacco in the past 30 days at both intake and at follow-up. Nearly one in ten boys initiated use by follow-up, while 17.3% of girls initiated tobacco use by follow-up. Only 6.0% of boys and a higher percentage of girls (19.2%) did not use tobacco at both intake and follow-up. Not only was the percentage of adolescents who used tobacco discouraging, but the intensity of use increased from intake to follow-up. Among persistent smokers (69.1% of adolescents who were not in a controlled environment all 30 days before intake or follow-up), there was a significant increase in past 30 day tobacco use from intake to follow-up.

Traditionally, the treatment of individuals with tobacco and other substance dependence has been focused on addressing the more serious of the two, the alcohol and/or drug use problem. Many times clinicians hesitate to address smoking behavior for fear it will hinder substance use treatment efforts (Brown, et al., 2009). Contrary to this belief, participation in voluntary smoking cessation efforts while engaged in substance abuse treatment is associated with a 25% greater likelihood of long-term abstinence from alcohol and other drugs (Schroeder & Morris, 2010). Substance use treatment offers a unique opportunity to intervene with tobacco-using adolescents by integrating tobacco cessation interventions with other substance use treatment, which can be important for attaining and continuing abstinence (Campbell et al., 2009). In a state that is the second largest producer of tobacco (Brown & Snell, 2010), this is a particularly difficult issue to address. The issue has become more pertinent because federal policymakers and funding agencies like the Centers for Substance Abuse Treatment and Prevention (CSAT and CSAP) prioritized tobacco abstinence for youth in 2010.

Youth who abuse substances are at higher risk of drop-out or non-completion of a degree. Poor grades or school performance can be an indication of drop-out risk. Educational attainment is correlated with later job security and financial stability. Individuals who complete a high school degree or obtain some college education have exponentially

higher income than those who do not advance their education (Autor et al., 2005; Heckman & LaFontaine, 2010). Because of this, it is important to examine education in a substance abuse treatment outcome study. In the Adolescent KTOS sample, there was a 19.0% increase in GPA from intake to follow-up. However, the findings did not show a significant decrease in number of days of school missed or the number of individuals who had been suspended or expelled. Because other research studies have found a complicated relationship between adolescents' employment and substance use, we have expanded questions about employment beginning with intake surveys completed in July 2010. The next Adolescent KTOS report will examine the relationship between employment and substance use post-treatment.

Involvement with the criminal justice system is a problem for Kentucky youth involved in substance abuse treatment with over half of Adolescent KTOS clients (52.3%) reporting they were arrested in the 12 months prior to treatment intake. At intake, the majority of adolescents (60.4%) were referred to substance abuse treatment by the criminal justice system, 38.3% were on probation, and 25.5% were involved with Juvenile Drug Court. The number of adolescents who were arrested in the past 12 months decreased significantly from 52.3% at intake to 40.3% at follow-up, which was a decrease of 23.1%. The decrease in number of girls arrested was even greater—a decrease of 43.5%, while the change in number of boys arrested did not decrease significantly. A look at the number of adolescents who reported they were incarcerated in the past 30 days significantly decreased by 76.0%, from 17.6% at intake to 4.2% at follow-up. However, the number of youth who reported they were incarcerated in the past 12 months did not change from intake to follow-up. The findings for this Adolescent KTOS sample are similar to the findings reported in the 2010 Adolescent KTOS Follow-Up Report (Cole et al., 2010). Other research studies have found similar paradoxical findings, such as the Services Research Outcomes Study (SROS). The SROS researchers speculated that the reason for the decrease in arrests but increase (or no change) in detention following substance abuse treatment was that the circumstances that prompted clients to seek treatment also placed them under more supervision by criminal justice personnel (Schildhaus et al., 2000). Regardless of what may have contributed to no change in incarceration for adolescents post-treatment, the 2009 Blueprint for Kentucky's Children recommends expanding diversion programs for youth to decrease the costs of incarceration and detention, and encourage use of community-based interventions that provide evidence-based treatment and recovery support.

This study's findings are consistent with other studies of adolescents in substance abuse treatment with regard to high rates of comorbidity of mental health problems. The majority of clients (69.4%) self-reported experiencing mental health problems in the 12 months before intake. Moreover, clinicians had entered psychiatric diagnoses other than substance use disorders and mental retardation for 39.4% of clients. On the positive side, adolescents reported significant reductions with trouble controlling violent behavior and hallucinations at follow-up. However, the decreases in number of adolescents reporting other mental health problems at follow-up were not significant. Moreover, self-reported mental health problems and psychiatric diagnoses were not associated with alcohol use or drug use. We have changed the questions used to measure mental health problems, beginning in July 2010, to focus more on symptoms that are at a level that is consistent with DSM-IV diagnostic criteria for major depressive disorder and anxiety.

Only a small minority of clients reported attending mutual help groups at intake (22.3%), with a slight decrease to 18.1% at follow-up. Adolescents participating in 12-step meetings with members closer to their own age attend more meetings and have better recovery outcomes (Kelly et al., 2005); however, this is not possible in many, if not most, communities in Kentucky. Participation in mutual help groups may not be appropriate for adolescents, for example, when groups are composed largely of adults. The UK CDAR research team is working to modify surveys to ask adolescents at follow-up about other forms of recovery support they may be using.

There are still approximately 85,500 youth under the age of 18 who are estimated to need substance abuse treatment (2010 Kentucky SAPT Block grant). The state is encouraged to increase its focus on expanding efforts to identify problem substance use, provide referrals, and improve access to and retention in treatment programs for youth. The state

estimates there are 290 inpatient residential treatment beds for youth and 84 non-medical residential beds for adolescents; the average occupancy rate is about 94% which is considered to be full capacity. Referring youth to brief targeted approaches at the first sign of risky behaviors may help prevent continued use or escalation of drug use problems (Conrod et al., 2010).

### LIMITATIONS OF THE STUDY

There are several areas of limitation to the findings presented in this report. First, this study examined 149 adolescents who received substance abuse treatment in state fiscal years 2009 and 2010, but no comparison group of similar adolescents who did not receive treatment. Because adolescents may still be experimenting with substances, it is difficult to tease apart developmental and peer influences from the effects of treatment when examining outcomes. Second, 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. Third, 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. Likewise, this treatment outcome study is not a clinical trial that tests the efficacy of interventions. The Adolescent KTOS project examines treatment outcomes from everyday clinical practice among the 14 Community Mental Health Centers and their affiliates that provide state and Substance Abuse Prevention and Treatment (SAPT) Block Grant-funded services. It includes clients who have participated in many different treatment modalities including residential, intensive outpatient and outpatient. Fourth, clinicians have varying interview skills and this might impact the reliability of the data they collected for the baseline. Fifth, the number of intake surveys completed for the Adolescent KTOS have been steadily decreasing. In an effort to capture more adolescents with substance use issues in the Adolescent KTOS data collection, eligibility criteria were expanded in July 2011 from adolescents with a primary diagnosis or services for substance use disorder to include adolescents with a primary or secondary diagnosis of substance use disorder.

### CONCLUSION

Findings from the Adolescent Kentucky Treatment Outcome Study provide important data for treatment providers, policymakers, and families. The outcomes data indicate successful treatment experiences for the majority of youth one year after intake, with significant reductions in substance use, increases in abstinence, decreases in select mental health problems, decreases in arrests, and improvements in grades. Furthermore, even when taking a conservative and short-term view of the costs to society that were reduced from intake to follow-up and taking into account the cost of treatment, there was a \$1.56 return on investment. This return on investment calculation does not take into account the gain in human capital that can be achieved when a substance-using adolescent reduces or abstains from substance use. Such gains would include, but are not limited to, increases in education, higher earning potentials, and more regular employment at higher skilled occupations.

## APPENDICES

### APPENDIX A. LOCATING EFFORTS

For the 2012 Adolescent KTOS Follow-up Report, a total of 149 follow-up surveys were completed from a pool of 184 possible participants included in the follow-up sample. Youth who were ineligible to participate because of incarceration or living in other controlled environments such as residential treatment at the time of follow-up were subtracted from the eligible pool, resulting in 172 adolescents who were eligible for follow-up. Of these 172 adolescents, follow-up surveys were completed with 149, resulting in a follow-up rate of 86.6% (see Table A1 and A2).

TABLE A1. FINAL CASE OUTCOMES FOR FOLLOW-UP EFFORTS FOR ADOLESCENTS IN 2010 FOLLOW-UP REPORT

	Number of Records (n = 184)	Percent
Ineligible for follow-up survey	12	6.5%
	Number of Cases Eligible for Follow-Up (n = 172)	
Completed follow-up surveys	149	
Follow-up rate subtracting the ineligible cases		<b>86.6%</b>
Expired	23	
Expired rate subtracting the ineligible cases		<b>13.4%</b>
Refusal	0	
Refusal rate subtracting the ineligible cases		<b>0.0%</b>
Cases accounted for (records ineligible for follow-up + completed surveys + refusals/total number of records)	161	<b>87.5%</b>

TABLE A2. REASONS CLIENTS WERE INELIGIBLE FOR FOLLOW-UP (N = 12)

	Number	Percent
In residential treatment	8	66.7%
Incarcerated	2	16.7%
Out of the country	1	8.3%
In the previous year sample	1	8.3%
<b>Total</b>	<b>12</b>	<b>100%</b>

## APPENDIX B. COMPARISON OF CLIENTS WHO DID NOT COMPLETE A FOLLOW-UP SURVEY AND CLIENTS WHO DID COMPLETE A FOLLOW-UP SURVEY

A total of 452 adolescents completed a baseline survey in FY 2009 and 2010. Of these 452 adolescents, 247 (54.6%) agreed to be contacted for the follow-up survey. Of these 247 cases, 184 were selected into the follow-up sample. Reasons cases were not selected into the follow-up sample were because the individual had been included in the follow-up sample within the other fiscal year's follow-up sample, the record was submitted via PDA after the follow-up sample had been selected, or the locator record for the case had no valid addresses or phone numbers listed.

Analyses were included to compare youth who completed a follow-up survey with youth who did not complete a follow-up survey, regardless of the reason (e.g., did not agree to be contacted for the follow-up survey, not selected into the follow-up sample, or not successfully contacted to complete the follow-up survey). Both groups were very similar with the exception of highest level of education (Table B1). Adolescents who completed a follow-up survey had completed a higher level of education than adolescents who did not complete a follow-up survey. No differences were found in past-30-day substance use but past-12-month tobacco and alcohol use were different between the two groups (Table B2). Table B3 displays self-reported criminal justice system involvement for the two groups; there were no significant differences in arrests, arrests for specific types of offenses, or incarceration between adolescents who did not complete a follow-up survey and those who did.

There were some differences between the two groups in some of the self-reported mental health problems (see Table B4). Significantly more adolescents who completed a follow-up survey reported serious anxiety, hallucinations, and cognitive difficulties compared to adolescents who did not complete a follow-up survey.

TABLE B1. DEMOGRAPHICS FOR CLIENTS WHO DID NOT COMPLETE A FOLLOW-UP SURVEY AND CLIENTS WHO DID COMPLETE A FOLLOW-UP SURVEY

	Completed a Follow Up Survey	
	No n = 303	Yes n = 149
Age	15.8	16.0
Gender		
Male	70.0%	63.1%
Female	30.0%	36.9%
Race		
White	85.1%	86.6%
Minority	14.9%	13.4%
Highest level of education completed*	9.2	9.5
Enrolled in school		
Yes	96.4%	96.0%
GPA	2.0	2.0
Repeated a grade in school	40.5%	39.9%
Number of days of school missed	15.4	15.1
Current primary caregiver		
Biological/adoptive parents	81.2%	76.5%
Grandparent	8.9%	10.1%
Foster parent	3.0%	4.7%
Other family	3.3%	4.7%
State agency/DCBS	3.0%	2.7%
Live with someone with an alcohol problem	7.9%	12.1%
Live with someone with a drug problem	7.3%	9.4%

\*p < .05.

TABLE B2. COMPARISON OF SUBSTANCE USE AT INTAKE FOR CLIENTS WHO DID NOT COMPLETE A FOLLOW-UP SURVEY AND CLIENTS WHO DID COMPLETE A FOLLOW-UP SURVEY

	Completed a Follow Up Survey	
	No n = 303	Yes n = 149
Ever participated in substance abuse treatment before current admission		
Yes	32.7%	34.9%
Substance use in the past 12 months		
Tobacco**	82.5%	94.0%
Alcohol**	76.2%	87.9%
Alcohol to intoxication	63.4%	67.1%
Illicit drugs	85.5%	88.6%
Substance use in the past 30 days		
Tobacco	71.3%	73.8%
Alcohol	22.8%	27.5%
Alcohol to intoxication	15.2%	19.5%
Illicit drugs	38.0%	40.9%

\*p < .05, \*\*p < .01.

TABLE B3. COMPARISON OF CRIMINAL JUSTICE INVOLVEMENT AT INTAKE FOR CLIENTS WHO DID NOT COMPLETE A FOLLOW-UP SURVEY AND CLIENTS WHO DID COMPLETE A FOLLOW-UP SURVEY

	Completed a Follow Up Survey	
	No n = 303	Yes n = 149
Admission prompted by the criminal justice system	64.7%	60.4%
Admission the result of a DUI charge	3.6%	1.3%
Admission prompted by the Department of Community Based Services	9.2%	8.1%
Arrested and charged with an offense in the past 12 months	57.4%	52.3%
DUI charge	5.0%	2.2%
Drug charge	24.7%	23.0%
Property crime	10.8%	11.5%
Crime against persons	5.8%	7.2%
Status offense	12.2%	12.2%
Other offenses	20.2%	23.4%
Incarcerated at least one day in the past 12 months	42.4%	38.3%
Incarcerated at least one day in the past 30 days	15.2%	18.8%

TABLE B4. COMPARISON OF SELF-REPORTED MENTAL HEALTH PROBLEMS AT INTAKE FOR CLIENTS WHO DID NOT COMPLETE A FOLLOW-UP SURVEY AND CLIENTS WHO DID COMPLETE A FOLLOW-UP SURVEY

	Completed a Follow Up Survey	
	No n = 303	Yes n = 149
In the Past 12 Months		
Serious depression	24.8%	31.5%
Anxiety*	27.4%	37.6%
Hallucinations**	3.6%	10.7%
Cognitive difficulties (trouble understanding, concentrating, remembering)*	31.4%	42.3%
Trouble controlling violent behavior	26.7%	33.6%
Suicidal thoughts	10.2%	9.4%
Suicide attempt	4.6%	3.4%

\*p < .05, \*\*p < .01.

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