

FINDINGS FROM THE

# ADOLESCENT KENTUCKY TREATMENT OUTCOME STUDY (AKTOS)

2016 REPORT





“I liked that they really discussed my issues and **WENT INTO DEPTH.**”

-AKTOS FOLLOW-UP CLIENT

## EXECUTIVE SUMMARY

This report summarizes substance abuse treatment outcomes for the Adolescent Kentucky Treatment Outcome Study (AKTOS). The goal of AKTOS is to examine client satisfaction, recovery support, and outcomes for several specific targeted factors including: (1) substance use including severity of substance use, (2) mental health, (3) education and employment, (4) caregiver and living situation, and (5) involvement with the justice system.

In particular, this report presents: (1) treatment intake data on 451 adolescent clients (ages 10-17 years old) who attended publicly-funded substance abuse treatment programs in Kentucky between July 1, 2012 and June 30, 2014; and (2) treatment intake and 12-month follow-up data on 181 adolescents who attended publicly-funded substance abuse treatment programs in Kentucky and then completed a follow-up survey approximately 12 months later. Of the adolescents who agreed to be contacted and were eligible for the follow-up survey (n =

201), the CDAR research team completed follow-up surveys with 181 individuals—a follow-up rate of 90.0%.

Results show that adolescent clients were satisfied with the treatment services they received. The majority of clients (63.4%) gave a highly positive rating between 8 and 10 of their satisfaction with the treatment program, with 1 representing the worst treatment and 10 representing the best treatment. The vast majority of clients believed they received the services they needed to get better, they felt better about themselves as a result of treatment, they believed they were treated with respect by treatment providers, they understood their treatment plan, their rights as a client, and treatment providers' expectations of them.

At follow-up, there were significant reductions in any illegal drug use from intake (91.7%) to follow-up (38.1%). Specifically, there were significant reductions in use of marijuana, synthetic drugs,

opioids/opiates, Central Nervous System (CNS) depressants, stimulants, and alcohol. Furthermore, of the individuals who reported recent alcohol and/or drug use, the number of youth who met criteria for self-reported severe substance use disorder decreased significantly from intake (44.2% for alcohol, 43.6% for drug use) to follow-up (13.5% for alcohol, 7.7% for drug use).

Adolescents' self-reported behavioral health problems were significantly reduced at follow-up. Specifically, the number of adolescents who reported meeting study criteria for depression decreased from 40.3% at intake to 12.7% at follow-up. In addition, there was a significant decrease in the number of adolescents who met study criteria for anxiety, traumatic stress, and attention deficit from intake to follow-

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**The number of clients reporting illegal drug use decreased from 92% at intake to 38% at follow-up**

# “My therapist helped me with FAMILY AND DRUG PROBLEMS.”

-AKTOS FOLLOW-UP CLIENT



## The number of clients who met study criteria for depression decreased from 40% at intake to 13% at follow-up

up. In addition, the number of adolescents who reported at least two types of aggressive behaviors and the number who reported engaging in criminal activity decreased significantly from 48.6% at intake to 23.2% at follow-up. At intake and follow-up significantly more girls met study criteria for depression, anxiety, and traumatic stress when compared to boys, while significantly more boys reported engaging in criminal activity at intake compare to girls.

Youth's academic performance improved while the number of individuals with school

## The number of youth who were in detention, suspended, or expelled decreased from 56% at intake to 19% at follow-up

disciplinary action decreased from intake to follow-up. Among adolescents who were enrolled in school at intake and follow-up, the mean Grade Point Average (GPA) increased significantly from 2.3 at intake to 2.7 at follow-up. Self-reported school absences in the past 3 months decreased significantly from intake (11.9) to follow-up (6.6). Because 18 is the typical age at which individuals graduate from high school, education status at follow-up was examined for the 50 individuals who were 18 years old or older at follow-up. Less than half of individuals who were at least 18 years old at follow-up ( $n = 50$ ) had obtained a high school diploma or GED (42.0%) or were enrolled in secondary school (4.0%). A small number of individuals were not enrolled in school and had less than a high school diploma or GED (i.e., dropout). The existence of this small percentage of dropouts in the follow-up sample suggests a need for far more intensive school-based programs to retain and successfully intervene with high

risk kids. At follow-up, the majority of individuals reported being unemployed; however, 15.2% of individuals who had attained a high school diploma reported they were employed full-time compared to just 5.1% of individuals who had not yet attained a high school diploma.

The majority of youth reported their primary caregiver(s) was their biological parent(s) at intake (77.3%) and follow-up (64.6%). About a quarter of individuals reported their caregiver was other family (including kinship foster care and adoptive parents). There was a significant increase in the number of individuals who were living independently from intake (1.7%) to follow-up (10.5%), which is expected given their aging from the intake to the 12-month follow-up. Significantly fewer individuals reported they had lived in an institutional facility (e.g., juvenile detention, residential treatment, group home at follow-up (6.1%) than at intake (25.4%).

For the most part, youth's involvement with the justice system remained stable. The

# “They took the time to LISTEN.”

-AKTOS FOLLOW-UP CLIENT

number of youth who reported being arrested and charged with any type of offense and the number of youth who were incarcerated remained stable at intake and follow-up. One aspect of adolescents' involvement with the justice system that decreased significantly was the number of clients under supervision of the justice system with 52.5% of clients reporting they were under justice system supervision at intake compared to 25.4% at follow-up.

Attendance at mutual help recovery meetings was reported by only a minority of adolescents at intake (12.7%) and follow-up (9.4%). The number of people adolescents reported they could count on for recovery support remained stable from intake to follow-up.

Looking at human capital indicators in the AKTOS 2016

follow-up sample there were important improvements in education—both academic and disciplinary factors and significant reductions in the number of youth who reported using drugs and alcohol at follow-up. Using Bureau of Labor statistics that show different expected yearly earnings for individuals based on educational attainment, projected likely earnings in the year after treatment and lifetime earnings are estimated to illustrate the greater tax revenues that are expected from keeping children in school to high school graduation and to higher levels of education.

Overall, results from this outcome evaluation study strongly suggest that publicly-funded substance abuse treatment for adolescents facilitated positive changes for the vast majority of clients in a

variety of areas including decreased substance use, decreased severity of substance use disorders, decreased mental health problems, improved school performance and decreased disciplinary issues at school, and a decrease in supervision by the justice system. Results also suggest clients appreciate their experiences in the community mental health center (CMHC) substance abuse treatment programs. Investment in treatment for today's substance using adolescents may translate into not only avoidance of substantial health care, mental health care, public benefit, and criminal justice system costs, but may also lead to gains in education, employment, health, and other less tangible qualities (e.g., social capabilities, parenting, quality of life) of adolescents who grow into tomorrow's adults.

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Overall, results from this outcome evaluation study strongly suggest that **publicly-funded substance abuse treatment for adolescents facilitated positive changes**

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## FINDINGS FROM THE ADOLESCENT KENTUCKY TREATMENT OUTCOME STUDY (AKTOS) 2016 REPORT

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## INTRODUCTION

Kentucky's Community Mental Health Centers (CMHC) provide substance abuse treatment (including outpatient, intensive outpatient, residential, and case management) to adolescents (ages 10-17 years old). The Commonwealth of Kentucky funds substance abuse treatment programs using both federal block grants and state general fund dollars. To measure treatment effectiveness, the Division of Behavioral Health within the Department for Behavioral Health, Developmental and Intellectual Disabilities (DBHDID) funds the Adolescent Kentucky Treatment Outcome Study (AKTOS).

The goal of AKTOS is to provide an annual outcome evaluation for the DBHDID in partnership with the Behavioral Health Outcome Studies team at the University of Kentucky Center on Drug and Alcohol Research (UK CDAR).

Results are presented in ten main sections including:

**Section 1: Overview and Description of Adolescent Clients in Substance Abuse Treatment in Kentucky.** This section briefly describes publicly-funded substance abuse treatment in Kentucky and the Adolescent Kentucky Treatment Outcome Study (AKTOS) including how clients are selected into the outcome evaluation. In addition, this section describes characteristics of clients who participated in publicly-funded substance abuse treatment in Kentucky's Community Mental Health Centers in FY 2013 and 2014 as well as clients who completed a 12-month follow-up interview.

**Section 2: Client Satisfaction with Substance Abuse Treatment Programs.** This section describes two aspects of client satisfaction: (1) overall client satisfaction and (2) client ratings of program experiences.

**Section 3: Substance Use.** This section examines substance use changes from the period before entering treatment (i.e., pre-program) to the 12-month follow-up (i.e., 12 months after they entered treatment). Analysis is organized by presenting the percentage of individuals who reported use of any illegal drugs or alcohol, and then the percentage of individuals who reported using illegal drugs, alcohol, and tobacco at intake and follow-up. In addition to examining the overall use of illegal drugs, several specific categories of illegal drugs were examined including: (a) marijuana, (b) synthetic drugs [i.e., bath salts, synthetic marijuana], (c) opioids [i.e., prescription opiates, methadone, and buprenorphine], (d) heroin, (e) central nervous system (CNS) depressants [i.e., tranquilizers, benzodiazepines, sedatives, and barbiturates], (e) stimulants/cocaine [i.e., cocaine, methamphetamine, Ecstasy, MDMA, Adderall, and Ritalin], and (f) other illegal drugs not mentioned above [i.e., hallucinogens and inhalants]. Analysis is presented in detail for adolescents who were not in a controlled environment for the entire period of 12 months and/or 30 days before entering treatment. Additionally, the average number of months individuals reported using each substance are presented for those individuals who reported any use at each period (i.e., intake and follow-up).

**Section 4: Behavioral Health.** This section examines change from pre-program to 12-month follow-up on five behavioral health measures: (1) depression symptoms, (2) anxiety-trauma symptoms, (3) attention deficit symptoms, (4) aggressive behavior, and (5) general crime activity. Results for each targeted factor are presented for the overall sample and separately by gender when there were significant differences between male and female clients.

**Section 5: Education and Employment.** This section examines changes in education and employment from pre-program to 12-month follow-up. Specifically, this subsection presents data on: (1) enrollment in school; (2) grade point average; (3) school absences for any reason and specifically for disciplinary reasons; (4) detention, suspension, and expulsion; (5) education status for individuals 18 years old and older at follow-up; and (6) employment status among those who were attending school and among those who were not attending school.

**Section 6: Living Situation.** This section of target factors examines the clients' living situation in two periods:

pre-program and 12-month follow-up. Specifically, clients were asked about: (1) their primary caregiver; and (2) the types of residences they had lived in the past 12 months (i.e., parents' home, other relatives' home, foster care, institutional facility, on their own).

**Section 7: Justice System Involvement.** This section describes change in client involvement with the justice system during the 12-month period before entering treatment and during the 12-month period before the follow-up interview. Specifically, results include changes in: (1) any arrest; (2) the number of times arrested; (3) types of criminal offenses; (4) any incarceration; (5) the number of nights incarcerated; and (6) supervision by the justice system.

**Section 8: Recovery Supports.** This section focuses on three main changes from pre-program to 12-month follow-up in recovery supports: (1) percentage of clients attending mutual help recovery group meetings; (2) recovery supportive interactions with family/friends in the past 30 days; and (3) the number of people the participant said they could count on for recovery support.

**Section 9: Investing in Substance Abuse Treatment for Youth.** This section discusses the importance of investing in adolescent substance abuse treatment and the implications for significant future cost savings to society termed the human capital approach.

**Section 10: Summary and Conclusions.** This section presents, summarizes, and discusses the implications of the major findings from the AKTOS Follow-Up 2016 Report.

## SECTION 1. OVERVIEW AND DESCRIPTION OF AKTOS CLIENTS

*This section briefly describes publicly-funded substance abuse treatment in Kentucky and the Adolescent Kentucky Treatment Outcome Study (AKTOS) including how clients are selected into the outcome evaluation. In addition, this section describes characteristics of clients who participated in publicly-funded substance abuse treatment in Kentucky's Community Mental Health Centers in FY 2013 and 2014 as well as clients who completed a 12-month follow-up interview.*

### PUBLICLY FUNDED SUBSTANCE ABUSE TREATMENT FOR ADOLESCENTS

Adolescence is a critical period of vulnerability to substance use. The neurodevelopment of the brain renders the adolescent brain more vulnerable to addiction than the adult brain.<sup>1</sup> Furthermore, the effects of substance use are more damaging to adolescents' brains than to adults' brains in many ways, and in some cases may have long-lasting effects.<sup>2,3,4</sup> Thus, early and effective treatment for substance abuse among adolescents is a high priority public health problem.

Unfortunately, only a minority of treatment facilities offer specialized care for adolescents.<sup>4</sup> In the most recent National Survey of Substance Abuse Treatment Services (N-SSATS) Profile of Kentucky treatment facilities in 2011 only 21.4% of the surveyed treatment facilities provided treatment to adolescents.<sup>5</sup> In the 2012 and 2013 National Survey on Drug Use and Health (NSDUH) it was estimated that 3% of adolescents in Kentucky needed but did not receive treatment for alcohol use and 2.8% of adolescents in Kentucky needed but did not receive treatment for illicit drug use in the past 12 months.<sup>6</sup>

A settlement Kentucky made with two pharmaceutical companies in 2014 provided the means to address limitations in the state's capacity for providing substance abuse treatment for juveniles. Embedded in the \$32 million settlement, which was announced in January 2014, was \$18 million that was allocated to fund the development and expansion of 19 substance abuse treatment programs across Kentucky. The goal is to fund the expansion of the treatment capacity of existing programs and to fund "new juvenile treatment programs to provide a full continuum of care, including intensive outpatient and follow-up care centers" (<http://kykidsrecovery.ky.gov>). A separate outcome evaluation study is currently underway for clients who are receiving substance abuse treatment in the programs that received Kentucky Kids Recovery funds. The final report for the Kentucky Kids Recovery outcome evaluation is scheduled to be released in October 2016.

The goal of AKTOS is to provide an annual outcome evaluation of Community Mental Health Centers' substance abuse treatment programs for the Department for Behavioral Health, Developmental and Intellectual Disabilities in partnership with the Behavioral Health Outcome Studies team at the University of Kentucky Center on Drug and

<sup>1</sup> Volkow, N., & Li, T.K. (2004). Drug addiction: The neurobiology of behavior gone awry. *Neuroscience*, 5, 963-970.

<sup>2</sup> Clark, D., Thatcher, D., & Tapert, S. (2008). Alcohol, psychological dysregulation, and adolescent brain development. *Alcohol Clinical and Experimental Research*, 32(3), 375-385.

<sup>3</sup> Crews, F., He, J., & Hodge, C. (2007). Adolescent cortical development: A critical period of vulnerability for addiction. *Pharmacology, Biochemistry and Behavior*, 86(2), 189-199.

<sup>4</sup> National Center on Addiction and Substance Abuse [CASA]. (2009). *Shoveling up II: The impact of substance abuse on federal, state and local budgets*. New York: The national Center on Addiction and Substance abuse at Columbia University.

<sup>5</sup> Substance Abuse and Mental Health Services Administration (SAMHSA). (2012). *2011 state profile—Kentucky national Survey of Substance Abuse Treatment Services*. Washington, DC: SAMHSA, Center for Behavioral health Statistics and Quality.

<sup>6</sup> Substance Abuse and Mental Health Services Administration. (2014). *2012-2013 National Survey on Drug Use and Health: Model-based prevalence estimates (50 states and the District of Columbia), Tables 21-22*. Center for Behavioral health Statistics and Quality (CBHSQ), Substance Abuse and Mental Health Services Administration, U.S. Department of health and Human Services. <http://www.samhsa.gov/data/sites/default/files/NSDUHStateEst2012-2013-p1/Tables/NSDUHsaePercents2013.pdf>

Alcohol Research (UK CDAR). Specifically, the outcome evaluation examines client satisfaction, recovery support, substance use outcomes and several other targeted outcomes: (1) behavioral health, (2) school attendance and performance, (3) employment, (4) living situation, and (5) justice system involvement. In addition, estimates present the avoided costs to society in relation to the cost of publicly-funded substance abuse treatment. Further, the importance of investing in publicly funded substance abuse treatment for youth in relation to increasing human capital and reducing the future costs to society are discussed.

This report describes the sample of adolescents in two main ways: (1) providing characteristics of the 451 adolescents who completed an intake interview in FY 2013 and FY 2014, and (2) the presentation of outcomes for a subsample of 181 youth who completed an intake interview in FY 2013 and FY 2014 and a 12-month follow-up telephone interview in FY 2014 and FY 2015.

AKTOS includes a face-to-face intake interview conducted by treatment program staff to assess targeted factors such as substance use, mental health symptoms, education, employment status, living situation, justice involvement, and recovery supports prior to entering substance abuse treatment (submitted to UK CDAR from July 1, 2012 through June 30, 2014). In FY 2013 and FY 2014, 451 adolescents completed an intake survey.<sup>7</sup> At the completion of the intake interview, treatment staff informed clients about the opportunity to participate in the AKTOS follow-up telephone interview and asked if they were interested in participating. About half of clients (52.5%, n = 237) gave consent to be contacted for the follow-up interview. The follow-up sample was then selected from the 237 clients who agreed to be contacted for the follow-up interview.

## DESCRIPTOR OF AKTOS CLIENTS AT TREATMENT INTAKE

The majority of clients with an intake survey submitted in FY 2013 and 2014 were male (72.1%), White (79.3%), and were 16 or 17 years old at intake (57.7%).<sup>8</sup> About one in ten clients reported they were African American/Black (10.9%) and 9.8% reported they were American Indian, Hispanic, or multiracial.<sup>9</sup> Clients were, on average, 15.5 years old, ranging from 10 to 17 years old. More than half of clients (55.1%) reported they were referred to treatment by the court (e.g., judge, court designated worker, probation officer), and 16.2% reported they were referred to treatment by their school personnel.<sup>10</sup>



“ They helped me with my behavior  
by **GIVING ME THE TOOLS**  
I needed.”  
-AKTOS FOLLOW-UP CLIENT

<sup>7</sup> When a client had more than one intake survey in the two fiscal years included in this report, the survey with the earliest submission date was kept in the data file and the other intake surveys were deleted so that each client was represented once and only once in the data set.

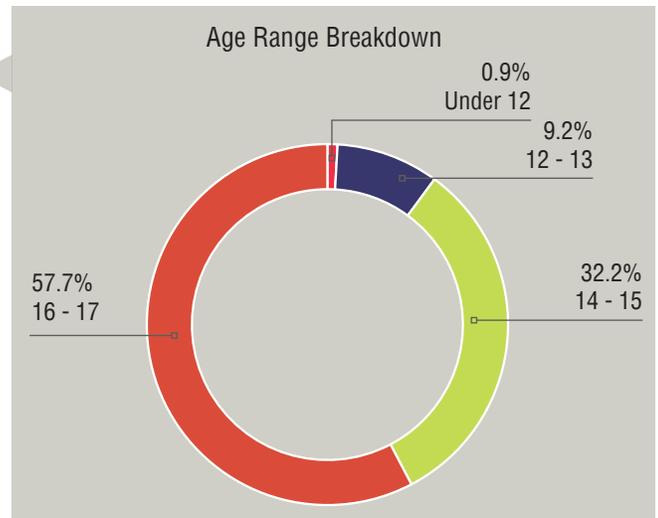
<sup>8</sup> Four cases had missing dates of birth and therefore age was missing.

<sup>9</sup> One case had missing data for race/ethnicity.

<sup>10</sup> Six cases had missing values for referral source.

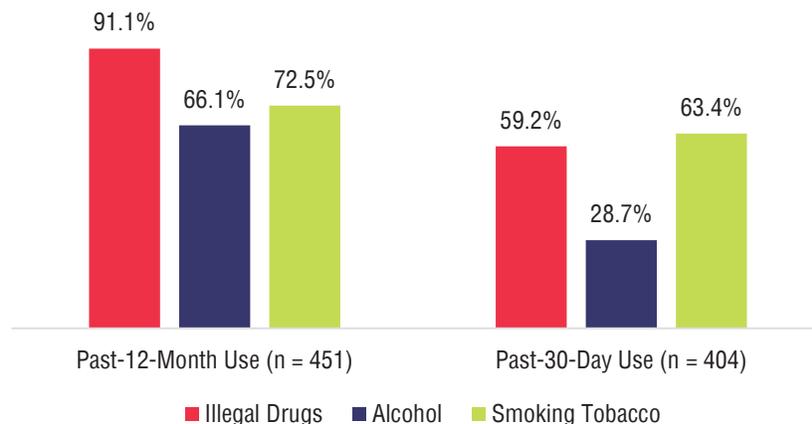
TABLE 1.1. DEMOGRAPHICS FOR ALL AKTOS CLIENTS AT INTAKE

(n = 451)	
AGE	15.5 years (range of 10-17)
GENDER	
Female	27.9%
Male	72.1%
RACE	
White	79.3%
African American	10.9%
Other or multiracial	9.8%
REFERRED BY	
The court	55.1%
School personnel	16.2%
DCBS	8.3%
Self	7.0%
Other sources	13.4%



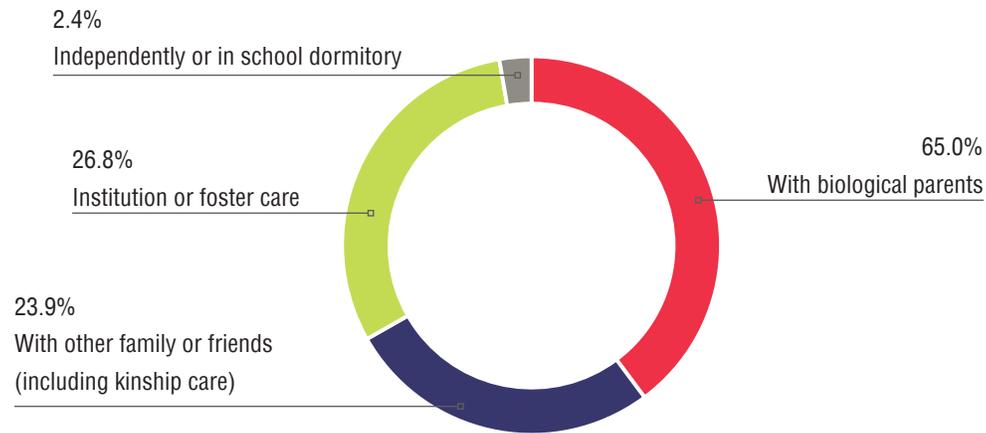
The vast majority of adolescents who completed an intake survey (91.1%) reported using illegal drugs, while 5.0% reported using alcohol but no illegal drugs and 3.9% reported using no illegal drugs or alcohol in the 12 months before intake. The majority of adolescents reported they had used alcohol (66.1%) and smoked tobacco (72.5%) in the 12 months before entering treatment. The drug classes reported by the greatest number of adolescents were marijuana (88.7%), synthetic/designer drugs (28.8%; i.e., bath salts, synthetic marijuana), prescription opioids/opiates (26.6%), and tranquilizers (19.7%). Because being in a controlled environment decreases opportunities for substance use, adolescents who were in a controlled environment all 30 days before entering treatment (n = 47) are not included in the analysis of substance use in the 30 days before entering treatment. Of the 404 adolescents who were not in a controlled environment all 30 days, 59.2% reported using illegal drugs, 28.7% reported using alcohol, and 63.4% reported smoking tobacco in the 30 days before entering treatment.

FIGURE 1.1. ALCOHOL AND DRUG USE AMONG NOT IN A CONTROLLED ENVIRONMENT ALL 365 DAYS (N = 451) OR 30 DAYS (N = 404) BEFORE PROGRAM ENTRY



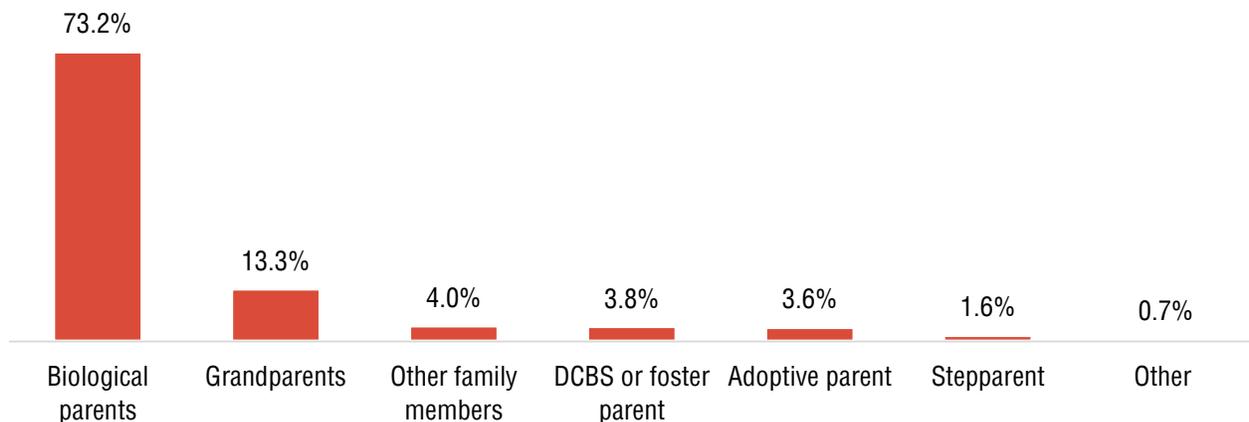
The majority of adolescents reported they lived at home with their biological parents (65.0%). Smaller percentages reported they lived with other family members or friends at intake (23.9%) or in an institution or foster care (26.8%; e.g., group home, residential treatment, or juvenile detention). A small number of youth reported they lived independently or in a school dormitory (2.4%).

FIGURE 1.2. USUAL LIVING ARRANGEMENT IN THE PAST 12 MONTHS AT INTAKE (N = 451)



The vast majority of adolescents reported their current caregiver was a family member: their biological parents (73.2%), grandparents (13.3%), other family members (4.0%), and adoptive parents (3.6%). Small percentages of adolescents reported their current caregiver was the Department of Community Based Services or a foster parent (3.8%), stepparent (1.6%), or other person (0.7%).

FIGURE 1.3. CURRENT CAREGIVER AT INTAKE (N = 451)



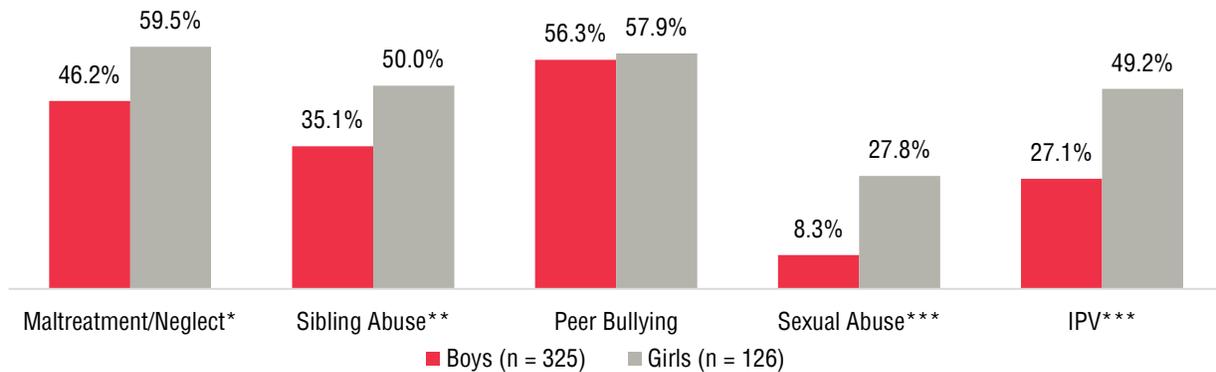
Epidemiological studies have found that individuals who experience chronic childhood adversity have a greater likelihood of abusing alcohol and drugs as well as having other psychiatric disorders.<sup>11</sup> Included in the intake interview were questions about a range of childhood adversities for which previous research has found associations with substance abuse such as child maltreatment and neglect, sexual abuse/assault, intimate partner violence, as well as other types of household dysfunction (e.g., witnessing domestic violence, mental illness, substance abuse, and incarceration of household members) that were included in the Adverse Childhood

<sup>11</sup> McLaughlin, K. A., Green, J. G., Gruber, M. J., Sampson, N. A., Zaslavsky, A. M., & Kessler, R. C. (2012). Childhood adversities and first onset of psychiatric disorders in a national sample of U.S. adolescents. *Archives of General Psychiatry*, 69(11), 1151-1160.

Experiences (ACE) Study.<sup>12,13,14</sup>

Significant numbers of youth experienced interpersonal victimization in their lifetime (see Figure 1.4A). Significantly more girls reported ever experiencing child maltreatment or neglect, sibling emotional or physical abuse, sexual abuse by any type of perpetrator<sup>15</sup> and intimate partner violence (IPV) compared to boys.

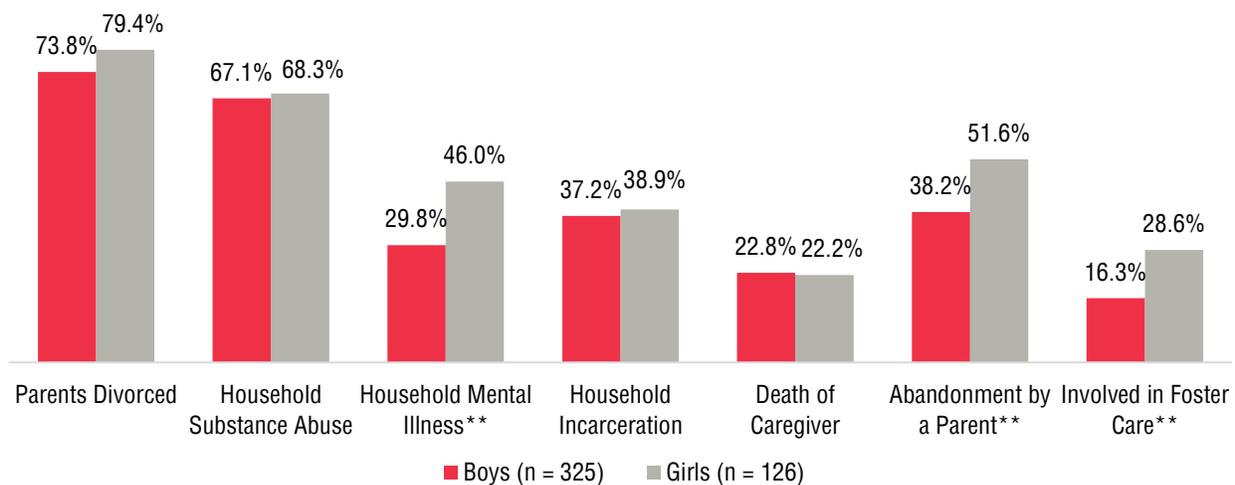
FIGURE 1.4A. LIFETIME INTERPERSONAL VIOLENCE EXPERIENCES AT INTAKE (n = 451)



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

In addition to lifetime interpersonal victimization, adverse experiences in the household were common in this sample of youth (see Figure 1.4B). The majority of youth reported that their parents were divorced or lived separately and that someone in their household abused alcohol or used illicit drugs. More than one-third of boys and girls reported a household member had been incarcerated in prison and more than one-fifth of boys and girls had a caregiver who had died. Significantly more girls than boys reported that a household member had a mental illness (46.0% vs. 29.8%), they felt like they were abandoned by a parent (51.6% vs. 38.2%), and they had been in foster care (28.6% vs. 16.3%).

FIGURE 1.4B. LIFETIME CHILDHOOD ADVERSE EXPERIENCES AT INTAKE (n = 451)



\*\*p < .01

<sup>12</sup> Centers for Disease Control and Prevention. (2014). *Prevalence of individual adverse childhood experiences*. Atlanta, GA: National Center for injury Prevention and Control, Division of Violence Prevention.

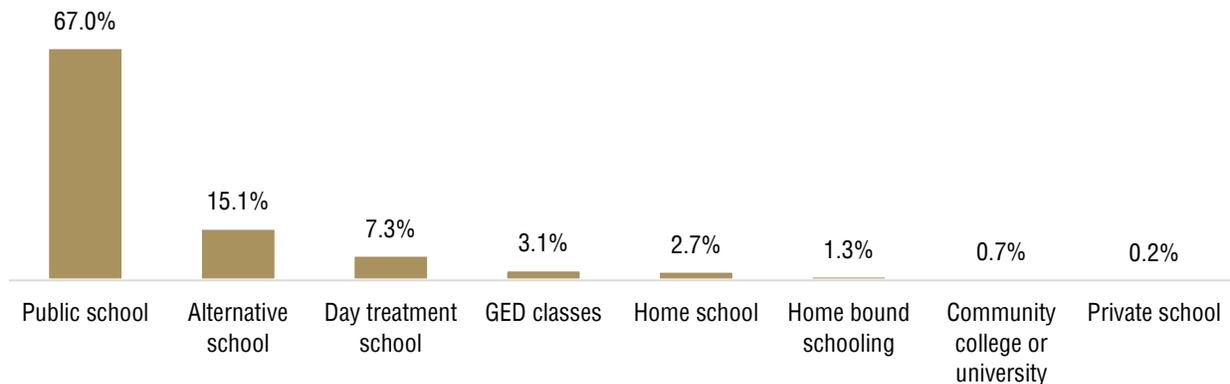
<sup>13</sup> Straus, M. A., & Gelles, R. J. (1990). *Physical violence in American Families: Risk factors and adaptations to violence in 8,145 families*. New Brunswick, NJ: Transaction Press.

<sup>14</sup> Bernstein, D. P., Fink, L., Handelsman, L., Foote, J., Lovejoy, M., Wenzel, K., Sapareto, E., & Ruggiero, J. (1994). Initial reliability and validity of a new retrospective measure of child abuse and neglect. *American Journal of Psychiatry*, 151, 1132-1136.

<sup>15</sup> The items about sexual abuse/assault asked about any type of perpetrator; thus, sexual abuse perpetrated by a guardian, sibling, partner are included in the category of sexual abuse and not in maltreatment, sibling abuse, or IPV.

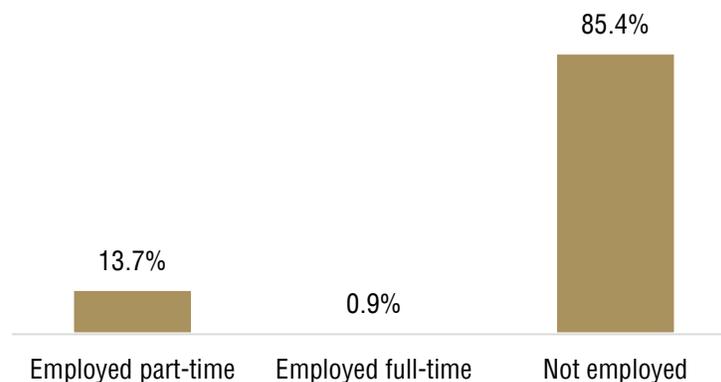
The vast majority of adolescents (97.3%) were enrolled in school at intake. The majority of clients reported they were attending public school (67.0%; see Figure 1.5). The next most frequently mentioned type of schooling was alternative school (15.1%), followed by day treatment school (7.3%), GED classes (3.1%), home school (2.7%), home bound (1.3%), community college or university courses (0.7%), and private school (0.2%).

FIGURE 1.5 SCHOOL STATUS AT INTAKE (n = 451)



Only a minority of adolescents reported at intake they were currently employed part-time or had occasional or seasonal employment (13.7%), or employed full-time (0.9%). Thus, the majority of youth were not employed at intake (85.4%). Of the five individuals with a high school diploma or GED at intake, only one was currently employed part-time and the other four were not employed.

FIGURE 1.6. EMPLOYMENT STATUS AT INTAKE (N = 451)



A sizable minority of adolescents (44.6%) reported they had been arrested and charged with an offense in the 12 months before entering treatment. A little over one-third (35.0%) reported they had been incarcerated in the 12 months before entering treatment.

## AKTOS FOLLOW-UP SAMPLE

Follow-up interviews are conducted with a selected sample of clients about 12 months after the intake survey is completed. All adolescents who agree to be contacted for the follow-up interview and have given at least one mailing address and one phone number, or two phone numbers if they do not have a mailing address in their locator information, are pulled into the follow-up sample. The follow-up interviews are conducted over the telephone by an interviewer at UK CDAR. Client responses to the follow-up interviews are kept confidential to help

facilitate the honest evaluation of client outcomes and satisfaction with program services. There were no direct refusals and a high follow-up rate (90%). This means that only 10.0% of individuals included in the sample to be followed up were not successfully contacted.<sup>16</sup>

This report describes outcomes for 181 adolescents (ages 11-17 years old) who participated in publicly-funded substance abuse treatment and who completed an intake interview and a follow-up telephone interview about 12 months (average of 337.0 days) after the intake survey was completed. Detailed information about the methods and follow-up efforts can be found in Appendices A and B.

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<sup>16</sup> Clients are not contacted for a variety of reasons including follow-up staff are not able to find a working address or phone number or are unable to contact any friends or family members of the client.

# AKTOS 2016 QUALITY OF DATA AND LOCATOR EFFORTS

For the 2016 follow-up study, 451 adolescents completed intake surveys and 237 of those youth agreed to be contacted for the follow-up survey. Of these adolescents, 230 cases were included in the follow-up sample.\* Of those, 29 clients were not eligible for the follow-up (e.g., in residential treatment, was in a controlled environment, military service) leaving a sample of 201. A total of 181 follow-up surveys were completed for a follow-up rate of 90.0%. Only 10.0% of clients were not contacted.

**90.0%**  
FOLLOW-UP RATE

## PHONE CALLS

**1,076**  
TOTAL

**3.3**

A total of 748 calls were made to client phone numbers, an average of 3.3 per client.

**1.4**

A total of 328 calls were made to contact phone numbers, an average of 1.4 per client.

**60.5%**

6 out of 10 clients had at least one unique contact phone number

## MAILINGS

**426**  
TOTAL

**1.7**

A total of 397 mailings were sent to a client address, an average of 1.7 per client.

**0.1**

A total of 29 mailings were sent to contact addresses, an average of 0.1 per client.

**10.8%**

A little more than 1 in 10 clients had at least one complete, unique contact address.

Client information was verified through external search in cases where (a) client contact information was incomplete; and (b) client contact information was incorrect. Overall, approximately 40.0% of all clients were searched with medium level effort and 24.8% of all clients were searched in-depth.

## ONLINE SEARCH



**39.1%**

of all clients were searched with light effort (i.e., verification, VINE, Whitepages)

**40.0%**

of all clients were searched with medium effort (i.e., social media, other public directory databases)

**24.8%**

of all clients were searched with in-depth effort (i.e., in-depth searching methods)

For more detail on the locating efforts of UK CDAR staff, please see Appendix B

*\*The seven adolescents who gave consent to be followed up but who were not included in the follow-up sample were excluded because they did not provide phone numbers or addresses in the locator information requested of individuals who agree to be contacted for the follow-up survey.*

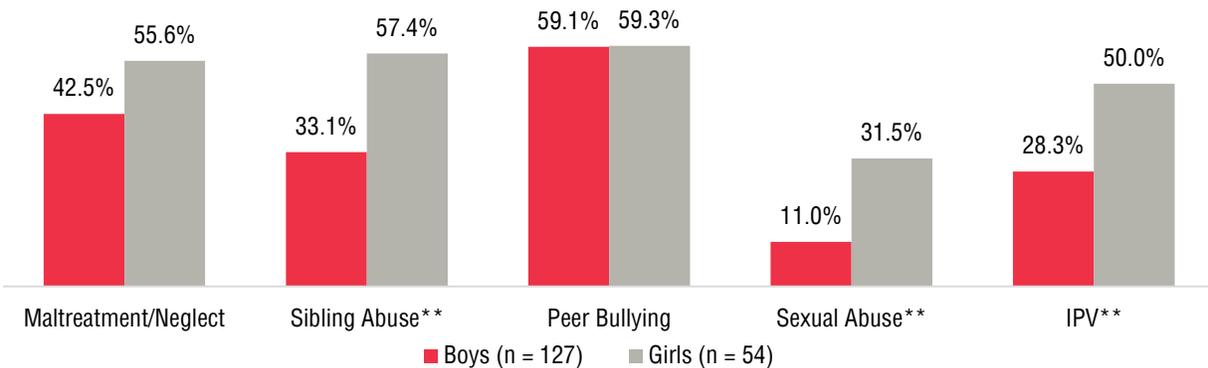
Of the 181 adolescents who completed a 12-month follow-up interview, 70.2% were male and 29.8% were female. The majority of follow-up clients were White (79.6%). A minority were African American/Black (9.9%) and 10.5% were Hispanic, American Indian, or multiracial. They were an average of 15.5 years old at the time of the intake interview. The majority of adolescents (56.4%) were 16 or 17 years old at intake.

TABLE 1.2 DEMOGRAPHICS FOR AKTOS FOLLOW-UP SAMPLE CLIENTS AT INTAKE

(n = 181)	
AGE	15.5 years (range of 11-17)
GENDER	
Male	70.2%
Female	29.8%
RACE	
White	79.6%
African American	9.9%
Other or multiracial	10.5%

As with the entire sample of adolescents who completed an intake interview, significant numbers of youth in the follow-up sample reported interpersonal victimization experiences in their lifetime (see Figure 1.7A). Significantly more girls reported ever experiencing sibling emotional or physical abuse, sexual abuse by any type of perpetrator<sup>17</sup> and intimate partner violence (IPV) compared to boys. The majority of boys (71.7%) and girls (81.5%) reported experiencing any type of interpersonal victimization in their lifetime (not depicted in a figure).

FIGURE 1.7A. LIFETIME INTERPERSONAL VIOLENCE EXPERIENCES AT INTAKE (n = 181)

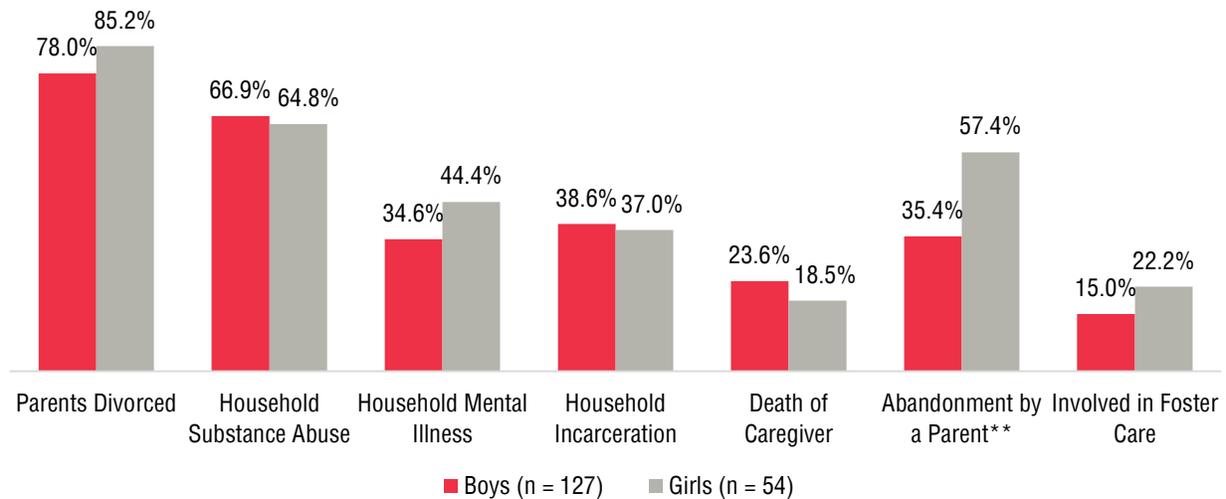


\*\*p < .01.

In addition to lifetime interpersonal victimization, adverse experiences in the household were common in this sample of youth (see Figure 1.7B). The majority of youth reported that their parents were divorced or lived separately and that someone in their household abused alcohol or used illicit drugs. More than one-third of boys and girls reported a household member had been incarcerated in prison and more than one-fifth of boys (23.6%) and 18.5% of girls had a caregiver who had died. Significantly more girls than boys reported that they felt like they were abandoned by a parent (57.4% vs. 35.4%). There were no other gender differences in household adversity experiences for the follow-up sample.

<sup>17</sup> The items about sexual abuse/assault asked about any type of perpetrator; thus, sexual abuse perpetrated by a guardian, sibling, partner are included in the category of sexual abuse and not in maltreatment, sibling abuse, or IPV.

FIGURE 1.7B. LIFETIME CHILDHOOD ADVERSE EXPERIENCES AT INTAKE (n = 181)



\*\*p < .01

When those with a follow-up interview were compared with those who did not have a follow-up interview on a variety of intake variables, there were few significant differences. Specifically, no differences were found in demographics, employment, living situation, behavioral health, and justice system involvement. The only statistically significant differences were that more individuals who had not completed a follow-up interview reported they had ever repeated a grade in school and more had used opioids (other than heroin) in the 12 months and 30 days before entering treatment when compared to individuals who had completed a follow-up interview. See Appendix C for detailed comparisons of adolescents who completed a follow-up interview (n = 181) and adolescents who did not complete a follow-up interview (n = 270).

## SECTION 2. CLIENT SATISFACTION WITH SUBSTANCE ABUSE TREATMENT PROGRAMS

One of the important outcomes assessed during the follow-up interview is the client’s perception of the treatment experience. This section describes two aspects of client satisfaction: (1) overall client satisfaction; and (2) client ratings of program experiences.

### OVERALL CLIENT SATISFACTION

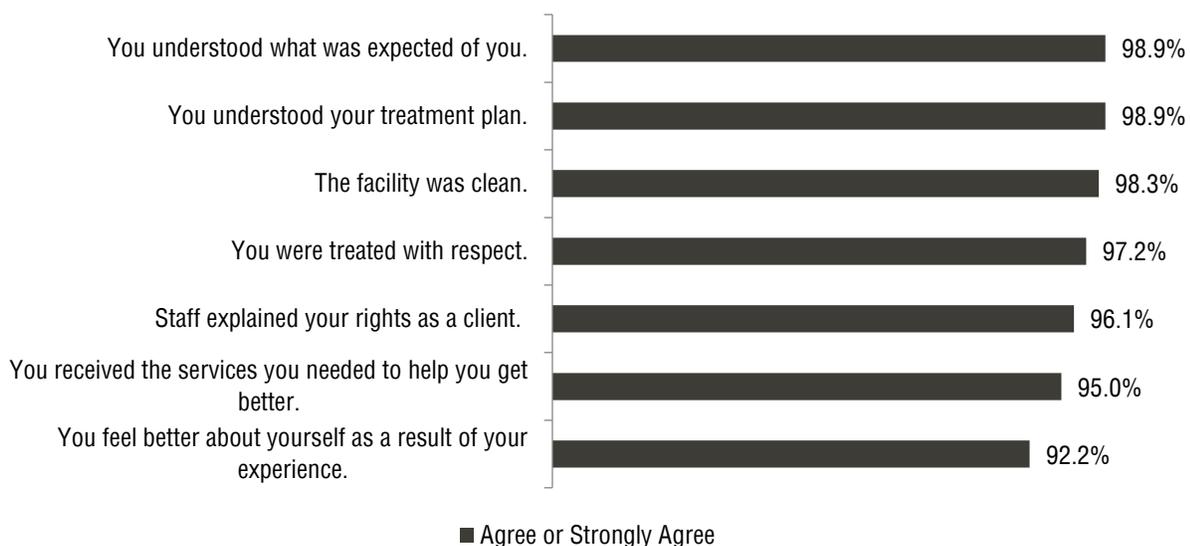
A key element in the evaluation of using public funds to address health or social problems is client satisfaction with the services they receive. Higher levels of satisfaction are generally associated with positive treatment outcomes.<sup>18</sup> At the beginning of the follow-up survey, interviewers asked participants questions about their satisfaction with the treatment programs where 1 represented the worst experience and 10 represented the best experience. Overall, the majority of clients (63.4%) gave a positive rating between 8 and 10 of their satisfaction with the treatment program (not in a table). The average rating was 7.7.

### CLIENT RATINGS OF PROGRAM EXPERIENCES

When asked about specific aspects of their treatment program, the vast majority of clients reported they either agreed or strongly agreed with each aspect of the program that was assessed (see Figure 2.1). The vast majority of clients understood what staff expected of them, understood their treatment plan, believed they were treated with respect, understood their rights as clients of substance abuse treatment, believed they had received the services they needed to help them get better, and felt better about themselves as a result of their treatment.

Appendix D presents data on the services adolescents received in the 12 months following their treatment intake.

FIGURE 2.1. PERCENTAGE OF CLIENTS WHO AGREED/STRONGLY AGREED WITH THE FOLLOWING STATEMENTS ABOUT THE TREATMENT PROGRAM AT FOLLOW-UP (n = 180)<sup>19</sup>



<sup>18</sup> Waxman, H.M. (1996). Using outcomes assessment for quality improvement. In L.I. Sederer & B. Dickey (Eds.), *Outcomes assessment in clinical practice*, (pp. 25-33), Boston, Massachusetts: Williams and Wilkins.

<sup>19</sup> Answers of don't know/don't remember were treated as missing on these items. Only one client reported "don't know" for some of the items and for one case the interviewer skipped these items in error.

## SECTION 3. SUBSTANCE USE

*This section describes pre-program compared to post-program change in illegal drug, alcohol, and tobacco use for adolescent clients. Past-12-month substance use is examined as well as past-30-day substance use for adolescent clients who were not in a controlled environment all 30 days before entering treatment or the follow-up interview. Results for each substance class are presented for the overall sample and by gender when there were significant gender differences.*

This section examines substance use changes which include use of any illegal drugs or alcohol, and then separately for illegal drugs, alcohol, and tobacco at intake and follow-up. In addition to examining the overall use of illegal drugs, several specific categories of illegal drugs were examined separately including: (a) marijuana, (b) synthetic drugs [i.e., bath salts, synthetic marijuana], (c) opioids [i.e., prescription opiates, methadone, and buprenorphine], (d) heroin, (e) central nervous system (CNS) depressants [i.e., tranquilizers, benzodiazepines, sedatives, and barbiturates], (e) stimulants/cocaine [i.e., cocaine, methamphetamine, Ecstasy, MDMA, Adderall, and Ritalin], and (f) other illegal drugs not mentioned above [i.e., hallucinogens and inhalants]. Analysis is presented in detail for AKTOS study participants who were not in a controlled environment for the entire period of 12 months and/or 30 days before entering treatment. Changes in substance use from intake to follow-up are presented in 4 main subsections and organized by type of substance use:

1. **Change in 12-month substance use from intake to follow-up.** Comparisons of the use of substances including ANY illegal drug use, marijuana, synthetic drugs, opioids, heroin, CNS depressants, stimulants, other illegal drug use, alcohol use, and tobacco use 12 months before the client entered the program and any use of these substances during the 12-month follow-up period (n = 181) are presented.
2. **Average number of months clients used substances at intake and follow-up.** For those who used each substance class, the average number of months used in the 12 months before treatment intake and during the 12-month follow-up period are reported.
3. **Change in 30-day substance use from intake to follow-up.** In addition to looking at past-12-month substance use, change in any use in the 30 days before program entry and the 30 days before the follow-up interview for any illegal drug use (including marijuana, synthetic drugs, prescription opioids, heroin, CNS depressants, stimulants, and other illegal drugs), alcohol use, and tobacco use (n = 164)<sup>20</sup> is also examined. Because some clients were in a controlled environment (e.g., detention center or residential facility) all 30 days before entering treatment (n = 17), changes in drug, alcohol, and tobacco use from intake to follow-up were analyzed only for clients who were not in a controlled environment all 30 days before entering treatment.
4. **Change in self-reported alcohol and drug severity composite scores from intake to follow-up.** The Addiction Severity Index (ASI) composite scores based on self-reported severity of drug or alcohol problems are also examined for change over time for illegal drugs (n = 78), alcohol (n = 52), and those with both alcohol and illegal drug use (n = 93). The alcohol and drug composite scores assess addiction severity even among those reporting no substance use in the past 30 days. The alcohol and drug severity composite scores are computed from items about 30-day alcohol (or drug) use and number of days clients used multiple drugs in a day, as well as the impact of substance use on an individual's life, such as money spent on alcohol, number of days individuals had alcohol (or drug) problems, how troubled or bothered individuals were by their alcohol (or drug) problems, and how important treatment was to them.

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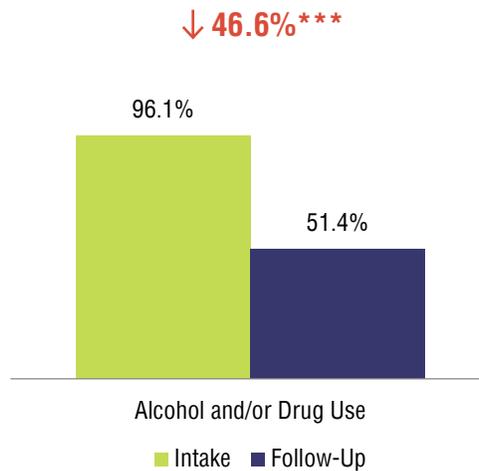
<sup>20</sup> Because some clients enter treatment after leaving jail or prison, substance use in the 30 days before entering the program was examined for clients who were not in a controlled environment all 30 days. The assumption for excluding clients who were in a controlled environment all 30 days before entering treatment from the change in past-30-day substance use analysis is that being in a controlled environment inhibits opportunities for alcohol and drug use.

## ALCOHOL AND/OR DRUG USE

### PAST-12-MONTH ALCOHOL AND/OR DRUG USE

The number of youth who reported using alcohol and/or drugs decreased significantly by 46.6% from intake to follow-up (see Figure 3.1). Nearly all of the youth reported using alcohol and/or drugs in the 12 months before intake, and at follow-up 51.4% reported using alcohol and/or drugs. In other words, a total of 88 youth (48.6%) reported no use of alcohol and/or drugs in the 12 month follow-up period.

FIGURE 3.1. PERCENTAGE OF CLIENTS REPORTING ALCOHOL AND/OR DRUG USE AT INTAKE AND FOLLOW-UP (n = 181)

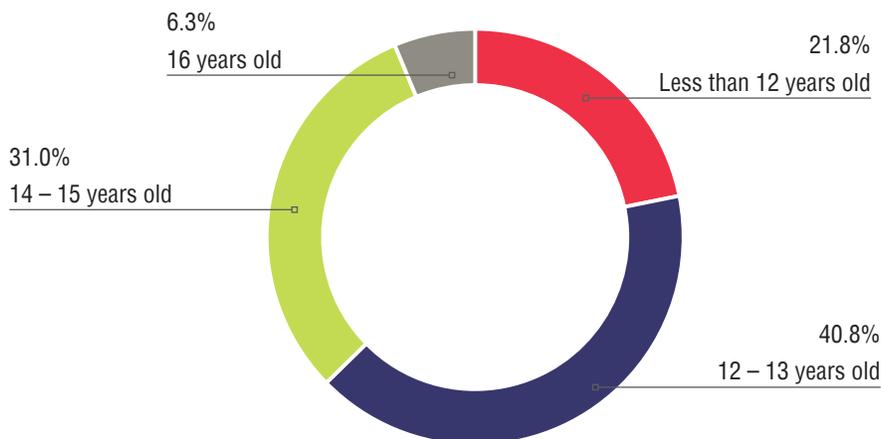


### AVERAGE AGE FIRST USED ALCOHOL OR DRUGS

The majority of youth in the AKTOS sample (62.6%) were early initiators of substance use (i.e., before the age of 14; see Figure 3.2). The average age youth initiated alcohol or drug use was 12.7 years old.

The majority of youth were **early initiators** of substance use

FIGURE 3.2. AVERAGE AGE CLIENT FIRST USED ALCOHOL OR DRUGS (n = 174)<sup>21</sup>

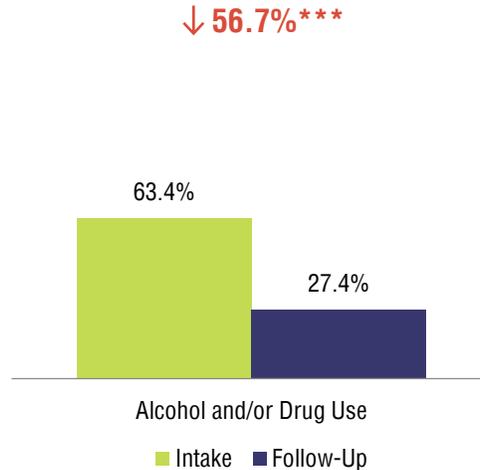


<sup>21</sup> Age of first use of alcohol and/or drugs was missing for 7 clients.

## PAST-30-DAY ALCOHOL AND/OR DRUG USE

The number of youth who reported using alcohol and/or drugs decreased significantly by 56.7% from intake to follow-up (see Figure 3.3). The majority of youth reported using alcohol and/or drugs in the 30 days before intake, and at follow-up a little more than one-fourth (27.4%) reported using alcohol and/or drugs. In other words, a total of 119 youth (72.6% of those who were not in a controlled environment all 30 days) reported no use of alcohol and/or drugs in the 30 days before follow-up.

FIGURE 3.3. PERCENTAGE OF CLIENTS REPORTING ALCOHOL AND/OR DRUG USE AT INTAKE AND FOLLOW-UP (n = 164)



\*\*\*p < .001

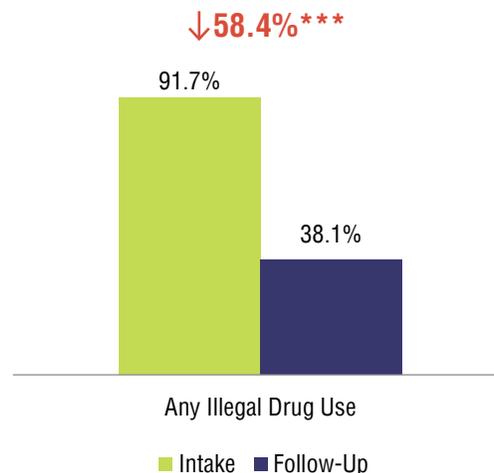
## ANY ILLEGAL DRUGS

### PAST-12-MONTH ILLEGAL DRUG USE

The vast majority of clients (91.7%) reported using illegal drugs in the 12 months before entering substance abuse treatment, which decreased to 38.1% at follow-up. Overall, for the adolescents in the AKTOS follow-up sample, there was a 58.4% decrease in the number of clients reporting use of any illegal drug (see Figure 3.4).

**The number of clients reporting illegal drug use decreased by 58%**

FIGURE 3.4. PAST-12-MONTH USE OF ILLEGAL DRUGS AT INTAKE AND FOLLOW-UP (N = 181)



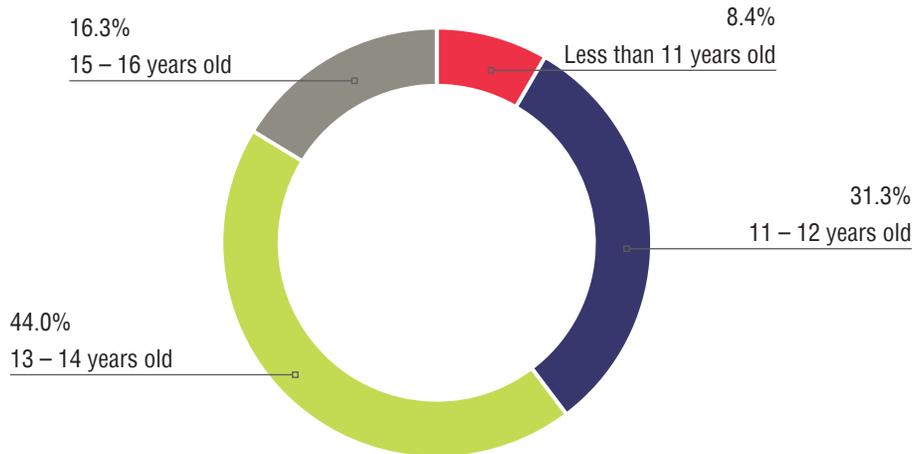
\*\*\*p < .001

### AVERAGE AGE FIRST USED ILLEGAL DRUGS

Adolescents who reported using illegal drugs in the 12 months before intake were asked how old they were when they first used illegal drugs. The 166 adolescents who reported using illegal drugs in the 12 months before intake were, on average, 12.9 years old when they first began using illegal drugs. Figure 3.5 shows the percentage of adolescents who reported first using illegal drugs at different ages.

Youth were on average 12.9 years old when they first used illegal drugs

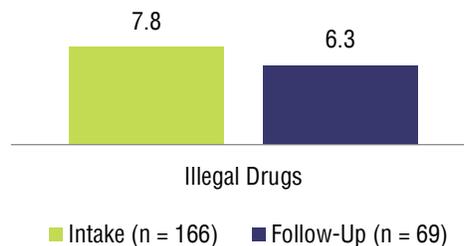
FIGURE 3.5. AVERAGE AGE FIRST USED ILLEGAL DRUGS (n = 166)



### AVERAGE NUMBER OF MONTHS USED ANY ILLEGAL DRUGS

Among the clients who reported using illegal drugs in the 12 months before entering treatment (n = 166), they reported using illegal drugs on average 7.8 months (see Figure 3.6). Among clients who reported using illegal drugs at follow-up (n = 69), they reported using on average 6.3 months.<sup>22</sup>

FIGURE 3.6. AMONG CLIENTS WHO USED ANY ILLEGAL DRUGS, THE AVERAGE NUMBER OF MONTHS ADOLESCENTS USED ILLEGAL DRUGS AT INTAKE AND FOLLOW-UP



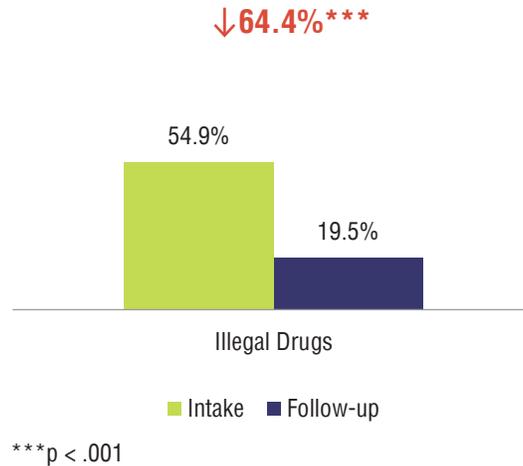
### PAST-30-DAY ILLEGAL DRUG USE

More than one-half of clients (54.9%) who were not in a controlled environment all 30 days reported they had used illegal drugs in the 30 days before entering treatment (see Figure 3.7). At follow-up, 19.5% of clients reported they had used illegal drugs in the past 30 days—a significant decrease of 64.4%. Examination of use of specific classes of illegal drugs in the following pages shows that most of the reported illegal drug use in the 30 days before follow-up was marijuana.

There was a significant reduction of 64% in the number of clients who reported past 30-day illegal drug use

<sup>22</sup> Because number of months of illegal drugs was measured separately for each class of substance, the value is a calculation of the maximum number of months clients used any class of substance.

FIGURE 3.7. PAST-30-DAY USE OF ANY ILLEGAL DRUG AT INTAKE AND FOLLOW-UP (n = 164)



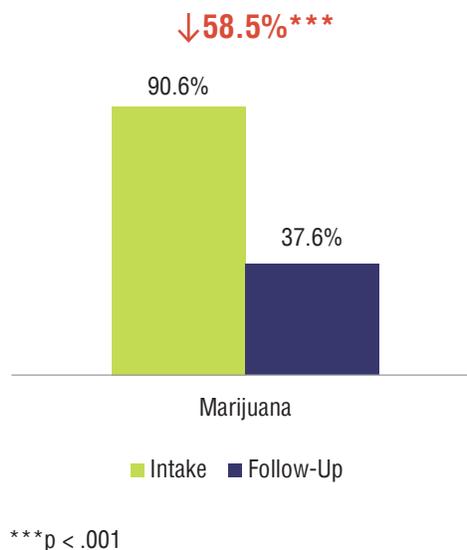
## MARIJUANA

### PAST-12-MONTH MARIJUANA USE

The vast majority of clients (90.6%) reported using marijuana in the 12 months before entering treatment, which decreased to 37.6% at follow-up. Overall, for the AKTOS follow-up sample, there was a 58.5% decrease in the number of clients reporting marijuana use (see Figure 3.8).

The number of clients reporting marijuana use decreased by 59%

FIGURE 3.8. PAST-12-MONTH USE OF MARIJUANA AT INTAKE AND FOLLOW-UP (n = 181)

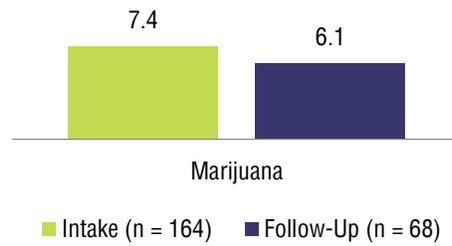


### AVERAGE NUMBER OF MONTHS USED MARIJUANA

Among the clients who reported using marijuana in the 12 months before entering treatment (n = 164), they reported using marijuana on average 7.4 months (see Figure 3.9). Among clients who reported using marijuana at follow-up (n = 68), they reported using an average of 6.1 months.

**“ I LIKED EVERYTHING about it. The counselor was cool and very understanding.”**  
-AKTOS FOLLOW-UP CLIENT

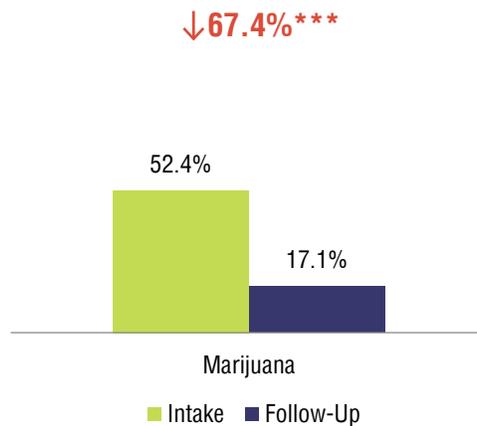
FIGURE 3.9. AMONG ADOLESCENTS WHO USED MARIJUANA, THE AVERAGE NUMBER OF MONTHS ADOLESCENTS USED MARIJUANA AT INTAKE AND FOLLOW-UP



## PAST-30-DAY MARIJUANA USE

The number of clients who reported using marijuana decreased significantly by 67.4%, from 52.4% at intake to 17.1% at follow-up (see Figure 3.10).

FIGURE 3.10. PAST-30-DAY USE OF MARIJUANA AT INTAKE AND FOLLOW-UP (n = 164)



\*\*\*p < .001

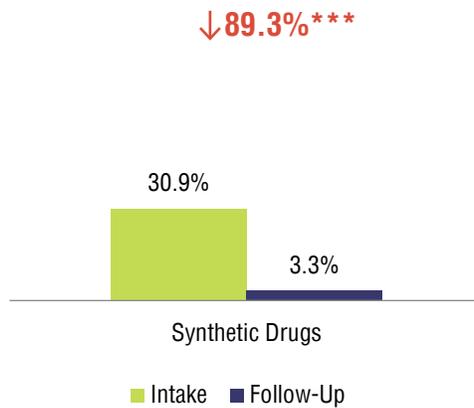
## SYNTHETIC DRUG USE

### PAST-12-MONTH SYNTHETIC DRUG USE

In the 12 months before entering treatment 30.9% of adolescents reported using synthetic drugs such as synthetic marijuana and bath salts. The number of adolescents who reported using synthetic drugs decreased by 89.3% to 3.3% at follow-up (see Figure 3.11).

The number of clients reporting synthetic drug use decreased by 89%

FIGURE 3.11. PAST-12-MONTH USE OF SYNTHETIC DRUGS AT INTAKE AND FOLLOW-UP (n = 181)

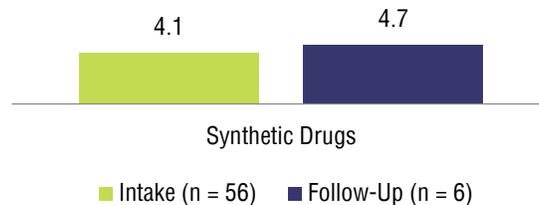


\*\*\*p < .001

### AVERAGE NUMBER OF MONTHS USED SYNTHETIC DRUGS

Among the clients who reported using synthetic drugs in the 12 months before entering treatment (n = 56), they reported using synthetic drugs on average 4.1 months (see Figure 3.12). Among clients who reported using synthetic drugs at follow-up (n = 6), they reported using an average 4.7 months.

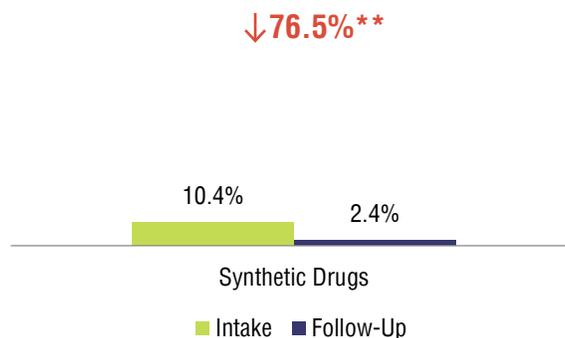
FIGURE 3.12. AMONG ADOLESCENTS WHO USED SYNTHETIC DRUGS, THE AVERAGE NUMBER OF MONTHS ADOLESCENTS USED SYNTHETIC DRUGS



### PAST-30-DAY SYNTHETIC DRUG USE

One in ten clients reported past-30-day use of synthetic drugs, with a significant decrease of 76.5% at follow-up (see Figure 3.13).

FIGURE 3.13. PAST-30-DAY USE OF SYNTHETIC DRUGS AT INTAKE AND FOLLOW-UP (n = 164)



\*\*p < .01

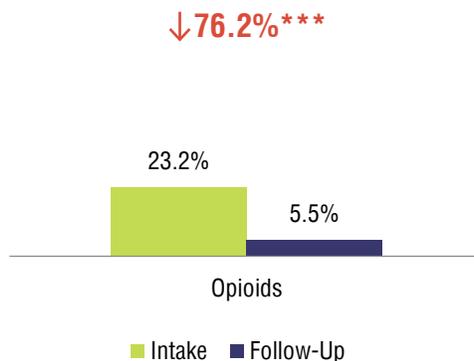
## OPIOID/OPIATE USE

### PAST-12-MONTH OPIOID/OPIATE USE

In the 12 months before entering treatment 23.2% of adolescents reported using opioids/opiates<sup>23</sup> other than heroin, including prescription opiates, methadone, and buprenorphine. The number of adolescents who reported using opioids decreased by 76.2% to 5.5% at follow-up (see Figure 3.14).

The number of clients reporting **opioid use decreased by 76%**

FIGURE 3.14. PAST-12-MONTH USE OF OPIOIDS AT INTAKE AND FOLLOW-UP (n = 181)

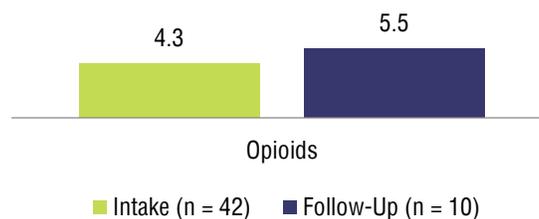


\*\*\*p < .001

### AVERAGE NUMBER OF MONTHS USED OPIOIDS

Among the clients who reported using opioids in the 12 months before entering treatment (n = 42), they reported using opioids on average 4.3 months (see Figure 3.15). Among clients who reported using opioids at follow-up (n = 10), they reported using an average 5.5 months.<sup>24</sup>

FIGURE 3.15. AMONG ADOLESCENTS WHO USED OPIOIDS, THE AVERAGE NUMBER OF MONTHS ADOLESCENTS USED OPIOIDS



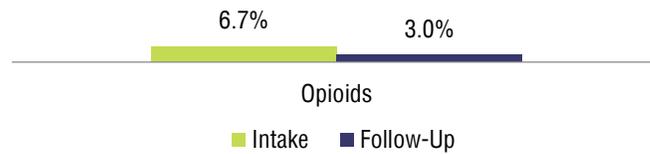
### PAST-30-DAY OPIOID USE

The number of clients who reported past-30-day use of opioids was small at intake and follow-up, with no significant change (see Figure 3.16).

<sup>23</sup> For brevity's sake, we will refer to this class of substance including prescription opiates and opioids as opioids.

<sup>24</sup> Because number of months of prescription opiates, methadone, and buprenorphine were measured separately, the value is a calculation of the maximum number of months clients used any of these specific types of opioids/opiates.

FIGURE 3.16. PAST-30-DAY USE OF OPIOIDS AT INTAKE AND FOLLOW-UP (n = 164)



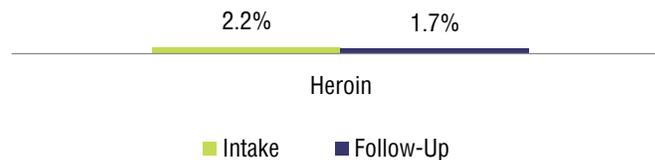
## HEROIN USE

### PAST-12-MONTH HEROIN USE

In the 12 months before entering treatment 2.2% of adolescents reported using heroin. The number of adolescents who reported using heroin did not change significantly at follow-up, 1.7% (see Figure 3.17).

The number of clients reporting heroin use was very low at intake and follow-up

FIGURE 3.17. PAST-12-MONTH USE OF HEROIN AT INTAKE AND FOLLOW-UP (n = 181)



Because so few adolescents reported using heroin in the 12 months before intake and follow-up, data is not presented in this report on the number of months of heroin use among individuals who used heroin or the percentage of individuals who reported 30-day heroin use.

## CNS DEPRESSANT USE

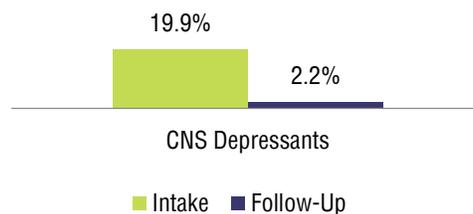
### PAST-12-MONTH CNS DEPRESSANT USE

In the 12 months before entering treatment, 19.9% of adolescents reported using CNS depressants (e.g., tranquilizers, sedatives, benzodiazepines). The number of adolescents who reported using CNS depressants decreased by 88.9% to 2.2% at follow-up (see Figure 3.18).

The number of clients reporting CNS depressant use decreased by 89%

FIGURE 3.18. PAST-12-MONTH USE OF CNS DEPRESSANTS AT INTAKE AND FOLLOW-UP (n = 181)

↓88.9%\*\*\*

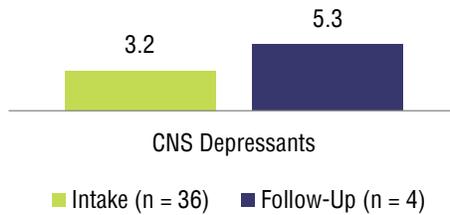


\*\*\*p < .001

### AVERAGE NUMBER OF MONTHS USED CNS DEPRESSANTS

Among the clients who reported using CNS depressants in the 12 months before entering treatment (n = 36), they reported using an average 3.2 months (see Figure 3.19). Among clients who reported using CNS depressants at follow-up (n = 4), they reported using an average 5.3 months.<sup>25</sup>

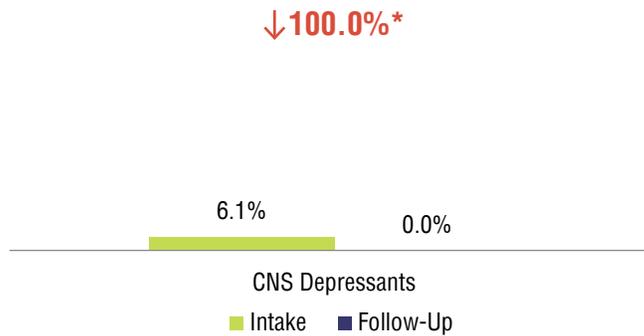
FIGURE 3.19. AMONG ADOLESCENTS WHO USED CNS DEPRESSANTS, THE AVERAGE NUMBER OF MONTHS CLIENTS USED CNS DEPRESSANTS AT INTAKE AND FOLLOW-UP



### PAST-30-DAY CNS DEPRESSANT USE

The number of clients who reported using CNS depressants decreased significantly from 6.1% at intake to 0.0% at follow-up (see Figure 3.20).

FIGURE 3.20. PAST-30-DAY USE OF CNS DEPRESSANTS AT INTAKE AND FOLLOW-UP (n = 164)



\*p < .05

## STIMULANT USE

### PAST-12-MONTH STIMULANT USE

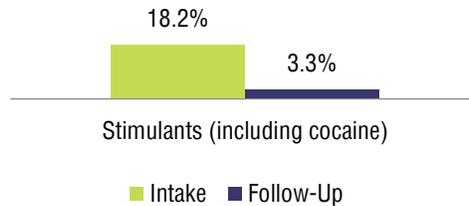
In the 12 months before entering treatment 18.2% of adolescents reported using stimulants (e.g., cocaine, speed, methamphetamine, Ritalin). The number of adolescents who reported using stimulants decreased by 81.8% to 3.3% at follow-up (see Figure 3.21).

The number of clients reporting stimulant use decreased by 82%

<sup>25</sup> Because number of months of CNS depressants were measured separately (e.g., barbiturates, tranquilizers), the value is a calculation of the maximum number of months clients used any of these specific types of CNS depressants.

FIGURE 3.21. PAST-12-MONTH USE OF STIMULANTS AT INTAKE AND FOLLOW-UP (n = 181)

↓ 81.8%\*\*\*

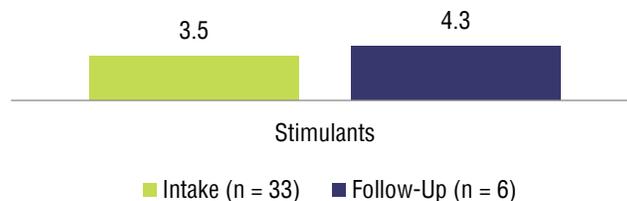


\*\*\*p < .001

### AVERAGE NUMBER OF MONTHS USED STIMULANTS

Among the clients who reported using stimulants in the 12 months before entering treatment (n = 33), they reported using stimulants on average 3.5 months (see Figure 3.22). Among a small number of clients (n = 6) who reported using stimulants at follow-up, they reported using an average of 4.3 months.

FIGURE 3.22. AMONG ADOLESCENTS WHO USED STIMULANTS, THE AVERAGE NUMBER OF MONTHS CLIENTS USED STIMULANTS AT INTAKE AND FOLLOW-UP



A small number of adolescents reported using stimulants in the 30 days before intake; thus examination of change from intake to follow-up is necessarily small and not appropriate for statistical tests (not depicted in a figure).

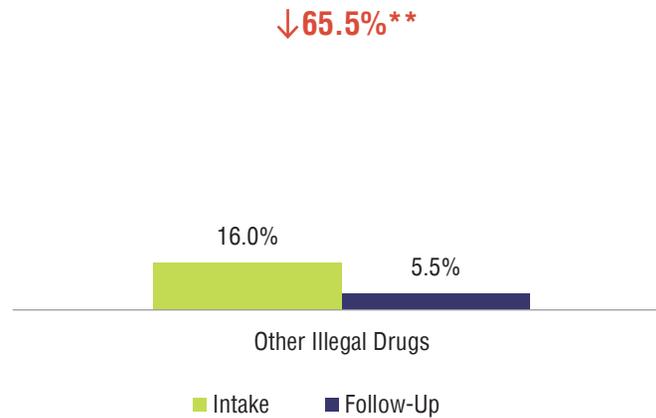
## OTHER ILLEGAL DRUG USE

### PAST-12-MONTH USE OF OTHER ILLEGAL DRUGS

Use of illegal drugs not included in any of the previous classes of substances (e.g., inhalants and hallucinogens) are presented here. About 1 in 6 adolescents reported using other illegal drugs in the 12 months before entering treatment. The number of adolescents who reported using other illegal drugs decreased by 65.5% to 5.5% at follow-up (see Figure 3.23).

The number of clients reporting other illegal drug use decreased by 66%

FIGURE 3.23. PAST-12-MONTH USE OF OTHER ILLEGAL DRUGS AT INTAKE AND FOLLOW-UP (n = 181)

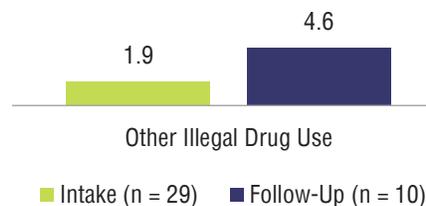


\*\*p < .01.

### AVERAGE NUMBER OF MONTHS USED OTHER ILLEGAL DRUGS

Among the clients who reported using other illegal drugs in the 12 months before entering treatment (n = 29), they reported using other illegal drugs on average 1.9 months (see Figure 3.24). Among clients who reported using other illegal drugs at follow-up (n = 10), they reported using an average of 4.6 months.<sup>26</sup>

FIGURE 3.24. AMONG ADOLESCENTS WHO USED OTHER ILLEGAL DRUGS, THE AVERAGE NUMBER OF MONTHS CLIENTS USED OTHER ILLEGAL DRUGS AT INTAKE AND FOLLOW-UP



A small number of adolescents reported using other illegal drugs in the 30 days before intake; thus examination of change in use of other illegal drugs from intake to follow-up is necessarily small and not appropriate for statistical tests used in this section of the report (not depicted in a figure).

“They taught me a lot and helped me a lot. They made me **WANT TO BE SOBER.**”  
-AKTOS FOLLOW-UP CLIENT

<sup>26</sup> Because number of months of other illegal drugs were measured separately (e.g., inhalants and hallucinogens), the value is a calculation of the maximum number of months clients used any of these specific types of other illegal drugs.

## ALCOHOL USE

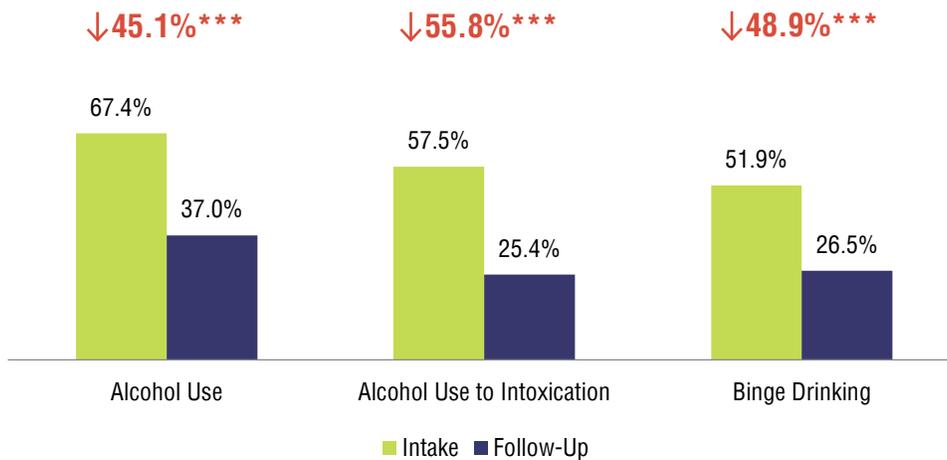
There were three measures of alcohol use including: (1) any alcohol use, (2) alcohol use to intoxication, and (3) binge drinking. Binge drinking was defined as having 5 or more alcoholic drinks for males and 4 or more for females in a period of about 2 hours.<sup>27</sup>

### PAST-12-MONTH ALCOHOL USE

The majority of clients (67.4%) reported using alcohol in the 12 months before entering treatment while a little more than one-third of adolescents reported alcohol use in the 12 months before follow-up (see Figure 3.25). Overall, for the AKTOS follow-up sample, there was a 45.1% decrease in the number of clients reporting any alcohol use. More than half of adolescents reported using alcohol to intoxication at intake. The number of adolescents who reported using alcohol to intoxication decreased by more than one-half (55.8%) to 25.4% at follow-up. Similarly there was a significant decrease of 48.9% in the number of clients who reported binge drinking from intake to follow-up (51.9% vs. 26.5%).

The number of clients reporting alcohol use decreased by 45%

FIGURE 3.25. PAST-12-MONTH USE OF ALCOHOL AT INTAKE AND FOLLOW-UP (N = 181)



\*\*\*p < .001

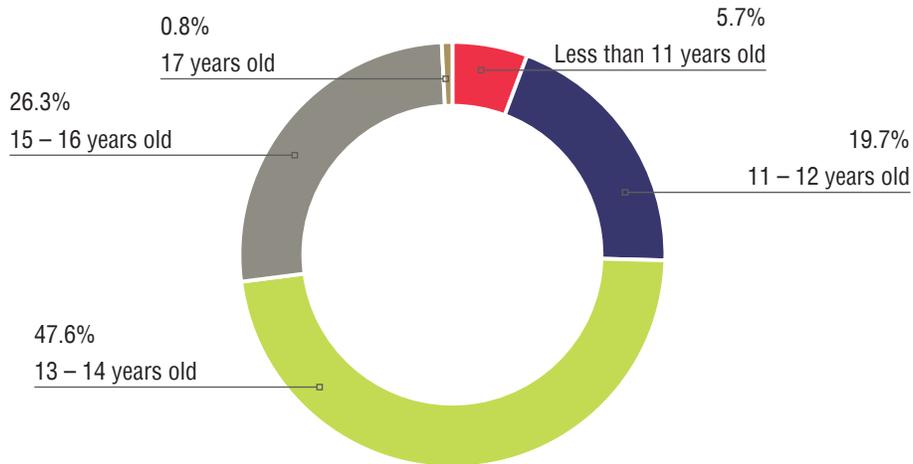
### AVERAGE AGE FIRST DRANK ALCOHOL (OTHER THAN A FEW SIPS)

Adolescents who reported using alcohol in the 12 months before intake were asked how old they were when they first had an alcoholic drink (other than a few sips). They were on average 13.4 years old when they had their first alcoholic drink (other than a few sips). Figure 3.26 shows the percentage of adolescents who reported having their first alcohol drink at different ages.

Adolescents were on average 13.4 years old when they first drank alcohol

<sup>27</sup> National Institute on Alcohol Abuse and Alcoholism [NIAAA]. (2004, Winter). NIAAA council approves definition of binge drinking. *NIAAA Newsletter, Winter 2004* (3). Rockville, MD: Department of Health and Human Services, National Institutes of Health, National Institute on Alcohol Abuse and Alcoholism.

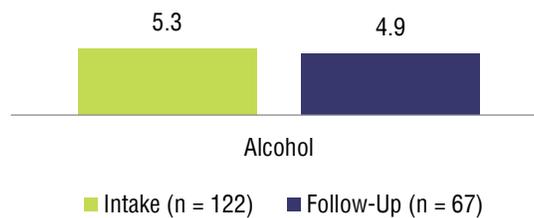
FIGURE 3.26. AVERAGE AGE CLIENT HAD FIRST ALCOHOLIC DRINK (n = 122)



### AVERAGE NUMBER OF MONTHS USED ALCOHOL

Figure 3.27 shows the number of months alcohol users reported using alcohol at intake and follow-up. Among the clients who reported using alcohol in the 12 months before entering treatment (n = 122), they reported using alcohol, on average, 5.3 months. Among clients who reported using alcohol in the 12 months before follow-up (n = 67), they reported using, on average, 4.9 months.

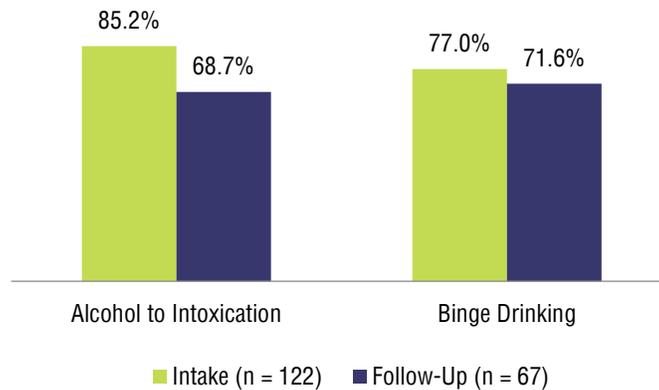
FIGURE 3.27. AMONG ADOLESCENTS WHO USED ALCOHOL, THE AVERAGE NUMBER OF MONTHS ADOLESCENTS USED ALCOHOL AT INTAKE AND FOLLOW-UP



### PAST-12-MONTH ALCOHOL INTOXICATION AND BINGE DRINKING AMONG THOSE WHO USED ALCOHOL

Of the clients who used alcohol in the 12 months before entering treatment (n = 122), 85.2% used alcohol to intoxication in the 12 months before intake and 77.0% binge drank alcohol (see Figure 3.28). Of the clients who used alcohol in the 12 months before follow-up (n = 67), 68.7% of clients reported alcohol use to intoxication and 71.6% binge drank alcohol.

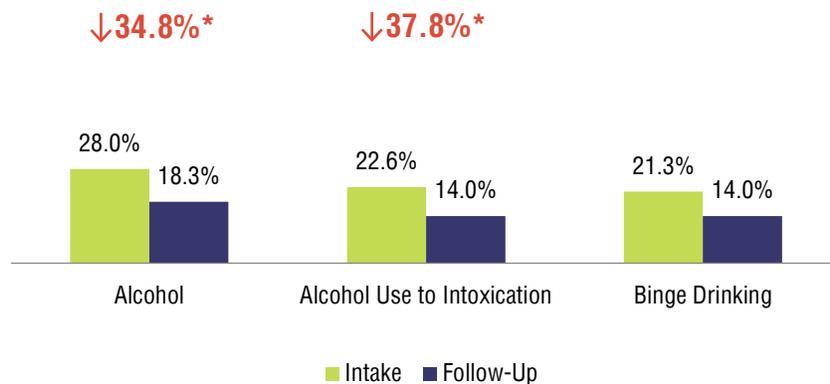
FIGURE 3.28. PAST-12-MONTH ALCOHOL USE TO INTOXICATION AND BINGE DRINKING AT INTAKE AND FOLLOW-UP, AMONG THOSE REPORTING ALCOHOL USE AT EACH POINT



### PAST-30-DAY ALCOHOL USE

The number of adolescents who reported using any alcohol and alcohol to intoxication decreased significantly from the 30 days before entering the program to the 30 days before follow-up (see Figure 3.29). The number of adolescents who reported binge drinking alcohol in the 30 day periods did not decrease significantly from intake to follow-up. About 1 in 7 individuals reported using alcohol to intoxication and binge drinking in the 30 days before follow-up.

FIGURE 3.29. PAST-30-DAY USE OF ALCOHOL AT INTAKE AND FOLLOW-UP (n = 164)



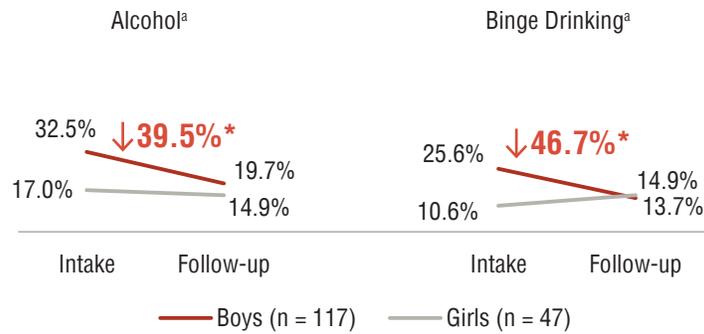
\*p < .05

### GENDER DIFFERENCES IN PAST-30-DAY ALCOHOL USE AND BINGE DRINKING

Significantly more boys than girls reported using alcohol and binge drinking in the 30 days before intake. Significantly fewer boys reported using alcohol and binge drinking in the 30 days before follow-up compared to the 30 days before intake. There was no statistically significant change in the percentage of girls who reported using alcohol and binge drinking in the 30 days before intake to the 30 days before follow-up, with similar percentages of boys and girls reporting past-30-day alcohol use and binge drinking at follow-up (see Figure 3.30).

Significantly more boys than girls reported using alcohol and binge drinking alcohol in the 30 days before intake

FIGURE 3.30. GENDER DIFFERENCES IN PAST-30-DAY ALCOHOL AND BINGE DRINKING AT INTAKE AND FOLLOW-UP



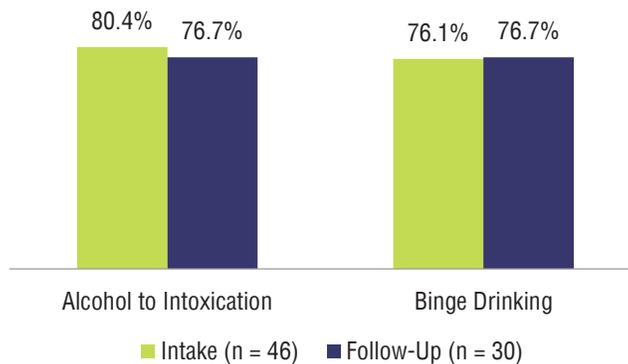
a—Significant difference by gender at intake,  $p < .05$ .  
 \* $p < .05$

### PAST-30-DAY ALCOHOL INTOXICATION AND BINGE DRINKING AMONG THOSE WHO USED ALCOHOL

Of the 46 adolescents who used alcohol in the 30 days before intake, 80.4% used alcohol to intoxication and 76.1% binge drank in the 30 days before intake (see Figure 3.31).

Of the 30 adolescents who reported using alcohol in the 30 days before follow-up, 76.7% reported using alcohol to intoxication and 76.7% reported binge drinking in the 30 days before follow-up.

FIGURE 3.31. PAST-30-DAY USE OF ALCOHOL TO INTOXICATION AND BINGE DRINKING, AMONG THOSE REPORTING ALCOHOL USE AT EACH POINT



“ I liked the fact that my counselor really HELPED ME and seemed to really CARE.”  
 -AKTOS FOLLOW-UP CLIENT

## SELF-REPORTED SEVERITY OF DRUG AND ALCOHOL USE

Another way to examine overall change in degree of severity of substance use is to use the Addiction Severity Index (ASI) composite scores for alcohol and drug use. These composite scores are computed based on self-reported severity of past-30-days alcohol and drug use, taking into consideration a number of issues including:

- the number of days of alcohol (or drug) use,
- money spent on alcohol,
- the number of days individuals used multiple drugs (for drug use composite score),
- the number of days individuals experienced problems related to their alcohol (or drug) use,
- how troubled or bothered they are by their alcohol (or drug) use, and
- how important treatment is to them for their alcohol (or drug) use (see sidebar).

Change in the average ASI composite for alcohol and drug use was examined for adolescents who were not in a controlled environment all 30 days before entering treatment or follow-up. Also, clients who reported abstaining from alcohol at both intake and follow-up were not included in the analysis of change in alcohol composite score. Similarly, clients who reported abstaining from drugs at both intake and follow-up were not included in the analysis of change in drug composite score.

Figure 3.32 displays the change in average composite scores.<sup>28</sup> The average for the alcohol composite score decreased significantly from 0.21 at intake to 0.09 at follow-up. The average for the drug composite score decreased significantly from 0.16 at intake to 0.04 at follow-up.

**The average ASI alcohol and drug composite scores decreased significantly from intake to follow-up**

<sup>28</sup> The following numbers of cases were not included in the analysis of change in alcohol composite score; 86 clients reported abstaining from alcohol at intake and follow-up and 24 were in a controlled environment all 30 days before treatment. The following numbers were not included in the analysis of change in drug composite score: 53 clients reported abstaining from drugs at intake and follow-up and 24 clients were in a controlled environment all 30 days before entering treatment.

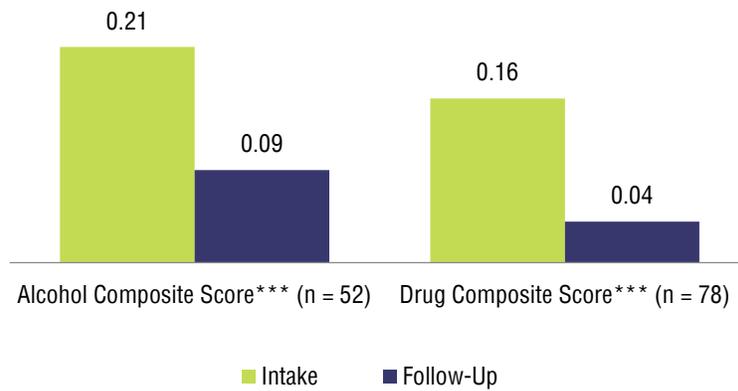
## ASI ALCOHOL AND DRUG COMPOSITE SCORES AND SUBSTANCE USE DISORDERS

Rikoon et al. (2006) conducted two studies to determine the relationship between the ASI composite scores for alcohol and drug use and DSM-IV substance dependence diagnoses. They identified alcohol and drug use composite score cutoffs that had 85% sensitivity and 80% specificity with regard to identifying DSM-IV substance dependence diagnoses: .17 for alcohol composite score and .16 for drug composite score. These composite score cutoffs can be used to estimate the number of individuals who are likely to meet criteria for active alcohol or drug dependence, and to show reductions in self-reported severity of substance use. In previous years we have used the ASI composite scores to estimate the number and percentage of clients who met a threshold for alcohol and drug dependence. However, recent changes in the diagnostics for substance abuse call into question the distinction between dependence and abuse. Thus, ASI composite scores that met the threshold can be considered indicative of severe substance use disorder to be compatible with current thinking about substance use disorders in the DSM-V, where we would have previously referred to them as meeting the threshold for dependence. Change from intake to follow-up in the severity rating as the same clinical relevance as moving from dependence to abuse in the older criteria.

Rikoon, S., Cacciola, J., Carise, D., Alterman, A., McLellan, A. (2006). Predicting DSM-IV dependence diagnoses from Addiction Severity Index composite scores. *Journal of Substance Abuse Treatment*, 31(1), 17–24.

American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders (5th ed.)*. Arlington, VA: American Psychiatric Publishing.

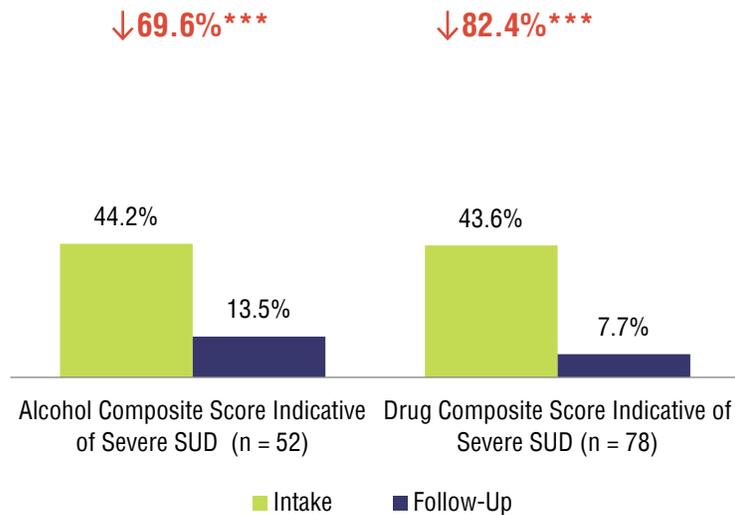
FIGURE 3.32. AVERAGE ASI ALCOHOL AND DRUG COMPOSITE SCORES AT INTAKE AND FOLLOW-UP



\*\*\*p < .001

The percentage of individuals who had ASI composite scores that met the cutoff for severe substance use disorder (SUD) decreased significantly from intake to follow-up (see Figure 3.33). A sizable minority of adolescents (44.2%) had an alcohol composite score that met the cutoff for severe SUD at intake, while only 13.5% had an alcohol composite score that met the cutoff for severe SUD at follow-up. This was a significant decrease of 69.6% in the number of adolescents who met criteria for severe alcohol use disorder. Among adolescents who did not report abstaining from drugs at both intake and follow-up, 43.6% met the cutoff score for severe drug use disorder at intake, while at follow-up only 7.7% of adolescents met criteria for severe drug use disorder—representing a significant decrease of 82.4%.

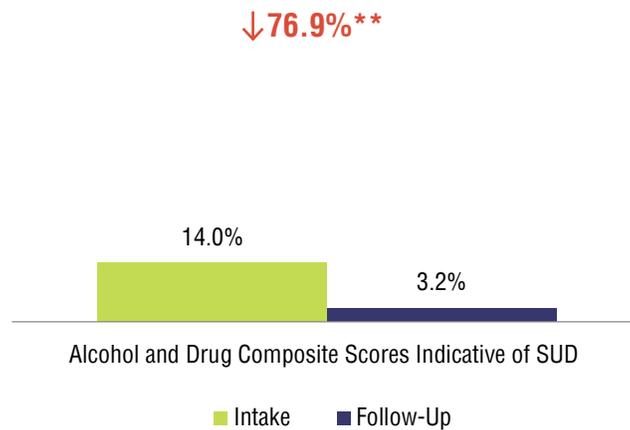
FIGURE 3.33. ADOLESCENTS WITH ASI COMPOSITE SCORES MEETING THE CUTOFF FOR SEVERE SUBSTANCE USE DISORDER AT INTAKE AND FOLLOW-UP



\*\*\*p < .001

Among the adolescents who were not in a controlled environment all 30 days before entering treatment and who reported using alcohol and/or drugs at intake or follow-up, 14.0% had alcohol and drug composite scores that met the cutoff for severe substance use disorder (see Figure 3.34). The percentage of clients who had composite scores that met the cutoff for dependence for both alcohol and drugs decreased significantly by 76.9% to only 3.2% at follow-up.

FIGURE 3.34. CLIENTS WITH ASI COMPOSITE SCORES MEETING THE CUTOFF FOR BOTH ALCOHOL AND DRUG SEVERE USE DISORDERS AT INTAKE AND FOLLOW-UP (n = 93)



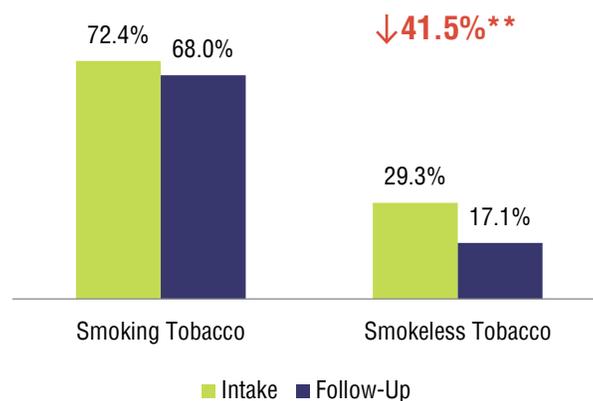
\*\*p < .01

## SMOKING TOBACCO AND SMOKELESS TOBACCO USE

### PAST-12-MONTH SMOKING TOBACCO AND SMOKELESS TOBACCO USE

Overall, there was no change in smoking tobacco use from intake to follow-up (see Figure 3.35). The majority of clients reported smoking tobacco in the 12 months before entering treatment (72.4%) and in the 12 months before follow-up (68.0%). Smaller percentages of clients reported using smokeless tobacco, with a significant decrease, from intake (29.3%) to follow-up (17.1%).

FIGURE 3.35. PAST-12-MONTH TOBACCO USE AT INTAKE AND FOLLOW-UP (N = 181)



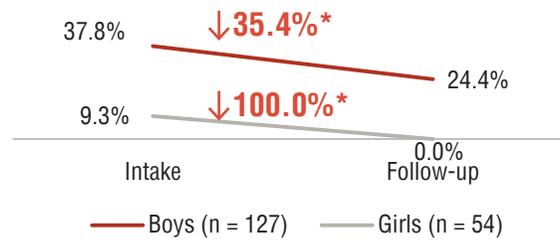
\*\*p < .01

### GENDER DIFFERENCES IN PAST-12-MONTH SMOKELESS TOBACCO USE

Significantly more boys than girls reported using smokeless tobacco at intake and follow-up (see Figure 3.36). Nonetheless, the number of boys and girls who reported using smokeless tobacco decreased significantly from intake to follow-up. Nearly 1 in 4 boys reported using smokeless tobacco in the 12 months before follow-up.

Significantly more boys than girls used smokeless tobacco at intake and follow-up

FIGURE 3.36. GENDER DIFFERENCES IN SMOKELESS TOBACCO USE AT INTAKE AND FOLLOW-UP (n = 181)<sup>a</sup>



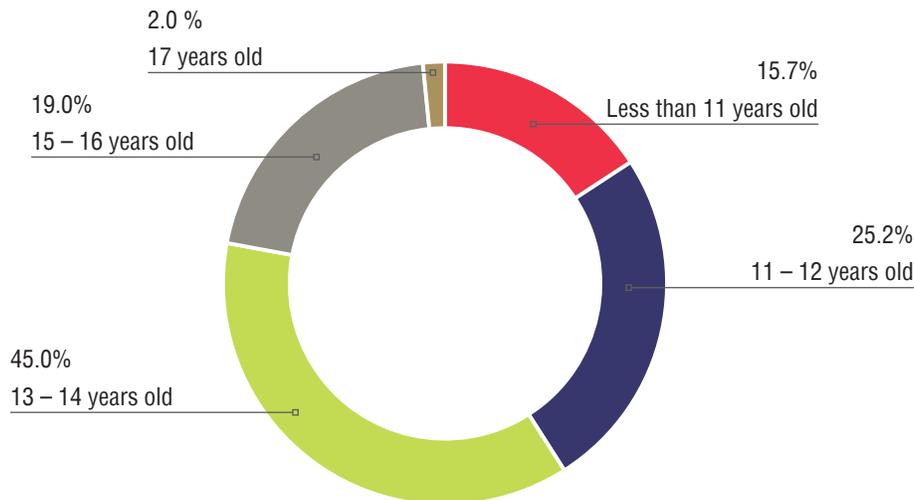
a—Significant gender differences at intake and follow-up;  $p < .001$ .  
\* $p < .05$

### AVERAGE AGE BEGAN SMOKING REGULARLY

Adolescents who reported smoking tobacco products in the 12 months before intake were asked how old they were when they began smoking regularly (i.e., on a daily basis). Among the 131 adolescents who reported smoking tobacco products, they began smoking regularly on average at age 12.7 years old.<sup>29</sup> Figure 3.37 shows the percentage of adolescents who reported beginning to smoke regularly at different ages.

Adolescents were on average **12.7 years old** when they began smoking tobacco regularly

FIGURE 3.37. AVERAGE AGE BEGAN SMOKING TOBACCO REGULARLY (n = 131)



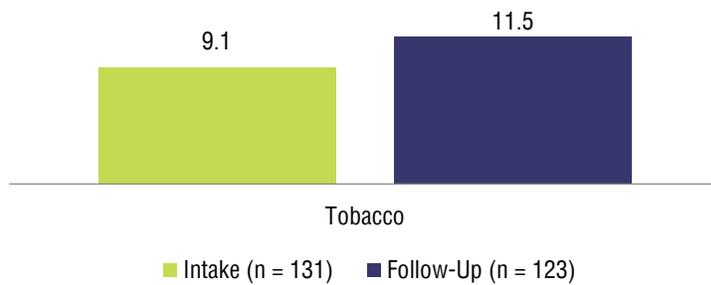
### AVERAGE NUMBER OF MONTHS OF TOBACCO USE

Figure 3.38 shows the number of months clients who used tobacco reported using tobacco at intake and follow-up. Among the clients who reported using tobacco in the 12 months before entering treatment (n = 131), they reported using tobacco, on average, 9.1 months. Among clients who reported using tobacco in the 12 months before follow-up (n = 123), they reported using, on average, 11.5 months.

“ I really liked my counselor. I felt like I could be honest with him. He HELPED ME OPEN UP.”  
-AKTOS FOLLOW-UP CLIENT

<sup>29</sup> Four adolescents who reported smoking tobacco in the 12 months before intake reported they had never begun smoking regularly, thus they did not report an age they began smoking.

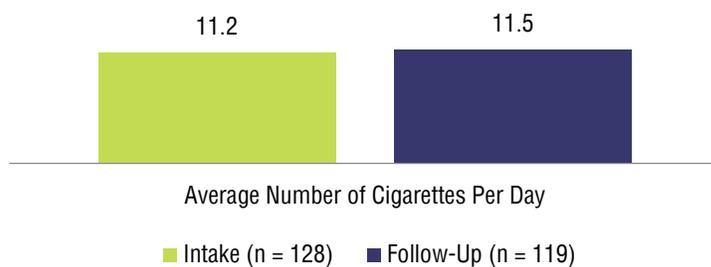
FIGURE 3.38. AMONG ADOLESCENTS WHO USED TOBACCO, THE AVERAGE NUMBER OF MONTHS OF TOBACCO USE AT INTAKE AND FOLLOW-UP



### AVERAGE NUMBER OF CIGARETTES SMOKED PER DAY

The average number of cigarettes clients reported smoking at intake and follow-up remained stable (see Figure 3.39). Of those who smoked tobacco at intake, clients reported smoking an average of 11.2 cigarettes in a day. At follow-up, among clients who reported smoking tobacco, they reported smoking an average of 11.5 cigarettes in a day.

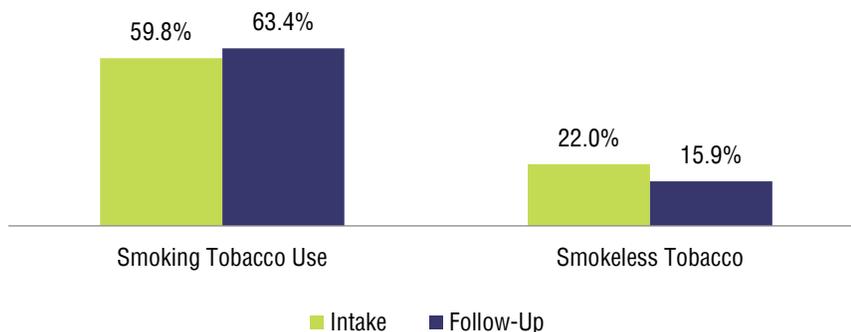
FIGURE 3.39. AVERAGE NUMBER OF CIGARETTES SMOKED PER DAY AT INTAKE AND FOLLOW-UP, AMONG THOSE WHO SMOKED



### PAST-30-DAY TOBACCO USE

The number of clients who reported any past-30-day smoking tobacco use did not change from intake to follow-up. Similarly, there was no change in the number of clients who reported smokeless tobacco use from intake to follow-up (see Figure 3.40).

FIGURE 3.40. PAST-30-DAY TOBACCO USE AT INTAKE AND FOLLOW-UP (N = 164)

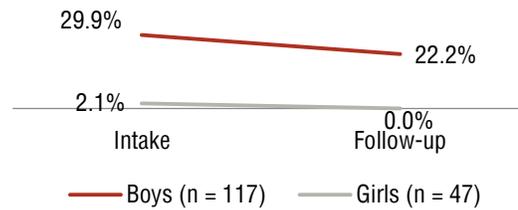


### GENDER DIFFERENCES IN PAST-30-DAY SMOKELESS TOBACCO USE

Significantly more boys than girls reported using smokeless tobacco at intake and follow-up (see Figure 3.41).

Significantly **more boys than girls used smokeless tobacco at intake and follow-up**

FIGURE 3.41. GENDER DIFFERENCES IN SMOKELESS TOBACCO USE AT INTAKE AND FOLLOW-UP (n = 164)<sup>a</sup>



a—Significant gender differences at intake and follow-up;  $p < .001$ .

## SECTION 4. BEHAVIORAL HEALTH

*This section examines change from pre-program compared to 12-month follow-up on six behavioral health measures: (1) depression symptoms, (2) anxiety-trauma symptoms, (3) attention deficit symptoms, (4) aggressive behavior, (5) criminal activities, and (6) suicidal ideation or attempts. Results for each targeted factor are presented for the overall sample and separately by gender when there were significant differences between male and female clients.*

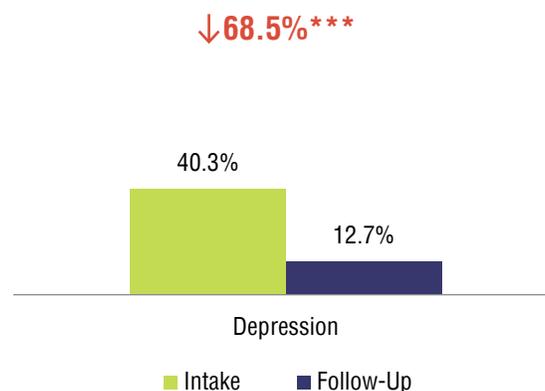
### DEPRESSION SYMPTOMS

To assess adolescents self-reported depression symptoms at intake and follow-up, five items from the Depression Symptom Scale in the GAIN-Quick instrument were included in the intake and follow-up surveys. Two items include criterion symptoms for depression: (1) “During the 12 months before you entered treatment, did you have significant problems with feeling very trapped, lonely, sad, blue, depressed, or hopeless about the future?” and (2) “During the 12 months before you entered treatment did you have significant problems with having no energy or losing interest or pleasure in work, school, friends, sex, or other things you cared about?”

Individuals who answered “Yes” to at least one of the criterion symptoms and at least one of the other three symptoms (e.g., sleep problems, somatic complaints, difficulty thinking, remembering, and concentrating) were classified as meeting study criteria for depression. Figure 4.1 shows the percentage of adolescents who met criteria for depression at intake and follow-up.

**The number of adolescents who met criteria for depression decreased by 69%**

FIGURE 4.1. MEETING STUDY CRITERIA FOR DEPRESSION AT INTAKE AND FOLLOW-UP (n = 181)



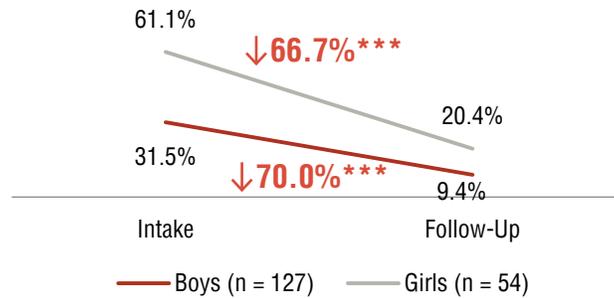
\*\*\*p < .001

### GENDER DIFFERENCES IN DEPRESSION SYMPTOMS

Compared to boys, significantly more girls met study criteria for depression at intake and follow-up (see Figure 4.2). The number of boys and girls who met criteria for depression decreased significantly from intake to follow-up.

**Significantly more girls met criteria for depression at intake and follow-up compared to boys**

FIGURE 4.2. GENDER DIFFERENCES IN MEETING STUDY CRITERIA FOR DEPRESSION<sup>a</sup>



a—Statistical difference by gender at intake ( $p < .001$ ) and follow-up ( $p < .05$ ).  
\*\*\* $p < .001$

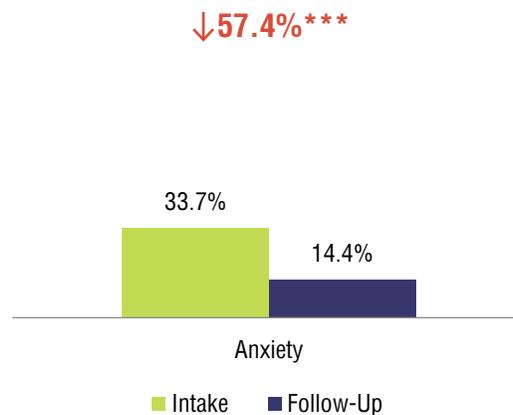
## ANXIETY SYMPTOMS

To assess for anxiety symptoms, three items from the Anxiety-Trauma Scale in the GAIN-Quick were included in the intake and follow-up surveys. One of the items measured a general symptom of generalized anxiety: “During the 12 months before you entered treatment, did you have significant problems with feeling very anxious, nervous, tense, scared, panicked or like something bad was going to happen?” Individuals who answered “Yes” to this item and at least one of the other two symptoms (i.e., having to repeat an action over and over, or having thoughts that kept running over in his/her mind, or trembling, having one’s heart race or feelings so restless that one could not sit still) met study criteria for anxiety.

The number of adolescents who met criteria for anxiety decreased significantly by more than half from intake to follow-up (see Figure 4.3).

The number of adolescents who met study criteria for anxiety decreased significantly from intake to follow-up

FIGURE 4.3. MEETING STUDY CRITERIA FOR ANXIETY AT INTAKE AND FOLLOW-UP (n = 181)



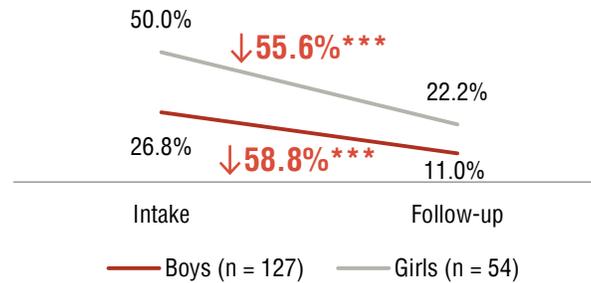
\*\*\*  $p < .001$

## GENDER DIFFERENCES IN ANXIETY SYMPTOMS

Compared to boys, significantly more girls met study criteria for anxiety at intake and follow-up (see Figure 4.4). The number of boys and girls who met criteria for anxiety decreased significantly from intake to follow-up.

Significantly more girls met criteria for anxiety at intake and follow-up compared to boys

FIGURE 4.4. GENDER DIFFERENCES IN MEETING CRITERIA FOR ANXIETY SYMPTOMS<sup>a</sup>



a—Statistical difference by gender at intake ( $p < .001$ ) and follow-up ( $p < .05$ ).  
\*\*\* $p < .001$ .

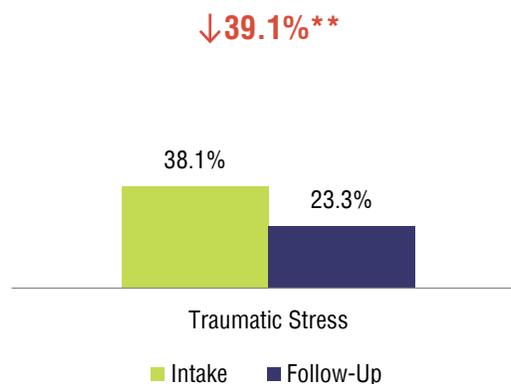
## TRAUMATIC STRESS SYMPTOMS

To assess for traumatic stress symptoms, four items from the Anxiety-Trauma Scale in the GAIN-Quick were included in the intake and follow-up surveys. One of the items measured a criterion symptom of traumatic stress: “During the 12 months before you entered treatment, when something reminded you of the past, you became very distressed and upset?” Individuals who answered “Yes” to this item and at least one of the other three symptoms (i.e., using alcohol or other drugs to help oneself sleep or forget about things that happened in the past, having a hard time expressing feelings, feeling guilty about things that happened because of feeling like one should have done something to prevent them) met study criteria for traumatic stress.

The number of adolescents who met criteria for traumatic stress decreased significantly 39.1% from intake to follow-up (see Figure 4.5).

**The number of adolescents who met study criteria for traumatic stress decreased significantly from intake to follow-up**

FIGURE 4.5. MEETING STUDY CRITERIA FOR TRAUMATIC STRESS AT INTAKE AND FOLLOW-UP ( $n = 180$ )<sup>30</sup>



\*\*  $p < .01$

## GENDER DIFFERENCES IN TRAUMATIC STRESS SYMPTOMS

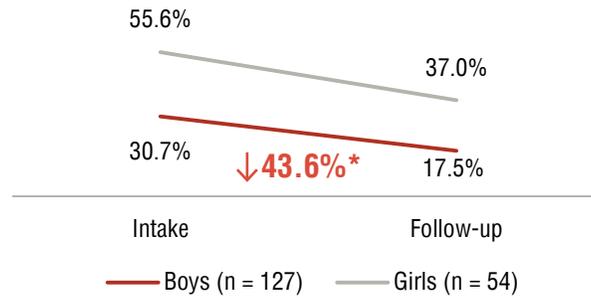
More than half of girls met study criteria for traumatic stress at intake, which was significantly higher than the number of boys (see Figure 4.6). The number of boys who met criteria for traumatic stress decreased significantly from intake to follow-up. Although the percentage of girls with traumatic stress symptoms decreased,

**Significantly more girls met criteria for traumatic stress at intake and follow-up compared to boys**

<sup>30</sup> There were missing values for the traumatic stress items at follow-up for one adolescent.

this change was not statistically significant.

FIGURE 4.6. GENDER DIFFERENCES IN MEETING CRITERIA FOR TRAUMATIC STRESS SYMPTOMS<sup>a</sup>



a—Statistical difference by gender at intake ( $p < .001$ ) and follow-up ( $p < .01$ ).  
\* $p < .05$ .

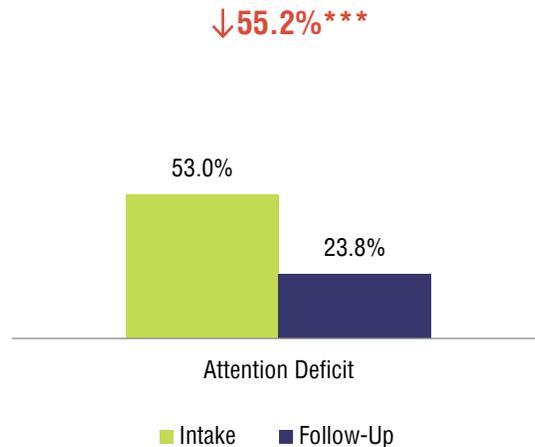
## ATTENTION DEFICIT SYMPTOMS

To assess for symptoms of attention deficit, six items from the Activity-Inattention Scale in the GAIN-Quick were included in the intake and follow-up surveys. An example of an item is “During the 12 months before you entered treatment, did you do the following things two or more times: Had a hard time listening to instructions at school, work or home?” Adolescents who answered “Yes” to at least two of the six symptoms were classified as meeting study criteria for attention deficit.

The number of adolescents who met criteria for attention deficit decreased significantly by more than one-half from intake to follow-up (see Figure 4.7).

The number of adolescents who met study criteria for attention deficit decreased significantly from intake to follow-up

FIGURE 4.7. MEETING STUDY CRITERIA FOR ATTENTION DEFICIT SYMPTOMS AT INTAKE AND FOLLOW-UP (n = 181)



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

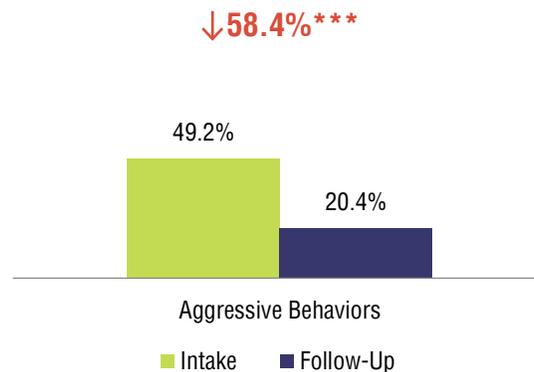
## AGGRESSIVE BEHAVIOR

To assess for aggressive behavior, four items from the Behavior Problem Scale in the GAIN-Quick were included in the intake and follow-up surveys. An example of one of the four behaviors is: “During the 12 months before you entered treatment, did you do the following things two or more times: Been a bully or threatened other people?”

The percentage of adolescents who reported at least two aggressive behaviors at intake and follow-up are presented in Figure 4.8. The number of adolescents who reported aggressive behaviors decreased by more than one-half from intake to follow-up.

**The number of adolescents who reported aggressive behaviors decreased by 58% from intake to follow-up**

FIGURE 4.8. REPORTED TWO OR MORE AGGRESSIVE BEHAVIORS AT INTAKE AND FOLLOW-UP (n = 181)



\*\*\*p < .001

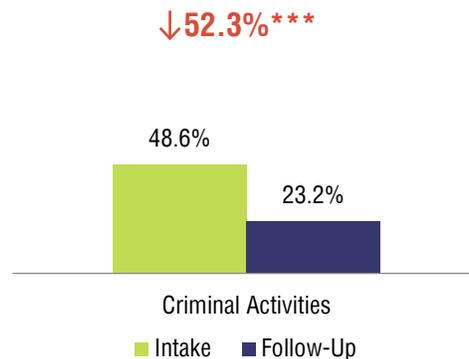
## CRIMINAL ACTIVITIES

To assess for involvement in criminal activity, three items from the General Crime Scale in the GAIN-Quick were included in the intake and follow-up surveys. An example of an item is: “During the past 12 months, have you purposely damaged or destroyed property that did not belong to you?” The other two items asked about stealing, and selling or distributing illegal drugs.

**Adolescents' self-reported involvement in criminal activity decreased significantly from intake to follow-up**

The percentage of adolescents who reported engaging in criminal activity decreased significantly from 48.6% at intake to 23.2% at follow-up (see Figure 4.9).

FIGURE 4.9. CRIMINAL ACTIVITIES AT INTAKE AND FOLLOW-UP (n = 181)



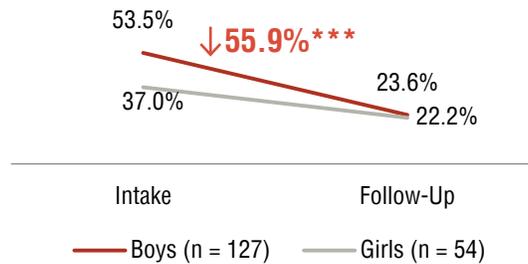
\*\*\*p < .001

## GENDER DIFFERENCES IN CRIMINAL ACTIVITIES

At intake, significantly more boys (53.5%) than girls (37.0%) reported engaging in at least one of the three types of criminal activities measured when compared (see Figure 4.10). The number of boys who reported criminal activity decreased significantly from intake to follow-up. At follow-up, there was no significant difference in the number of boys and girls who reported criminal activity.

Compared to girls, significantly more boys reported criminal activities at intake

FIGURE 4.10. GENDER DIFFERENCES IN CRIMINAL ACTIVITIES AT INTAKE AND FOLLOW-UP<sup>a</sup>

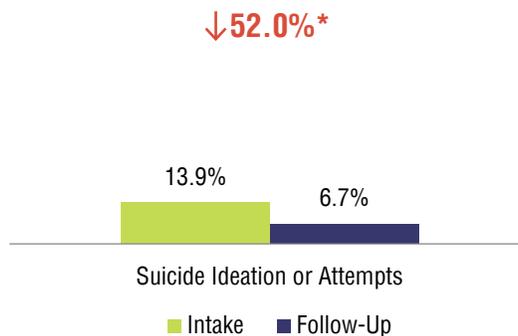


a—Statistical difference by gender at intake;  $p < .05$ .  
 \*\*\* $p < .001$

## SUICIDAL IDEATION AND/OR ATTEMPTS

Suicidal ideation and attempts were measured with self-reported questions about thoughts of suicide and actual attempts to commit suicide (e.g., suicidality). The number of adolescents who reported suicidality decreased significantly from intake to follow-up (see Figure 4.11). Nonetheless, almost 7% reported suicidality in the 12 months before follow-up.

FIGURE 4.11. ADOLESCENTS REPORTING SUICIDAL IDEATION AND/OR ATTEMPTS AT INTAKE AND FOLLOW-UP (n = 180)<sup>31</sup>



\* $p < .05$

<sup>31</sup> One case had missing data on thoughts of suicide and attempts at follow-up.

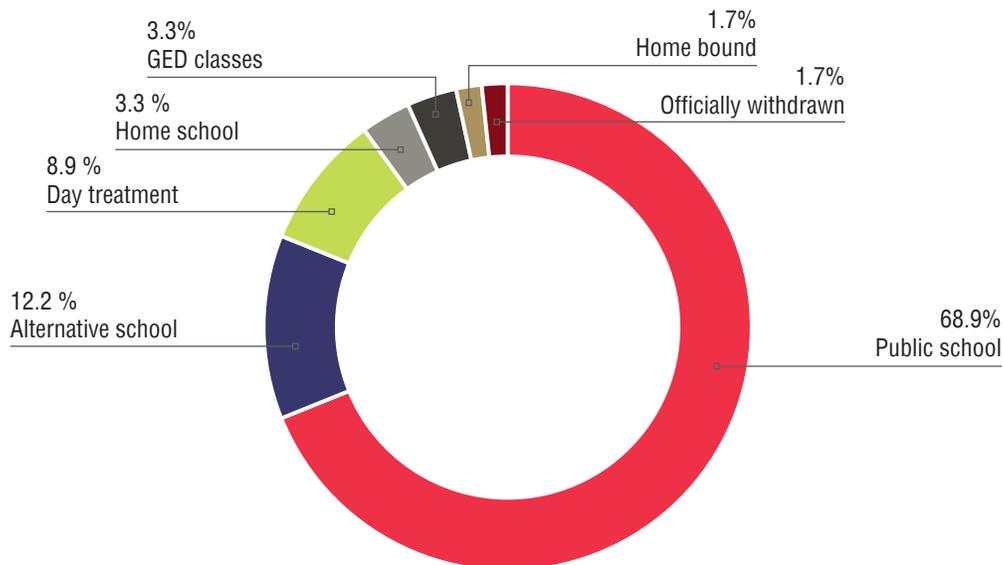
## SECTION 5. EDUCATION AND EMPLOYMENT

*This section examines changes in education and employment from pre-program to 12-month follow-up. Specifically, this subsection presents data on: (1) attending school, (2) grade point average, (3) school absences for any reason and specifically for disciplinary reasons, (4) detention, suspension, and expulsion, (5) education status for individuals 18 years old and older, and (6) employment status among those who were attending school and among those who were not attending school.*

### ATTENDING SCHOOL

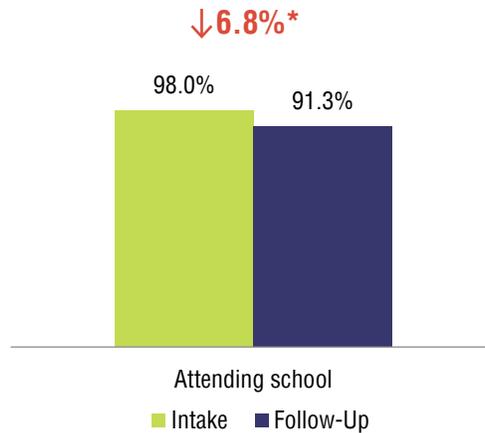
At intake, only one individual (0.6%) had a high school diploma. Of the remaining 180 adolescents, the vast majority reported they were currently attending school or taking GED classes at intake (98.3%), with only 1.7% reporting they were officially withdrawn from school (see Figure 5.1). The largest percentage of youth were enrolled in public school (68.9%), followed by 12.2% in alternative school, and 8.9% in day treatment.

FIGURE 5.1. PERCENTAGE OF ADOLESCENTS ATTENDING DIFFERENT TYPES OF SCHOOLS AT INTAKE, AMONG THOSE WITH LESS THAN A HIGH SCHOOL DIPLOMA (n = 180)



Of the 150 individuals who had not received their high school diploma by follow-up, Figure 5.2 shows the percentage enrolled in school (including public, private, alternative, day treatment, home school, and GED classes) at intake and follow-up. There was a significant decrease in the number of youth attending school, with the decrease for girls greater than the decrease for boys: a decrease of 11.1% for girls and a non-significant decrease for boys (not depicted in a figure).

FIGURE 5.2 AMONG ADOLESCENTS WITH LESS THAN A HIGH SCHOOL DIPLOMA AT FOLLOW-UP, THE PERCENTAGE ATTENDING SCHOOL AT INTAKE AND FOLLOW-UP (n = 150)



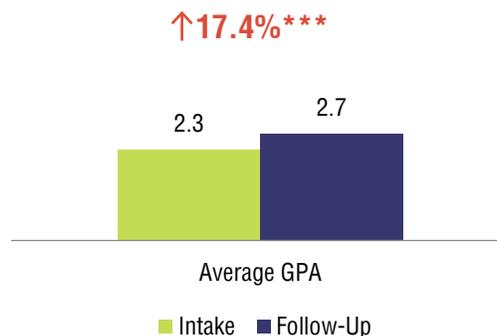
\*p < .05

## GRADE POINT AVERAGE

Among adolescents who were enrolled in school at intake and follow-up, adolescents' academic performance was assessed by examining their self-reported grade point average (GPA; see Figure 5.3). The highest GPA is 4.0, equivalent to an A, and the lowest GPA is a 0.0, equivalent to an F or E. At intake, the average GPA was 2.3 (nearly a low C). At follow-up, adolescents' average GPA had increased significantly to 2.7 (closer to a B than a C).

Self-reported GPA increased significantly from intake to follow-up

FIGURE 5.3. AMONG THOSE ENROLLED IN SECONDARY SCHOOL AT INTAKE AND FOLLOW-UP (N = 126)<sup>32</sup>, SELF-REPORTED AVERAGE GPA



\*\*\*p < .001

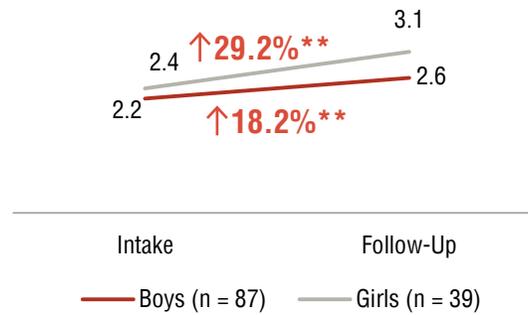
## GENDER DIFFERENCES IN SELF-REPORTED GPA

Boys and girls reported similar average GPAs at intake; however, at follow-up, girls reported significantly higher GPAs than boys (see Figure 5.4). Both boys' and girls' average GPA increased from intake to follow-up.

At follow-up girls reported, on average, a higher GPA when compared to boys

<sup>32</sup> 130 adolescents had less than a high school diploma or GED at follow-up and were enrolled in school at intake and follow-up. Data on grades was missing for 4 adolescents at follow-up: 3 did not know their average grade, and for 1 the interviewer skipped the question in error.

FIGURE 5.4. GENDER DIFFERENCES IN AVERAGE GPA AT INTAKE AND FOLLOW-UP<sup>a</sup>



a—Statistical difference by gender at follow-up;  $p < .01$ .  
 \*\* $p < .01$

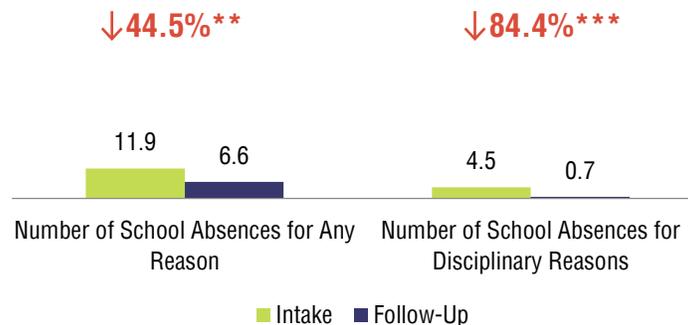
## SCHOOL ABSENCES FOR ANY REASON AND FOR DISCIPLINARY REASONS

Youth who had less than a high school diploma or GED were asked if they had attended school in the past 3 months it was in session. For those who answered yes, they were asked several questions in the intake and follow-up surveys about the number of days they missed for various reasons in the past 3 months.

Among those who were enrolled in school in the past 3 months at both intake and follow-up, the average number of school absences decreased significantly by 44.5% from 11.9 days at intake to 6.6 days at follow-up (see Figure 5.5). Not only was there a significant decrease in total school absences, but also there was a significant decrease in the average number of absences for disciplinary reasons (e.g., in-school and out-of-school suspension, and expulsion). The average number of absences due to suspension or expulsion decreased by 84.4%.

The number of **school absences** decreased significantly by **45%** from intake to follow-up

FIGURE 5.5. AMONG THOSE ENROLLED IN SCHOOL IN THE PAST 3 MONTHS SCHOOL WAS IN SESSION AT INTAKE AND FOLLOW-UP ( $n = 116$ )<sup>33</sup>, AVERAGE NUMBER OF SCHOOL ABSENCES



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

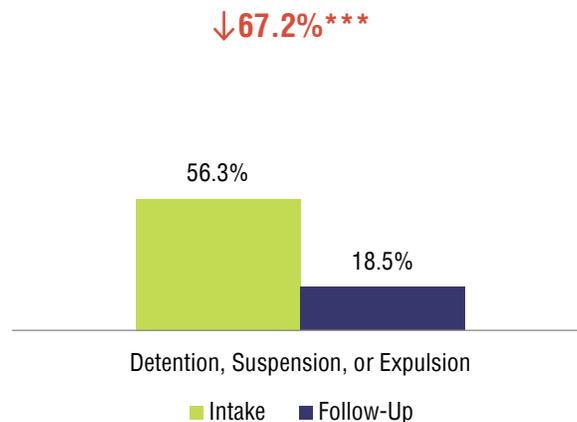
<sup>33</sup> 119 individuals reported they were enrolled in school at in the 3 months before intake and the 3 months before follow-up but 3 of these individuals had missing values on the number of days they missed school for various reasons at follow-up.

## DETENTION, SUSPENSION, AND EXPULSION

The number of adolescents who reported being in detention, suspended, or expelled in the past 3 months school was in session decreased significantly by 67.2% from intake to follow-up (see Figure 5.6). At intake, the majority of individuals (56.3%) reported they had been in detention, suspended, or expelled, whereas at follow-up, this had decreased to 18.5%.

The number of youth in detention, suspension, or expelled decreased by 67%

FIGURE 5.6. AMONG THOSE ENROLLED IN SCHOOL IN THE PAST 3 MONTHS SCHOOL WAS IN SESSION AT INTAKE AND FOLLOW-UP (n = 119), THE PERCENTAGE OF CLIENTS WHO WERE IN DETENTION OR EXPELLED

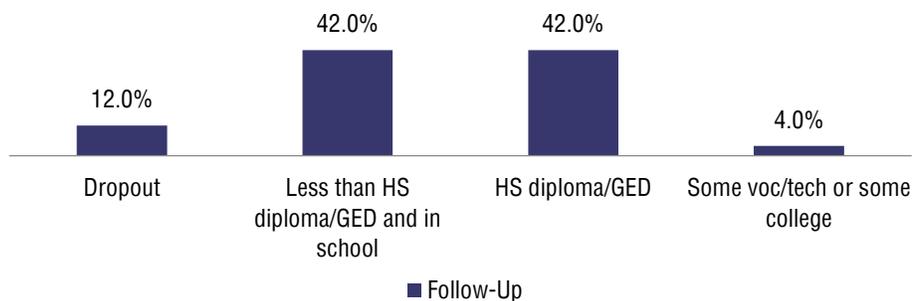


\*\*\*p < .001

## EDUCATION STATUS AMONG INDIVIDUALS 18 YEARS OLD AND OLDER

Because all of the adolescents were under 18 years old at intake, it was expected that only a small number of individuals would already have a high school diploma or GED; in fact, only one individual (0.6%) reported he or she had already attained a high school diploma or GED at intake. However, by follow-up, 51 individuals were 18 (or 19) years old. Because this is an age when a typical individual graduates from high school, we examined the education status at follow-up of this subsample (see Figure 5.7). Among these individuals, 12.0% were not enrolled in school and had less than a high school diploma or GED (i.e., dropout); these are the individuals that cause the greatest concern. A significant minority (42.0%) had less than a high school diploma or GED and they were enrolled in secondary school, GED classes, or were enrolled in online classes (not clear which types of classes). About 2 in 5 (42.0%) had attained a high school diploma or GED by follow-up and 4.0% had completed some college by follow-up.

FIGURE 5.7. EDUCATION STATUS AT FOLLOW-UP AMONG CLIENTS 18 YEARS OLD AND OLDER (N = 50)<sup>34</sup>



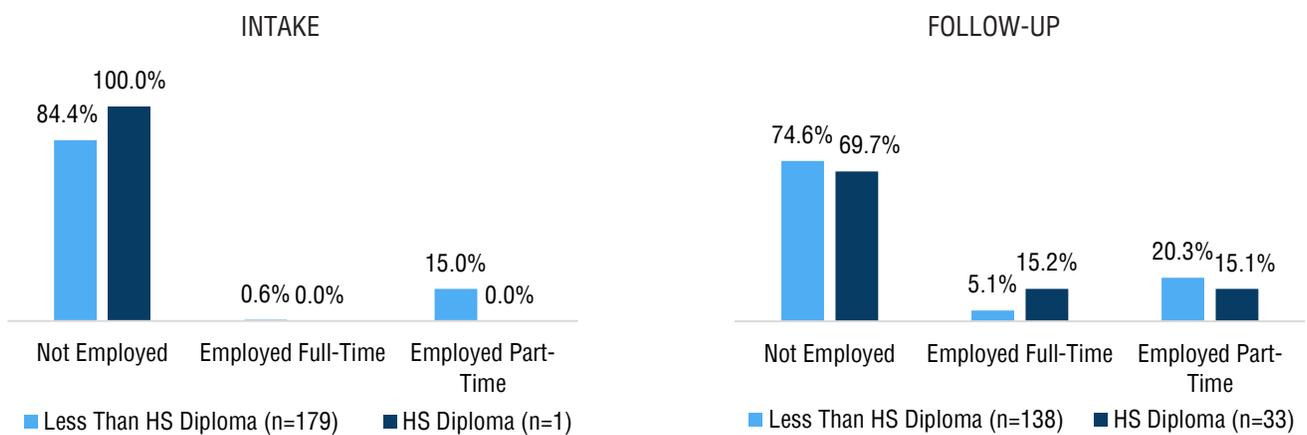
<sup>34</sup> One of the individuals aged 18 and older at follow-up had a missing value for highest level of education at follow-up.

## EMPLOYMENT

Adolescents' current employment is reported separately for those who had less than a high school diploma/GED and those who had a high school diploma/GED at each period (see Figures 5.8A & 5.8B). The majority of adolescents reported being unemployed at intake, regardless of whether they had attained a high school diploma. Only one individual reported having a high school diploma/GED at intake and this individual reported being unemployed at intake.

At follow-up, the majority of individuals reported being unemployed. Among individuals who had attained a high school diploma/GED at follow-up, 15.2% were employed full-time and 15.1% were employed part-time (see Figure 5.8B). Among individuals who did not have a high school diploma/GED at follow-up, 5.1% were employed full-time and 20.3% were employed part-time at follow-up.

FIGURE 5.8A & 5.8B. EMPLOYMENT STATUS BY COMPLETION OF HIGH SCHOOL DIPLOMA/GED AT INTAKE AND FOLLOW-UP<sup>35,36</sup>



<sup>35</sup> One case had a missing value for highest level of education at intake and is not included in the figure for intake data.

<sup>36</sup> Eight cases had missing data for current employment status at follow-up; 7 in the group of individuals with less than HS diploma and one with a HS diploma.

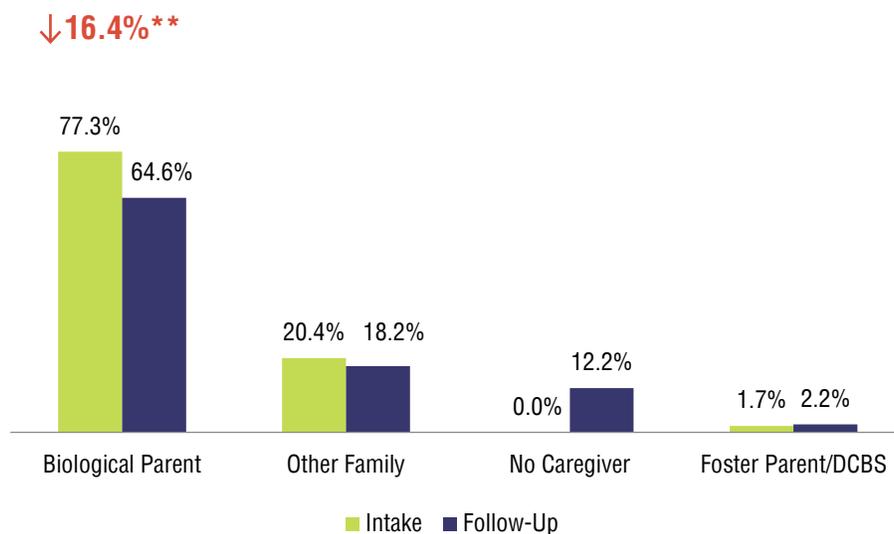
## SECTION 6. LIVING SITUATION

This section of target factors examines change in clients' living situation before they entered treatment and at 12-month follow-up. Specifically, clients are asked at both periods about: (1) their primary caregiver, and (2) the types of residences they had lived in the past 12 months (i.e., parents' home, other relatives' home, foster care, institutional facility, on their own).

### PRIMARY CAREGIVER

The majority of youth reported at intake and follow-up that their primary caregiver was their biological parent (see Figure 6.1). At intake and follow-up the next most frequently reported caregiver was other family (including kinship foster care and adoptive parents). There was a significant increase in the number of individuals who were living independently from intake to follow-up.<sup>37</sup> This increase in the number of individuals who had no caregiver was related to their age. Of the 22 individuals who reported at follow-up that they had no primary caregiver, 81.8% were 18 years old at the time of the follow-up survey.

FIGURE 6.1. PRIMARY CAREGIVER AT INTAKE AND FOLLOW-UP (n = 181)



\*\*p < .01

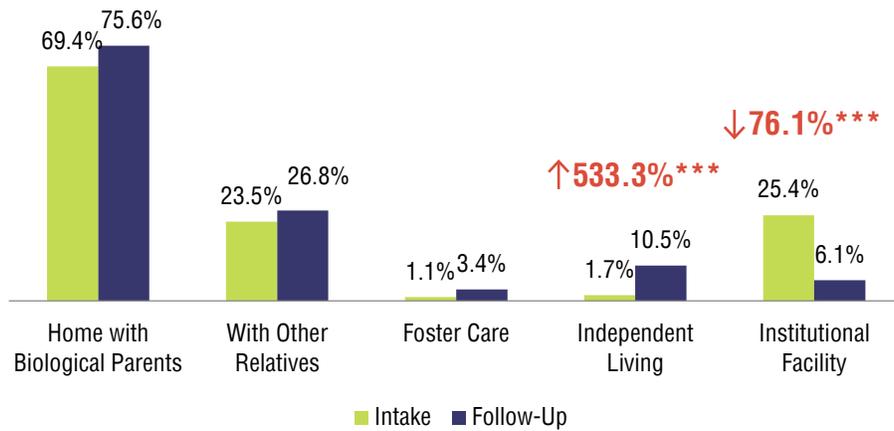
### LIVING SITUATION

Individuals were asked to report all the types of residences they lived in the prior 12 months at intake and follow-up; because individuals could report more than one type of residence the categories presented in Figure 6.2 are not mutually exclusive. The majority of youth reported at intake and follow-up that they had lived with their biological parents at home in the prior 12 months (see Figure 6.2). About one-fourth reported at intake and follow-up they had lived with other relatives (including kinship foster care). A very small number of individuals reported living in foster care at intake and follow-up. The number of individuals who reported they had lived independently (e.g., on their own, in a school dormitory) increased more than five-fold from intake to follow-up, which is not unexpected given their aging. Finally, the number of individuals who reported they had lived in an

<sup>37</sup> Percent change cannot be calculated for the category no caregiver because 0 individuals reported this option at intake. Percent change is meaningless when the first number is 0.

institutional setting (e.g., juvenile detention, residential treatment, group home) decreased 76.1% at follow-up.

FIGURE 6.2. LIVING SITUATION IN THE 12 MONTHS BEFORE INTAKE AND FOLLOW-UP (n = 181)<sup>38</sup>



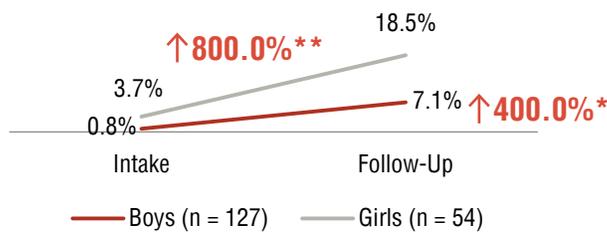
\*\*\*p < .001

### GENDER DIFFERENCES IN LIVING INDEPENDENTLY

Similar percentages of boys and girls reported they lived independently (including in a school dormitory) in the 12 months before they entered treatment; whereas at follow-up, significantly more girls than boys reported they had lived independently in the past 12 months (see Figure 6.3).

At follow-up, significantly more girls had lived independently when compared to boys

FIGURE 6.3. GENDER DIFFERENCES IN LIVING INDEPENDENTLY AT INTAKE AND FOLLOW-UP<sup>a</sup>



a—Statistical difference by gender at follow-up; p < .05.  
\* p < .05, \*\*p < .01

<sup>38</sup> Two cases had missing values on variables for living with other family and foster care at intake because they completed older versions of the survey that combined foster care (non-kinship) with kinship foster care, which should not be included as foster care.

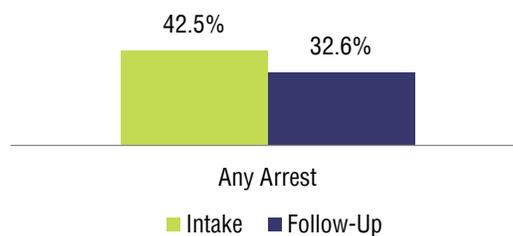
## SECTION 7. JUSTICE SYSTEM INVOLVEMENT

*This section describes self-reported change in client involvement with the justice system during the 12-month period before entering treatment and the 12-month period before the follow-up interview. Specifically, results include changes in: (1) any arrest, (2) the number of times arrested, (3) types of criminal offenses among those with arrests, (4) incarceration; (5) the number of nights incarcerated among those who reported being incarcerated, and (6) supervision by the justice system.*

### ARRESTS

At intake clients were asked about their arrests in the 12 months before they entered treatment. At follow-up clients were asked about their arrests in the 12 months prior to the follow-up interview. Less than half of the adolescents (42.5%) reported an arrest in the 12 months before entering treatment, with a non-significant decrease at follow-up (see Figure 7.1).

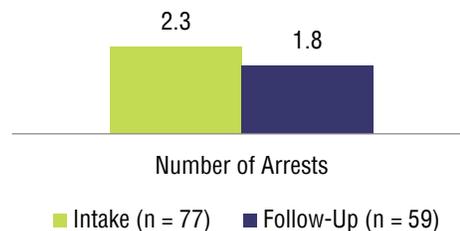
FIGURE 7.1. PERCENTAGE OF CLIENTS REPORTING ARRESTS IN THE PAST 12 MONTHS AT INTAKE AND FOLLOW-UP  
(n = 181)



### AVERAGE NUMBER OF ARRESTS, AMONG THOSE WITH AN ARREST

Among those individuals who reported any arrests at each period, the average number of arrests are presented in Figure 7.2.

FIGURE 7.2. AVERAGE NUMBER ARRESTS AT INTAKE AND FOLLOW-UP, AMONG THOSE WITH AT LEAST ONE ARREST

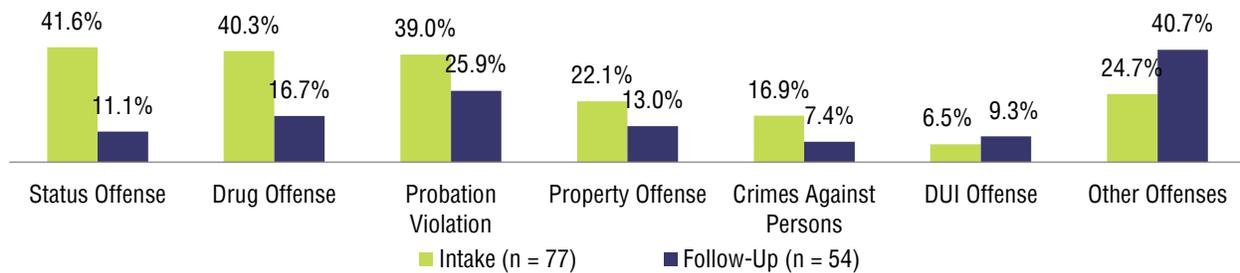


## TYPES OF CRIMINAL CHARGES

Adolescents who reported being arrested were asked to report the criminal charges they were given (e.g., crimes against persons, property crime, drug charges, DUI, status offenses, and other offenses) in the 12 months before intake and follow-up.<sup>39</sup> Figure 7.3 shows the percentage of adolescents who reported being charged with different types of offenses among those who reported being arrested at intake (n = 77) and follow-up (n = 54).<sup>40</sup>

At intake, among the individuals who reported any arrest, the most frequently mentioned charges were for status offenses, drug offenses, and probation violation

FIGURE 7.3. PERCENTAGE OF ADOLESCENTS WHO WERE CHARGED WITH DIFFERENT TYPES OF CRIMINAL OFFENSES, AMONG THOSE WHO REPORTED BEING ARRESTED AT INTAKE AND FOLLOW-UP

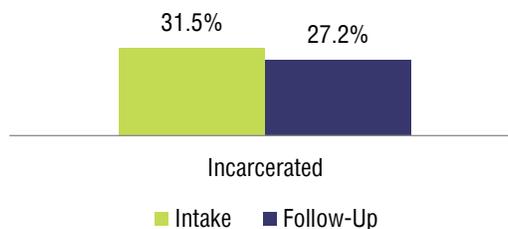


## INCARCERATION

Nearly 1 in 3 adolescents (31.5%) reported spending at least one night incarcerated in the 12 months prior to entering treatment (See Figure 7.4). At follow-up, 27.2% of adolescents reported spending at least one night incarcerated in the past 12 months, which was a non-significant decrease.

The number of adolescents who reported being incarcerated in the past 12 months remained stable from intake to follow-up

FIGURE 7.4. PERCENTAGE OF CLIENTS REPORTING INCARCERATION IN THE 12 MONTHS BEFORE INTAKE AND FOLLOW-UP (n = 181)



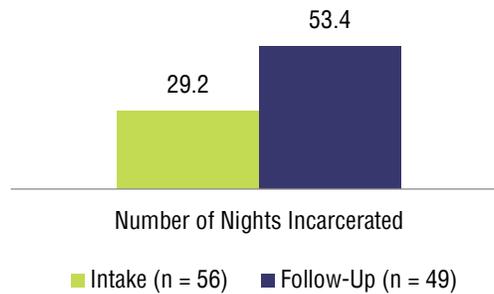
<sup>39</sup> One or more charges for each offense type was recoded into a categorical variable (Yes/No).

<sup>40</sup> Five cases had missing values for the type of criminal offenses the individual was charged with at follow-up.

## AVERAGE NUMBER OF NIGHTS INCARCERATED

Even though there was a slight, but non-significant decrease in the number of individuals who were incarcerated at follow-up, the number of self-reported nights incarcerated was higher at follow-up than at intake (see Figure 7.5).

FIGURE 7.5. AVERAGE NUMBER OF NIGHTS INCARCERATED IN THE 12 MONTHS BEFORE INTAKE AND FOLLOW-UP, AMONG THOSE WHO WERE INCARCERATED

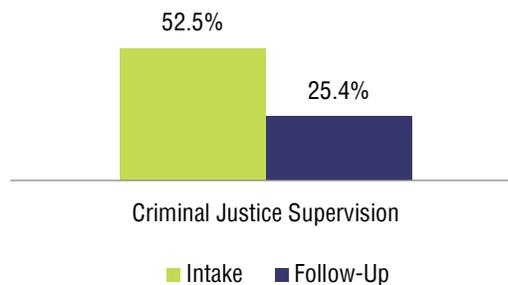


## SELF-REPORTED JUSTICE SYSTEM SUPERVISION

The number of youth who self-reported they were under justice system supervision (e.g., drug court or probation) decreased significantly by 51.6% from 52.5% at intake to 25.4% at follow-up (see Figure 7.6).

FIGURE 7.6. PERCENTAGE OF CLIENTS REPORTING SUPERVISION BY THE JUSTICE SYSTEM AT INTAKE AND FOLLOW-UP (n = 181)

↓51.6%\*\*\*



\*\*\*p < .001

## SECTION 8. RECOVERY SUPPORTS

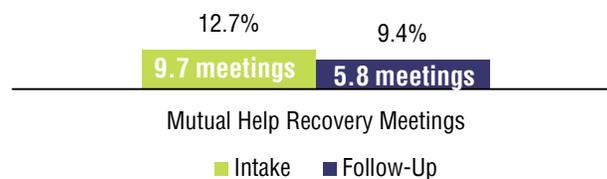
*This section focuses on three main changes in recovery supports: (1) percentage of clients attending mutual help recovery group meetings; (2) recovery supportive interactions with family/friends in the past 30 days; and (3) the number of people the participant said they could count on for recovery support.*

### MUTUAL HELP RECOVERY GROUP MEETINGS

At intake, only 12.7% of clients reported going to mutual help recovery group meetings (e.g., AA, NA, or faith-based) in the past 30 days (See Figure 8.1). At follow-up, 9.4% of clients reported they had gone to mutual help recovery group meetings in the past 30 days. Among those who attended meetings, the average number of meetings attended in the past 30 days was 9.7 at intake and 5.8 at follow-up.

The percentage of clients reporting attending mutual help recovery groups remained low and stable from intake to follow-up

FIGURE 8.1. PARTICIPATION IN MUTUAL HELP RECOVERY GROUP MEETINGS AT INTAKE AND FOLLOW-UP (n=181)

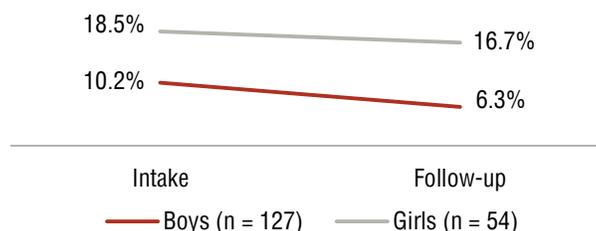


### GENDER DIFFERENCES IN MUTUAL HELP RECOVERY GROUP MEETINGS

There was no significant change from intake to follow-up in the number of boys or girls who attended mutual help recovery group meetings (see Figure 8.2). Compared to boys, significantly more girls reported attending mutual help recovery group meetings in the 12 months before follow-up.

Significantly more girls reported attending mutual help recovery group meetings at follow-up compared to boys

FIGURE 8.2. GENDER DIFFERENCES IN MUTUAL HELP RECOVERY GROUP MEETING ATTENDANCE (n = 181)<sup>a</sup>



<sup>a</sup>— Significant difference by gender at follow-up;  $p < .05$

## AVERAGE NUMBER OF PEOPLE ADOLESCENTS COULD COUNT ON FOR RECOVERY SUPPORT

The average number of people adolescents reported that they could count on for recovery support increased slightly but not significantly from intake to follow-up (see Figure 8.3).

FIGURE 8.3. AVERAGE NUMBER OF PEOPLE ADOLESCENTS COULD COUNT ON FOR RECOVERY SUPPORT AT INTAKE AND FOLLOW-UP (n = 178)<sup>41</sup>

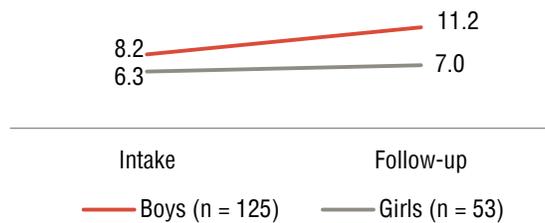


## GENDER DIFFERENCES IN AVERAGE NUMBER OF PEOPLE ADOLESCENTS COULD COUNT ON FOR RECOVERY SUPPORT

Compared to girls, boys reported having significantly more people they could count on for recovery support in the 12 months before follow-up (see Figure 8.4).

**Boys reported having more people they could count on for recovery support at follow-up than girls**

FIGURE 8.4. GENDER DIFFERENCES IN AVERAGE NUMBER OF PEOPLE ADOLESCENTS COULD COUNT ON FOR RECOVERY SUPPORT (n = 178)<sup>42a</sup>



a— Significant difference by gender at follow-up;  $p < .05$

<sup>41</sup> Three cases had missing values for the number of people clients could count on for recovery support at follow-up.

<sup>42</sup> Three cases had missing values for the number of people clients could count on for recovery support at follow-up.

## SECTION 9. INVESTING IN SUBSTANCE ABUSE TREATMENT FOR YOUTH

### SUBSTANCE ABUSE SETS ADOLESCENTS ON A NEGATIVE LONG-TERM PATH

The development of children can be severely compromised by early substance use. First, early initiation of alcohol and drug use is associated with a greatly increased incidence of substance use disorders in adulthood.<sup>43</sup> The vast majority of adults with a substance use disorder began drinking alcohol and using illicit drugs before age 18.<sup>44</sup> Youth who began drinking alcohol at age 14 or younger were four times more likely to develop alcohol dependence than youth who began drinking after age 15.<sup>45</sup> Children who first smoked marijuana younger than 14 years old were more than five times as likely to abuse drugs in their adulthood compared to individuals who first used marijuana when they were 18 years old.<sup>44</sup> The robust relationship between early drug initiation and substance use disorders in adulthood reinforces the importance of preventing and ceasing (or at least delaying or reducing) drug use in adolescence. More importantly, substance use in adolescence is associated with other serious problems, such as lower educational attainment, psychopathology, repeated arrests, and physical health problems in adulthood.<sup>46,47,48</sup>

The finding that the majority of youth in the follow-up sample for this year's report first used alcohol or drugs before the age of 14 suggests that treatment efforts that reduce or cease substance use among these youth may very well net significant long-term benefits and decrease substantial longer term personal and societal costs. For example, of the 88 individuals who reported abstaining from alcohol and drugs for the entire 12-month follow-up period, the majority (64.5%) were early initiators of substance use. This report's findings show significant decreases in individuals' substance use, with decreases in drug use being even greater than decreases in alcohol use. **Changing adolescents' trajectories from heavier substance use and substance use disorders to abstinence has meaningful effects on the individual's life but also is likely to have substantial societal benefits by increasing the individual's future capabilities and productivity.**

### TREATMENT AS AN INVESTMENT

The costs to society for substance abuse are high. The National Drug Intelligence Center estimated that illicit drug use totaled more than \$193 billion in 2007 in the United States.<sup>49</sup> A report by The National Center on Addiction and Substance Abuse (CASA) estimated that federal, state, and local governments spent at least \$167.7 billion in 2005 on expenditures related to substance use and abuse.<sup>47</sup> These costs include interventions for the negative consequences of substance use such as health and mental health care costs, criminal justice system costs, child

<sup>43</sup> Grant, B., & Dawson, D. (1997). Age at onset of alcohol use and its association with DSM-IV alcohol abuse and dependence: Results from the National Longitudinal Epidemiologic Survey. *Journal of Substance Abuse, 9*, 103-110.

<sup>44</sup> National Center on Addiction and Substance Abuse (CASA). (2011). *Adolescent substance use: America's #1 public health problem*. New York: Columbia University.

<sup>45</sup> Substance Abuse and Mental Health Services Administration. (2013). *Results from the 2012 National Survey on Drug Use and Health: Summary of national findings*. NSDUH Series H-46, HHS Publication No. (SMA) 13-4795. Rockville, MD: Substance Abuse and Mental Health Services Administration.

<sup>46</sup> Ellickson, P., Martino, S., & Collins, R. (2004). Marijuana use from adolescence to young adulthood: Multiple developmental trajectories and their associated outcomes. *Health Psychology, 23*(3), 299-307.

<sup>47</sup> McGue, M., Iacono, W., Legrand, L., & Elkins, I. (2001). The origins and consequences of age at first drink: Associations with substance use disorders, disinhibitory behavior and psychopathology, and P3 amplitude. *Alcohol Clinical & Experimental Research, 25*, 1156-1165.

<sup>48</sup> Flory, K., Lynam, D., Milich, R., Leukefeld, C., & Clayton, R. (2004). Early adolescent through young adult alcohol and marijuana use trajectories: Early predictors, young adult outcomes, and predictive utility. *Development and Psychopathology, 16*, 193-213.

<sup>49</sup> National Drug Intelligence Center. (2011). *The economic impact of illicit drug use on American Society*. Washington, DC: United States Department of Justice.

and family assistance, costs to the education system, and public safety costs. The researchers estimated that for every dollar government spent on substance use and abuse, only 1.9 cents was spent on prevention and treatment.

Convincing the public and policymakers to invest in substance abuse treatment is often a challenging task. Substance abuse treatment programs have had to justify their existence by showing their effectiveness and cost efficiencies to a skeptical public. One way to demonstrate value to society is by showing cost offsets whereby treatment costs are outweighed by short-term savings in other societal costs. Many of the benefits of treatment, particularly for adolescents, may not be realized in the short-term and instead are realized in the long-term; thus, cost savings studies that examine the cost of substance abuse in the year before treatment and the year post-treatment cannot detect the long-term benefits of improving the developmental trajectories of adolescents, which are salient when considering a chronic health problem such as addiction. The investment in treatment for today's substance using adolescents translates into not only avoidance of substantial future health care, mental health care, public benefit, and criminal justice system costs, but it may also increase individuals' capabilities by increasing their education, employment, health, and other less tangible qualities (e.g., social capabilities, parenting, quality of life) and improving their functioning in adulthood. Thus, it may be more informative for policy makers to examine the benefits of adolescent substance abuse treatment in the context of an investment in future wellbeing rather than an immediate cost offset.

### The Human Capital Approach

One way to explore this kind of investment in future wellbeing is the human capital approach that has been developed by two Nobel Prize winning economists – Theodore Schultz and Gary Becker. Human capital is the acquisition “of all useful skills and knowledge...that is part of deliberate investment” (p. 1).<sup>50</sup> Economists have largely focused on investments in education and health care and their relationship to long-term quality of life. One could argue that examining the value of societal investment in publicly funded substance abuse treatment would benefit from the use of a human capital approach. Because adolescents' substance use can have serious adverse effects on their education, health, and involvement in the criminal justice system, treatment that lessens or stops their substance use may lessen the adverse effects on their education, health, and involvement in the justice system, and thereby allow for greater investments in adolescents' human capital.

Schooling is a personal and societal investment. For every year of education an individual completes there is an estimated 10% gain in career earnings.<sup>51</sup> Some studies have found an even greater return rate for the years of education until high school completion with smaller increases in post-secondary education completion.<sup>52</sup> Thus, high school graduation has a robust impact on an individual's lifetime earnings and their contributions to society, in the form of more tangible benefits such as tax revenue and less tangible benefits such as increased entrepreneurship.<sup>48,53</sup>

One possible way to apply a human capital approach to adolescent substance abuse treatment is to examine the cost of treatment in comparison to client outcomes in terms of staying in school or, if age eligible (at least 18 years old), completion of schooling sufficient for gainful employment (i.e., high school diploma or GED). Thus, treatment in this sense is coupled with educational attainment based on the well-supported relationship

<sup>50</sup> Schultz, T. W. (1971). *Investment in Human Capital*. New York: Free Press.

<sup>51</sup> Psacharopoulos, G., & Patrinos, H. A. (2004). Returns to investment in education: A further update. *Education Economics*, 12(2), 111-134.

<sup>52</sup> Heckman, J., Lochner, P., & Todd, P. (2008). Earnings functions and rates of return. *Journal of Human Capital*, 2(1), 1-31.

<sup>53</sup> Becker, G. (1993). *Human capital: A theoretical and empirical analysis with special reference to education (3rd ed.)*. Chicago: University of Chicago Press.

between substance abuse and worse academic performance and lower levels of education.<sup>54,55,56</sup> Interestingly, the outcomes research on adolescents with substance use disorders does not focus much on educational attainment but instead tends to examine only school interests and attachments to school.<sup>57</sup> However, in considering a return on investment for substance abuse intervention for adolescents, examining post-treatment educational attainment may prove valuable.

There are two ways to conceive of the return on investment (ROI) given the age of clients in adolescent substance abuse treatment: (1) a first year ROI that examines how well prepared clients are for the job market and their likely earnings in that first year after treatment; and (2) an estimated lifetime ROI based on lifetime earnings differentials based on different levels of educational attainment in relation to treatment effects on substance use. Different levels of educational attainment have very different economic value in terms of wages and earnings (see Table 9.1).

TABLE 9.1. BUREAU OF LABOR STATISTICS EARNINGS AND UNEMPLOYMENT RATES BY EDUCATIONAL ATTAINMENT IN 2014

Education attained	Unemployment rate in 2014 (Percent)	Median weekly earnings
Doctoral degree	2.1	\$1,591
Professional degree	1.9	\$1,639
Master's degree	2.8	\$1,329
Bachelor's degree	3.5	\$1,101
Associate's degree	4.5	\$792
Some college, no degree	6.0	\$741
High school diploma	6.0	\$668
Less than a high school diploma	9.0	\$488

Source: Bureau of Labor Statistics, Employment Projections, Earnings and unemployment rates by educational attainment [http://www.bls.gov/emp/ep\\_chart\\_001.htm](http://www.bls.gov/emp/ep_chart_001.htm)

For the return on investment estimate, we examined the educational attainment of AKTOS adolescents who can reasonably be expected to have attained a diploma, GED, or at least one year of other post-secondary education at follow-up. Because 18 is the typical age at which individuals graduate from high school, analysis examined education status at follow-up of the 50 individuals who were 18 years old or older at follow-up. For this analysis this subgroup was examined in regard to treatment cost by comparison to estimated earnings that can be expected given the clients' educational attainments. Nearly half (42.0%,  $n = 21$ ) had attained a high school diploma or GED by follow-up and 4.0% ( $n = 2$ ) had completed some vocational/technical school or college by follow-up. Out of the 50 individuals who were 18 years old or older at follow-up, 12.0% ( $n = 6$ ) were dropouts, meaning they had less than a high school diploma/GED and were not enrolled in school. The percentage of Kentucky students who graduate in four years with a regular high school diploma was 87.9% in 2014-2015, meaning that 12.1% were dropouts (Kentucky School Report Card, 2014-2015); thus, the percentage of individuals ages 18 and older at follow-up who had dropped out of secondary school is similar to the percentage for the general population in

<sup>54</sup> Centers on Disease Control and Prevention. (2010). *Alcohol and Other Drug Use and Academic Achievement*. Atlanta, GA: Centers on Disease Control and Prevention. [http://www.cdc.gov/healthyyouth/health\\_and\\_academics/pdf/alcohol\\_other\\_drug.pdf](http://www.cdc.gov/healthyyouth/health_and_academics/pdf/alcohol_other_drug.pdf)

<sup>55</sup> DuPont, R. L., Campbell, M. D., Campbell, T. G., Shea, C. L., & DuPont, H. S. (2013). Self-reported drug and alcohol use and attitudes toward drug testing in high schools with random student drug testing. *Journal of Child & Adolescent Substance Abuse*, 22(2), 104-119.

<sup>56</sup> Hawkins, J.D., Catalano, R.F., & Miller, J.Y. (1992). Risk and protective factors for alcohol and other drug problems in adolescence and early adulthood: implications for substance abuse prevention. *Psychological Bulletin*, 112 (1), 64-105.

<sup>57</sup> Kumpfer, L. K. (1999). Factors and processes contributing to resilience: The resilience framework. In M. D. Glantz & J. L. Johnson (Eds), *Resilience and development: Positive life adaptations* (pp. 179-224). New York: Academic/Plenum.

Kentucky. Twenty-one (42.0%) individuals (ages 18 and older at follow-up) had less than a high school diploma or GED and they were enrolled in secondary school; because they had not yet reached the terminal phase of secondary education (i.e., graduation or dropout), they are not included in the subsequent analysis.

## The Cost of Treatment

The cost of treatment for adolescents included in this analysis was calculated from clinical service event data provided by community mental health centers (CMHC) to the DBHDID (see Appendix D). Service event data from the date of the intake survey until the date of the follow-up survey was matched to intake and follow-up survey data for 50 adolescents included in this return on investment analysis. Rates for state-funded services in FY 2014 were provided by the Kentucky DBHDID. These rates were used to calculate the cost of treatment from intake to follow-up. Services paid for by private payer sources (e.g., private insurance, employee assistance programs, self-pay) were not included in the cost calculations.

### Estimate 1 - Short Term Return on Investment from Substance Abuse Treatment

The cost of treatment for the three groups of adolescents who would be age-eligible for graduation is shown in Table 9.2.<sup>58</sup>

TABLE 9.2. COST OF TREATMENT FOR AKTOS CLIENTS BY LEVEL OF EDUCATIONAL ATTAINMENT AT AGE 18

Client Level of Attainment	Average cost per client	Total cost for the group
Less than high school – dropout (n = 10)	\$2,396	\$23,962
High school or GED (n = 32)	\$4,103	\$131,297
Some post HS schooling/training (n = 2)	\$15,364	\$30,728
<b>Total for all (n = 44)</b>		<b>\$185,987</b>

Table 9.3 shows the expected earnings per person based on the level of educational attainment for each of the three groups, assuming their level of education does not increase in the year.

TABLE 9.3. U.S. BUREAU OF LABOR STATISTICS ESTIMATES OF EXPECTED EARNINGS BY LEVEL OF EDUCATIONAL ATTAINMENT AS APPLIED TO AKTOS INDIVIDUALS WHO WERE 18 YEARS OLD AT FOLLOW-UP

Client Level of Attainment	Average expected earnings per week	Average likely earnings per year	Earnings per year for the group
Less than high school – dropout (n = 6)	\$488	\$25,376	\$152,256
High school or GED (n = 21)	\$668	\$34,736	\$729,456
Some post HS schooling/training (n = 2)	\$741	\$38,532	\$77,064
<b>Total for all (n = 29)</b>		<b>\$96,644</b>	<b>\$958,776</b>

Table 9.4 shows the expected earnings per person adjusted for the latest unemployment rates issued by the U.S. Bureau of Labor Statistics by each level of educational attainment.

<sup>58</sup> After calculating the cost of treatment services for all 140 adolescents in the follow-up sample for whom we were able to match survey data with clinical service data, outliers at the highest 5% for total cost of treatment were recoded to the value for the 95th percentile. For cases with invalid SSNs provided that prevented matching service event data to survey data, the mean cost of treatment was input. For cases with valid SSNs provided but no matching service event data, the assumption was made that the client received no services so the cost of treatment was input as \$0.

TABLE 9.4. U.S. BUREAU OF LABOR STATISTICS ESTIMATES OF EXPECTED EARNINGS ADJUSTED BY U.S. UNEMPLOYMENT RATES BY LEVEL OF EDUCATIONAL ATTAINMENT AS APPLIED TO AKTOS INDIVIDUALS WHO ARE 18 YEARS OLD AT FOLLOW-UP

Client Level of Attainment	Unemployment rate	Average expected earnings per year adjusted by unemployment	Earnings per year for the group adjusted by unemployment
Less than high school – dropout (n = 6)	9.0%	\$23,853	\$143,118
High school or GED (n = 21)	6.0%	\$32,652	\$685,692
Some post HS schooling/training (n = 2)	6.0%	\$36,220	\$72,440
<b>Total for all (n = 29)</b>		<b>\$92,725</b>	<b>\$901,250</b>

With expected yearly earnings of \$901,250, we can estimate 6% of this amount in the form of income taxes and an estimated 2.5% of the earnings in sales taxes for covered items (allowing that food and medicine would be excluded from the tax). Thus, approximately 8.5% of the earnings will likely result in direct returns to the state general fund. This would suggest that \$76,606 would be returned to the state general fund through tax revenues in the course of the year following the follow-up interviews with the AKTOS clients included in this analysis. Within 2.4 years the \$185,987 in treatment costs would be directly returned to the state general fund. However, in the larger context of overall social economic costs, the return to society on treatment expenditures can be expressed as for every \$1.00 spent on treatment there is a \$4.84 return in estimated employment additions to local and state economies. An important caveat is that it is unknown how many of the adolescents who attained at least a GED or high school diploma by age 18 would not have graduated had they not been in substance abuse treatment. However, the robust association between adolescent substance use and worse school performance and lower educational attainment bolsters the assumption that investment in substance abuse treatment leads to decreased substance use for many adolescents, which allows for greater educational attainment and subsequently higher earnings.

### Estimate 2. A Longer Term Return on Investment from Substance Abuse Treatment

The more important gains from substance abuse treatment for adolescents needs to contrast the lifetime earnings of those with a high school diploma, GED and other post high school education with those who dropped out. For this purpose, we used a 35-year lifetime employment average. An individual who dropped out of high school is estimated to have average lifetime earnings of \$834,855 (adjusted for a 9.0% unemployment rate applied to all 35 years in a lifetime earnings model). The same adjusted average income (at a 6.0% unemployment rate applied to all 35 years) for an individual who graduated from high school is \$1,142,820— a \$307,965 difference. For an individual with at least one year of additional education or training after high school the estimated adjusted lifetime earnings is \$1,267,700 or \$432,845 more than the lifetime earnings for an individual who dropped out of high school. For the entire group of completers, adjusted lifetime earnings would be estimated at \$26,534,620, in contrast to the estimate of \$5,328,960 for lifetime earnings for the AKTOS individuals who dropout of secondary school. Subtracting the estimate of lifetime earnings from individuals who dropout of secondary school from net earnings estimates means that lifetime earnings of this groups of AKTOS clients who completed high school can be expected to be over \$21 million. Thus, an investment of \$185,987 for substance abuse treatment can facilitate a long term gain to society of \$37 million in expected lifetime earnings. It is true that some adolescents who continue on their substance use trajectory will attain a high school diploma or higher level of education, but given the robust relationship between substance abuse in youth and lower educational attainment, treatment can interrupt this negative association for many youth. The gains in estimated earnings also assumes that with reduced or terminated drug use, arrests and criminal justice erosions of employment will decrease.

## Conclusion

The most important finding from this estimate of a return on investment is that substance abuse treatment needs to focus far more intensively on clinical efforts that bolster high school completion. The gains in future earnings from small amounts of college or technical schools on top of the high school diploma are modest. But the difference between high school dropouts and graduates is very great. The economics literature on specific long term cost savings related to human capital investment has not examined the role of any form of treatment as an investment even though the literature is replete with mentions of the importance of health care in human capital investment. However, it stands to reason that reductions in risk behaviors and increases in educational attainments can only be seen as positive contributions to the future economic wellbeing of adolescents who have begun dealing with their problems of substance use.

## SECTION 10.

# SUMMARY AND RECOMMENDATIONS

Substance use disorders in youth are best understood within the context of several interrelated problems,<sup>59,60</sup> such as childhood adversity and victimization,<sup>61</sup> comorbid psychiatric disorders,<sup>62</sup> and problem behaviors (i.e., delinquency).<sup>63</sup> The 181 youth who completed intake and follow-up interviews for the 2016 AKTOS Follow-Up Study were, on average, 15.5 years old at intake and came into treatment with significant adversities. At treatment intake 98.3% of the youth in this study reported they had used alcohol, drugs, and/or tobacco, and the average age adolescents began using drugs was just under 13 and under 14 years old for alcohol. Three-fourths of adolescents in the follow-up sample (74.6%) had experienced interpersonal victimization in their lifetime (e.g., child maltreatment [46.4%], peer bullying [59.1%], sibling abuse [40.3%], intimate partner violence [34.8%], and sexual abuse [17.1%]) and many (66.3%) had a household member with an alcohol and/or drug abuse problem. Additionally, the majority of youth enrolled in school (57.5%) had an average grade of C or lower, and nearly half of adolescents enrolled in school (56.3%) had been in school detention, suspended, or expelled from school in the past 90 days school was in session at treatment intake. A little more than half of adolescents reported they were under supervision by the justice system at treatment intake and about two-fifths of adolescents (42.5%) had been arrested in the 12 months before intake. Finally, large percentages of youth self-reported externalizing behavior, such as attention deficit symptoms, aggressive behavior, and criminal activity.

The outcomes data show significant decreases in substance use and severity of substance use over time. The follow-up findings show that 96.1% of adolescents reported that they had used alcohol and/or drugs in the 12 months before intake. By follow-up, the number of adolescents who reported they had used alcohol and/or drugs decreased to 51.4%. Specifically, the number of adolescents who reported using alcohol in the past 12 months decreased from 67.4% at intake to 37.0% at follow-up. Looking specifically at drugs, a total of 91.7% of adolescents reported that they had used drugs in the 12 months before intake, compared to 38.1% that used drugs in the 12 months before follow-up. In other words, 63.0% of youth reported abstaining from alcohol and 61.9% of youth reported abstaining from drugs in the 12 month follow-up period. 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%.<sup>64</sup> Not only did substance use decrease significantly, but so did severity of substance use, as measured by the ASI alcohol and drug composite scores. The number of alcohol using adolescents who met the criteria for severe alcohol disorder decreased significantly by 69.6%. The number of drug using adolescents who met criteria for severe drug use disorder decreased significantly by 82.4%.

Youth who abuse substances are at higher risk of dropout or non-completion of a degree.<sup>65</sup> Poor grades or school performance can be an indication of dropout risk. Keeping youth in school until high school graduation

<sup>59</sup> Jessor, R., and Jessor, S.L. (1997). *Problem Behavior and Psychosocial Development: A Longitudinal Study of Youth*. New York: Academic Press.

<sup>60</sup> Teplin, L., Abram, K., McClelland, G., Dulcan, M., & Mericle, A. (2002). Psychiatric disorders in youth in juvenile detention. *Archives of General Psychiatry*, 59, 1133-1143.

<sup>61</sup> Tonmyr, L., Thornton, T., Draca, J., & Wekerle, C. (2010). A review of childhood maltreatment and adolescent substance use relationship. *Current Psychiatry Reviews*, 6(3), 223-234.

<sup>62</sup> Rohde, P., Lewinsohn, P. M., & Seeley, J. R. (1996). Psychiatric comorbidity with problematic alcohol use in high school students. *Journal of the American Academy of Child and Adolescent Psychiatry*, 35(1), 101-109.

<sup>63</sup> Kuperman, S., Schlosser, S., Kramer, J., Bucholz, K., Hesselbrock, V., Reich, T., et al. (2001). Developmental sequences from disruptive behavior diagnosis to adolescent alcohol dependence. *American Journal of Psychiatry*, 158, 2022-2026.

<sup>64</sup> Williams, R. J., & Chang, S. Y. (2000). A comprehensive and comparative review of adolescent substance abuse treatment outcome. *Clinical Psychology: Science & Practice*, 7, 138-166.

<sup>65</sup> DuPont, R. L., Campbell, M. D., Campbell, T. G., Shea, C. L., & DuPont, H. S. (2013). Self-reported drug and alcohol use and attitudes toward drug testing in high schools with random student drug testing. *Journal of Child & Adolescent Substance Abuse*, 22(2), 104-119.

has substantial impacts on their future earning capability. In fact, the rate of return is higher for completing a high school diploma than for completing college.<sup>66</sup> Individuals who complete a high school degree or obtain some college education have exponentially higher income than those who do not advance their education.<sup>67,68</sup> Because of this, it is important to examine education in a substance abuse treatment outcome study. In the AKTOS sample, the majority of individuals who had not yet obtained a high school diploma at follow-up were still enrolled in school at follow-up (98.3%). Additionally, there was a significant increase in GPA from intake (2.3) to follow-up (2.7) and significant decreases in the number of school absences for any reason as well as school absences for disciplinary reasons. Not only were there improvements in academic performance and attendance among those enrolled in school, but fewer individuals enrolled in school had received disciplinary measures such as detention, suspension, or expulsion at follow-up. Another positive finding is that when individuals who had reached the age that most individuals typically graduate from high school (18 years old) by follow-up were examined (n = 50), the vast majority (88.0%) were either still enrolled in secondary school (42.0%), had obtained a high school diploma or GED (42.0%), or had completed some post-secondary education (4.0%). Only a minority of individuals who were 18 years old at follow-up (12.0%, n = 6) had dropped out of secondary school. How does this percentage compare to the percentage of youth in Kentucky who do not graduate from high school in four years? In the 2013-2014 school year, the graduation rate for Kentucky was 87.5%, meaning that 12.5% of students did not graduate.<sup>69</sup> Thus, the dropout rate for the individuals in the follow-up sample is slightly lower than the rate for the general population of high school students in Kentucky.

The majority of individuals either continued their education and had improvements in their grades and/or reductions in disciplinary measures or obtained at least a high school diploma or GED. Nonetheless, a small minority of individuals dropped out of secondary school before attaining a high school diploma or GED, which suggests a need for more intensive school-based programs to retain and successfully intervene with high risk kids. The benefits of keeping youth in school are well documented but require significant investments from the community including treatment staff, families, schools, and other community agencies.

Psychiatric comorbidity is common in adolescents with substance use disorders.<sup>70,71</sup> Externalizing behavior has been associated with early substance use initiation and greater substance use overall.<sup>72</sup> More than one-third of the AKTOS follow-up sample (35.5%) had comorbid substance use disorder and other psychiatric disorders recorded in the client-level service event data (see Appendix D). Adolescents' self-reported symptoms showed a significant decrease in depression, anxiety, traumatic stress, attention deficit, aggressive behavior, and criminal activity from intake to follow-up. Significantly more girls met the criteria for depression, anxiety, and traumatic stress compared to boys, while significantly more boys reported engaging in at least one of the criminal behaviors measured. These findings are consistent with other research indicating that boys exhibit more externalizing behavior and girls exhibit more internalizing behavior.<sup>73</sup> Interestingly, there were no significant differences by

<sup>66</sup> Heckman, J., Lochner, P., & Todd, P. (2008). Earnings functions and rates of return. *Journal of Human Capital*, 2(1), 1-31.

<sup>67</sup> Autor, D. H., Katz, L.F. & Kearney, M.S. (2005). *Rising Wage Inequality: The Role of Composition and Prices*. NBER technical working paper 11627.

<sup>68</sup> Heckman, J.J., & LaFontaine, P.A. (2010). The American high school graduation rate: Trends and levels. *The Review of Economics and Statistics*, 92(2), 244-262.

<sup>69</sup> Kentucky Department of Education. (2015). *Kentucky School Report Card, 2013-2014, Graduation Rate*. <https://applications.education.ky.gov/src/DeliveryTargetByState.aspx>

<sup>70</sup> Armstrong, T. D., & Costello, E. J. (2002). Community studies on adolescent substance use, abuse, or dependence and psychiatric comorbidity. *Journal of Consulting and Clinical Psychology*, 70, 1224-1239.

<sup>71</sup> Turner, W.C., Muck, R.D., Muck, R.J., Stephens, R.L., & Sukumar, B. (2004). Co-occurring disorders in the adolescent mental health and substance abuse treatment systems. *Journal of Psychoactive Drugs*, 36, 455-462.

<sup>72</sup> Lillehoj, C., Trudeau, L., Spoth, R., & Madon, R. (2005). Externalizing behaviors as predictors of substance initiation trajectories among rural adolescents. *Journal of Adolescent Health*, 37, 493-501.

<sup>73</sup> Achenbach, T., Howell, C. Quay, H., Conners, C. (1991). National survey of problems and competencies among four- to sixteen-year olds. *Monographs of the Society for Research in Child Development*, 56(3), 1-130.

gender in age of initiation of drugs, alcohol, or tobacco use. There was only one significant gender difference in substance use; more boys reported past-30-day alcohol use at intake compared to girls.

A number of studies on interpersonal victimization have found an association of interpersonal victimization and substance use/substance use disorders.<sup>74,75</sup> In this sample of adolescent clients of publicly-funded substance abuse treatment in Kentucky, interpersonal victimization and childhood adversities were relatively common experiences. High percentages of clients had experienced interpersonal victimization in their lives and had exposure to multiple household adversities, such as divorced parents/parents living apart and someone in their household abusing alcohol or using illicit drugs. Substance abuse treatment could address these experiences, which may have profound and lasting effects on youth's emotion regulation, cognitive capacities, and interpersonal relationships. Assessment of a range of victimization experiences should be explored with youth entering substance abuse treatment, and because prior research has shown that youth may not disclose victimization experiences at intake, the Center for Substance Abuse Treatment (CSAT) TIP on child abuse and neglect issues recommends that properly trained substance abuse treatment providers assess for victimization at intervals during the course of treatment.<sup>76</sup>

Youth reported high satisfaction with treatment providers, which is important because higher levels of satisfaction with treatment are associated with positive treatment outcomes.<sup>77</sup> Specifically, the majority of youth gave a highly positive rating of 8 to 10 for their treatment experience on a scale of 1 to 10, with 10 representing the best experience. Additionally, the vast majority of clients agreed that they received the services they needed to help them get better, they felt better about themselves as a result of their treatment experience, they were treated with respect, and they understood their treatment plan, their rights as a client, and staff member's expectations of them.

The investment in treatment for today's substance using adolescents translates into not only avoidance of substantial future health care, mental health care, public benefit, and criminal justice system costs, but it may also increase individuals' capabilities by increasing their education, employment, health, and other less tangible qualities (e.g., social capabilities, parenting, quality of life). Thus, it may be more informative for policy makers to examine the benefits of adolescent substance abuse treatment in the context of an investment in future well-being rather than an immediate cost offset. Looking at human capital indicators in the AKTOS 2016 follow-up sample there were important improvements in education—both academic and disciplinary factors and significant reductions in the number of youth who reported using drugs and alcohol at follow-up. Educational attainment for age-eligible (i.e., 18 years old and older) AKTOS clients was examined at follow-up. About two-fifths (42.0%) had attained a high school diploma/GED or higher level of education, another two-fifths (42.0%) were still enrolled in secondary school, and only 12.0% were not enrolled in school and had not attained a high school diploma or GED. Using Bureau of Labor statistics that show different expected yearly earnings for individuals based on educational attainment, projected likely earnings in the year after treatment and lifetime earnings are estimated to illustrate the greater tax revenues that are expected from keeping children in school to high school graduation and to higher levels of education.

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<sup>74</sup> McCart, M. R., Zajac, K., Danielson, C. K., Strachan, M., Ruggiero, K. J., Smith, D. W., Saunders, B. E., & Kilpatrick, D. G. (2011). Interpersonal victimization, posttraumatic stress disorder, and change in adolescent substance use prevalence over a ten-year period. *Journal of Clinical Child and Adolescent Psychology, 40*, 136-143. Doi:10.1080/15374416.2011.533411.

<sup>75</sup> Vermeiren, R., Schwab-Stone, M., Deboutte, D., Leckman, P. E., & Ruchkin, V. (2003). Violence exposure and substance use in adolescents: Findings from three countries. *Pediatrics, 111*, 535-540. doi: 10.1542/peds.111.3.535

<sup>76</sup> Center for Substance Abuse Treatment. (2000). *Substance abuse treatment for persons with child abuse and neglect issues*. Treatment Improvement protocol (TIP) Series, No. 36. Rockville, MD: Substance Abuse and mental Health Services Administration.

<sup>77</sup> Waxman, H.M. (1996). Using outcomes assessment for quality improvement. In L.I. Sederer & B. Dickey (Eds.), *Outcomes assessment in clinical practice*, (pp. 25-33), Boston, Massachusetts: Williams and Wilkins.

## AREAS OF CONCERN

Even with the significant positive changes in adolescents' functioning there was a minority of adolescents who continued to struggle with substance use, behavioral health problems, school attendance and performance, and justice system involvement.

**Substance use and smoking.** Half of youth (51.4%) in AKTOS reported using alcohol and/or drugs at some point in the 12-month follow-up period and almost one-third (27.4%) of youth reported using alcohol and/or drugs in the 30 days before the follow-up survey. Specifically, 38.1% of youth reported using illegal drugs and 37.0% reported using alcohol in the 12-month follow-up period. In particular, among those individuals who reported using alcohol in the 12-month follow-up period, 68.7% reported drinking alcohol to intoxication and 71.6% reported binge drinking at some point in the 12-month follow-up period. In a review of 60 studies on recovery outcomes for adolescents in substance abuse treatment, substance use rates at 12-month follow-up, which were calculated from the recovery/remission rates presented in the review, ranged from 33% to 68%, with an average use rate of 58%.<sup>78</sup> Thus, the substance use rates in AKTOS are consistent with the substance use rates in other treatment outcome studies.<sup>79</sup>

Cigarette smoking among adolescents increases the risk of other drug use and the risk of nicotine addiction.<sup>80</sup> In fact, of all addictions to substances, nicotine addiction is the one most likely to occur in adolescence.<sup>71</sup> In 2012 and 2013, Kentucky had the highest rate of smoking among adolescents of all 50 states: 9.5% for past-month cigarette use.<sup>81</sup> In the AKTOS sample, in the 30 days before follow-up 63.4% of adolescents reported smoking tobacco, which was 6.7 times greater than the percentage of adolescents in the general population in Kentucky (9.5%). The findings for tobacco use were not as positive as the findings for alcohol and drug use in terms of reductions in the number of adolescents who reported using in the 12 months before intake and follow-up. For example, in the 12 months before intake nearly three-fourths of youth (72.4%) smoked tobacco. In the 12 months before follow-up the percentage of adolescents who reported smoking tobacco products had decreased slightly, but not significantly, to 68.0%. Furthermore, almost one-fourth of boys reported using smokeless tobacco in the 12-month follow-up period.

What's more, of those who reported smoking tobacco products, the average age they began smoking tobacco regularly was 12.7 years old. Prior research has shown that individuals who began smoking tobacco before age 14 are significantly less likely to have stopped smoking in young adulthood than individuals who began smoking at age 14 or later.<sup>82</sup> These findings are consistent with other research on tobacco use among adolescents in substance abuse treatment.<sup>83,84</sup> Nonetheless, substance use treatment offers a unique opportunity to intervene with tobacco-using adolescents by integrating tobacco cessation interventions with

<sup>78</sup> White, W. L. (2012). *Recovery/remission from substance use disorders: An analysis of reported outcomes in 415 scientific reports, 1868-2011*. Philadelphia, PA: Philadelphia Department of Behavioral Health and Intellectual disability Services.

<sup>79</sup> Williams, R. J., & Chang, S. Y. (2000). A comprehensive and comparative review of adolescent substance abuse treatment outcome. *Clinical Psychology: Science and Practice*, 7(2), 138-166.

<sup>80</sup> Centers for Disease Control & Prevention (CDC). (1994). *Preventing tobacco use among young people: A report of the Surgeon General*. Atlanta, GA: U.S. Department of Health and Human Services.

<sup>81</sup> Lipari, R. N., & Hughes, A. (2015). *States estimates of adolescent cigarette use and perceptions of risk of smoking: 2012 and 2013*. Rockville, MD: Substance Abuse and Mental Health Services Administration, Center for Behavioral Health Statistics and Quality.

<sup>82</sup> Breslau, N. and Peterson, E. L. (1996). Smoking cessation in young adults: age at initiation of cigarette smoking and other suspected influences. *American Journal of Public Health*, 86, 214-220.

<sup>83</sup> Campbell, C. I., Chi, F., Sterling, S., Kohn, C., & Weisner, C. (2009). Self-initiated tobacco cessation and substance use outcomes among adolescents entering substance use treatment in a managed care organization. *Addictive Behaviors*, 34(2), 171-179.

<sup>84</sup> Myers, M. G., & MacPherson, L. (2004). Smoking cessation efforts among substance abusing adolescents. *Drug and Alcohol Dependence*, 73(2), 209-213.

other substance use treatment, which can be important for attaining and continuing abstinence.<sup>74</sup> The belief that quitting smoking while attempting to quit alcohol or drugs may increase the risk of alcohol or drug relapse is pervasive and yet empirical evidence indicates that voluntary smoking cessation interventions with adults and adolescents do not negatively impact alcohol and drug recovery.<sup>85,86,87</sup>

**Behavioral Health Problems.** Even though the percentage of adolescents who met criteria for depression, anxiety, traumatic stress, attention deficit, aggressive behaviors, criminal behavior, and suicidality decreased significantly from intake to follow-up, a minority of youth were continuing to experience behavioral health problems at follow-up. For example, in the 12 months before follow-up, about 1 in 5 girls met criteria for depression (20.4%) and anxiety (22.2%). In addition, 1 in 5 youth (20.4%) reported two or more aggressive behaviors at follow-up. Finally, almost one-fourth of youth met criteria for traumatic stress at follow-up (including 37% of girls and 17.5% of boys) and almost one-fourth of youth (23.2%) reported engaging in criminal activity in the 12-month follow-up period.

Because adolescents with substance use disorders and comorbid psychiatric disorders have poorer substance abuse treatment outcomes than those with only substance use disorders, there is growing evidence that integrated treatment of comorbid psychiatric disorders in substance abuse treatment may improve treatment engagement and treatment completion as well as treatment outcome.<sup>88,89,90</sup>

**Education.** Even though the majority of individuals either continued their education and had improvements in their grades and/or reductions in disciplinary measures or obtained at least a high school diploma or GED, a minority of youth reported unfavorable education outcomes during the follow-up period. For example, 18.5% of youth enrolled in school at follow-up reported they had missed school for disciplinary reasons (i.e., detention, suspension, or expulsion) in the last 90 days school was in session. Second, a small minority of individuals dropped out of secondary school before attaining a high school diploma or GED, which suggests a need for more intensive school-based programs to retain and successfully intervene with high risk kids.

**Justice System Involvement.** Involvement with the justice system is a problem for Kentucky youth involved in substance abuse treatment; half of AKTOS follow-up participants (52.5%) reporting they were under supervision by the justice system, either through probation or juvenile drug court, and two-fifths of AKTOS follow-up participants (42.5%) reporting they were arrested in the 12 months prior to treatment intake. At follow-up, nearly one-third of youth (32.6%) reported an arrest in the past 12 months and a little more than one-fourth reported they had been incarcerated at least one night in the past 12 months. 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.

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<sup>85</sup> de Dios, M. A., Vaughan, E. L., Stanton, C. A., & Niaura, R. (2009). Adolescent tobacco use and substance abuse treatment outcomes. *Journal of Substance Abuse Treatment, 37*(1), 17-24.

<sup>86</sup> Myers, M.G., & Brown., S.A. (2005). A controlled study of a cigarette smoking cessation intervention for adolescents in substance abuse treatment. *Psychology of Addictive Behaviors, 19*, 230-233.

<sup>87</sup> Reid, M. S., Fallon, B., Sonne, S., Flammio, F., Nunes, E. V., Jiang, H., Kourniotis, E., Lima, J., Brady, R., Burgess, C., Arfken, C., Pihlgren, E., Giordano, L., Starosta, A., Robinson, J., & Rotrosen, J. (2008). Smoking cessation treatment in community-based substance abuse rehabilitation programs. *Journal of Substance Abuse Treatment, 35*, 68-77.

<sup>88</sup> Grella, C. E., Hser, Y. I., Joshi, V., & Rounds-Bryant, J. (2001). Drug treatment outcomes for adolescents with comorbid mental and substance use disorders. *Journal of Nervous & Mental Disease, 189*(6), 384-392.

<sup>89</sup> Wise, B. K., Cuffe, S. P., Fischer, T. (2001). Dual diagnosis and successful participation of adolescents in substance abuse treatment. *Journal of Substance Abuse Treatment, 21*(3), 161-165.

<sup>90</sup> Cornelius, J. R., Maisto, S. A., Martin, C. S., Bukstein, O. G., Salloum, I. M., Daley, D. C., Wood, D. S., & Clark, D. B. (2004). Major depression associated with earlier alcohol relapse in treated teens with AUD. *Addictive Behavior, 29*, 1035-1038.

**Recovery Supports.** In this sample of adolescents, there was no significant increase in the number of individuals who reported attending mutual help recovery meetings from intake to follow-up. Participation in mutual help recovery meetings is an important recovery support that is associated with abstinence and lower risk of relapse among adults.<sup>91</sup> Nonetheless, limited research has examined the role of AA and NA meeting attendance among adolescents.<sup>92</sup> The few studies that have been conducted suggest that adolescents who attend AA/NA meetings after residential substance abuse treatment are more likely to remain abstinent.<sup>93,94,95</sup> Yet, adolescents' attendance at group meetings that are predominately composed of adults may not be helpful and may even be harmful.<sup>96,97</sup> Many communities, including many if not most in Kentucky, may not have mutual help group meetings specifically for adolescents. Other forms of recovery support may be crucial to helping adolescents maintain their recovery, such as peer support, particularly in communities that lack mutual help group meetings that are specific for adolescents. Research shows that adolescents benefit from continuing care following treatment,<sup>98</sup> such as drug use monitoring, follow-up visits at home, and linking to other family services. However, the research on recovery supports for adolescents is more limited than it is for adults.

## LIMITATIONS OF THE STUDY

There are several areas of limitation to the findings presented in this report. First, this study examined 181 adolescents who received substance abuse treatment in state fiscal years 2013 and 2014, but did not examine a comparison group of similar adolescents who did not receive treatment, which prevents us from inferring that changes from intake to follow-up are due solely to 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 for this age group. 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,<sup>99</sup> 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 and validity of the data they collected for the intake.

<sup>91</sup> Gossop, M., Stewart, D., & Marsden, J. (2008). Attendance at Narcotics Anonymous and Alcoholics Anonymous meetings, frequency of attendance and substance use outcomes after residential treatment for drug dependence: a 5-year follow-up study. *Addiction, 103*(1), 119-125.

<sup>92</sup> Kelly, J., Brown, S., Abrantes, A., Kahler, C., & Myers, M. (2008). Social recovery model: An 8-year investigation of adolescent 12-step group involvement following inpatient treatment. *Alcohol Clinical & Experimental Research, 32*(8), 1468-1478.

<sup>93</sup> Hsieh, S., Hoffman, N., & Hollister, D. (1998). The relationship between pre-, during-, and post-treatment factors, and adolescent substance abuse behaviors. *Addictive Behaviors, 23*, 477-488.

<sup>94</sup> Kelly, J., Myers, M., & Brown, S. (2000). A multivariate process model of adolescent 12-step attendance and substance use outcome following inpatient treatment. *Psychology of Addictive Behavior, 14*, 376-389.

<sup>95</sup> Kelly, J., Myers, M., & Brown, S. (2002). Do adolescents affiliate with 12-step groups? A multivariate process model of effects. *Journal of Studies on Alcohol, 63*, 293-304.

<sup>96</sup> Kelly, J., & Myers, M. (1997). Adolescent treatment outcome in relation to 12-step group attendance. Abstracted in *Alcoholism: Clinical and Experimental Research, 21*, 27A.

<sup>97</sup> Kelly, J., Myers, M., & Brown, S. (2005). The effects of age composition of 12-step groups on adolescent 12-step participation and substance use outcomes. *Journal of Child and Adolescent Substance Abuse, 15*(1), 63-72.

<sup>98</sup> Godley, M. D., Godley, S. H., Dennis, M. L., Funk, R. R., & Passetti, L. L. (2007). The effect of assertive continuing care on continuing care linkage, adherence and abstinence following residential treatment for adolescents with substance use disorders. *Addiction, 102*(1), 81-93.

<sup>99</sup> Rutherford, M.J., Cacciola, J.S., Alterman, A.I., McKay, J.R. & Cook, T.G. (2000). Contrasts between admitters and deniers of drug use. *Journal of Substance Abuse Treatment, 18*(4), 343-8.

## CONCLUSION

Findings from the AKTOS 2016 report indicate successful treatment experiences for many youth, with significant reductions in substance use and severity, decreases in behavioral health problems, greater attainment of high school diplomas, improved academic performance, and fewer youth with school disciplinary problems. About one-fifth to one-quarter of these youth reported continued substance use, behavioral health problems, school attendance problems, and involvement with the juvenile justice system, indicating these dimensions of functioning require more attention and intervention in substance abuse treatment programs. Slowing down or stopping youth's substance use trajectories may lead to substantial increases in education, lower psychiatric comorbidities, and lower criminal behavior and involvement in the justice system—all of which may have significant positive effects on the youth's long-term development.

## APPENDIX A. METHOD

Intake surveys were collected by a clinician or staff person at the treatment center using a web-based survey tool, in which the identifying data were encrypted and submitted to the master database on the UK CDAR 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 (i.e., the follow-up survey). Adolescents who were interested in participating in the follow-up study gave consent to be contacted by UK CDAR BHOS staff members, who conduct follow-up surveys approximately 12 months later. Follow-up surveys were conducted via telephone using a survey with items and questions similar to the ones used in the intake survey. The data collection instruments for AKTOS build on the Teen Addiction Severity Index (T-ASI).<sup>100</sup> UK CDAR BHOS faculty conducted monthly meetings with follow-up interviewers to monitor progress with locating participants and completing follow-up surveys to ensure consistent application of locating strategies and interview techniques.

In FY 2013 and 2014, a total of 451 adolescents in publicly funded substance abuse treatment completed intake surveys. Of these 451 adolescents who completed an intake survey, 52.5% (n = 237) gave consent at the end of the intake survey to be contacted for the 12-month follow-up survey. Almost all of these individuals were included in the sample to be followed up (n = 230). The seven adolescents who gave consent to be followed up but who were not included in the follow-up sample were excluded because they did not provide phone numbers or addresses in the locator information requested of individuals who agree to be contacted for the follow-up survey.

The target month for the follow-up survey was 12 months after the intake survey was submitted. The window for completing a follow-up survey with an individual selected into the follow-up sample began two months before the target month and spanned until two months after the target month. For example, if an intake survey was submitted for an individual in May 2014, the target month for the follow-up survey was May 2015 and interviewers began working to locate and contact the individual in March and could work on the file until the end of July.

Of the 230 adolescents who were included in the sample of individuals to be followed up, 29 were ineligible to complete the follow-up survey when they were contacted (see Table AA.1). Reasons for ineligibility include being in residential treatment (n = 21), incarcerated (n = 5), in military service (n = 2), and had participated in AKTOS within several months at the time of follow-up. Of the remaining 201 adolescents, interviewers completed follow-up surveys with 181 adolescents, representing a follow-up rate of 90.0%. Of the eligible individuals, 20 were never successfully contacted or if they were contacted, interviewers were not able to complete a follow-up survey with them during the follow-up period: these cases are classified as expired (10.0%). No individuals refused to complete the follow-up survey when the interviewer contacted him/her; thus, the refusal rate was 0.0%. The project interviewers' efforts accounted for 91.3% of the cases (n = 210) included in the follow-up sample. The only cases not considered accounted for are those individuals who are classified as expired.

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<sup>100</sup> Kaminer, Y., Bukstein, O., & Tarter, R. E. (1991). The teen-addiction severity index: Rationale and reliability. *Substance Use & Misuse, 26*(2), 219-226.

TABLE AA.1. FINAL CASE OUTCOMES FOR FOLLOW-UP EFFORTS

	Number of Records (n = 230)	Percent
Ineligible for follow-up survey	29	12.6%
	Number of cases eligible for follow-up (n = 201)	
Completed follow-up surveys	181	
Follow-up rate is calculated by dividing the number of completed surveys by the number of eligible cases and multiplying by 100		90.0%
Expired cases (i.e., never contacted, did not complete the survey during the follow-up period)	20	
Expired rate ((the number of expired cases/eligible cases) * 100)		10.0%
Refusal	0	
Refusal rate ((the number of refusal cases/eligible cases) * 100)		0.0%
Cases accounted for (i.e., records ineligible for follow-up + completed surveys + refusals)	210	
Percent of cases accounted for ((# of cases accounted for/total number of records in the follow-up sample) * 100)		91.3%

Appendix C compares adolescents who completed a follow-up survey with those who did not complete a follow-up survey. Few differences were found between the two groups.

## REPORT DATA ANALYSIS

This report examines adolescents' self-reported changes from intake to follow-up in outcomes for substance abuse treatment such as substance use, mental health, justice system involvement, and recovery supports. To assess whether the change in a factor (e.g., tobacco use) was statistically significant, paired t-tests were run for continuous variables and z test of proportions were run for categorical variables. Additionally, all analyses presented in the main text of the report examined gender differences using t-test for continuous variables and chi square test of independence for categorical variables. All statistically significant ( $p < .05$ ) differences by gender are reported when they were found.

This report presents not only differences in the absolute numbers and percentages of clients' reporting different behaviors, conditions, and situations (e.g., living situation, used tobacco, and bullied others), but also presents a calculation of the rate of change—a measure often used by policy makers. The percent of change presents 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 increase in their salary they get with a promotion and salary increase. To calculate the percent change in a variable from intake to follow-up (e.g., alcohol use in the past 12 months), we first subtract the value at time 1 (i.e., intake) from the value at time 2 (i.e., follow-up), then divide by the value at time 1 and multiply this value by 100 to get a percentage. For example, let's say 143 clients out of 197 (72.6%) reported using alcohol in the past 12 months at intake. At follow-up, 105 clients out of 197 (53.3%) reported using alcohol in the 12 months before follow-up. The absolute difference between the percentage at intake and follow-up is  $72.6\% - 53.3\% = 19.3\%$ . However, the rate of change is calculated with the equation:  $((105 - 143)/143) * 100 = -26.6\%$ , with the negative sign indicating that the number of individuals who reported using alcohol decreased from intake to follow-up. A positive percent change corresponds to an increase in the number of individuals and a negative percent change corresponds to a decrease in the number of individuals reporting a particular condition or behavior.

## APPENDIX B.

# LOCATING EFFORTS AND QUALITY OF CONTACT INFORMATION FOR THE AKTOS 2014-2015 FOLLOW-UP STUDY

Project interviewers documented their efforts (e.g., mailings, phone calls, internet searches, etc.) to locate each participant included in the sample of individuals to be followed up from July 2013 to June 2015. (n = 230). All the locator files were examined and used to extract information about the efforts project interviewers made to locate and contact participants as well as the type of contact information provided by participants in the original locator information when the intake survey data was submitted to UK CDAR. A subsample of records was randomly selected and independently examined to check that the procedures for extracting data were reliable and valid. The extraction sheets were compared between the two raters for interrater reliability, which was high (98.8%). The following information is based on the data collected during this review of locator files.

For all 230 records, a total of 748 phone calls were made to client phone numbers and 328 calls to contact persons' phone numbers. As Table AB.1 shows, project interviewers made an average of about 3.3 calls to client phone numbers and 1.4 calls to contact persons' phone numbers. Fewer than 40% of clients called in at any point and only 10.9% called-in to complete the survey after receiving the initial mailing without project interviewers putting additional effort into contacting the clients. That means 89.2% of clients took considerable effort to try to locate, contact, and complete follow-up surveys.

A total of 397 mailings were sent to client addresses and 29 mailings were sent to contact persons, an average of 1.7 mailings to clients and 0.1 mailings to contact persons. The research team received returned mail for 16.5% of clients that received mailings to client addresses and 2.2% of clients that received mailings to contact addresses.

In cases where the client contact information was incorrect (i.e., mail was returned, phone number was disconnected), online public directory databases were used to try to verify that we had correct or updated information for the client. Because it had been twelve months since they provided contact information, we want to be sure we are not calling or sending mailings to someone other than the client. Therefore, verifying the correct contact information is a critical interim step in the follow-up process to protect confidentiality. For 39.1% of the clients, the interviewers used public searches/directories to verify contact information. If the client information could not be verified, interviewers also used social media and more detailed public directory databases to find updated contact information (40.0%). In cases where very little contact information was given or clients were not successfully located in the ways listed above, more in-depth searching methods were used (24.8%). As a last resort, in the cases where the client was not successfully located in any of the ways described above, interviewers worked to reach client contacts provided by them at intake (30.0%).

TABLE AB.1. LOCATING EFFORTS FOR ALL FILES (N = 230)

LOCATING EFFORTS	% OF CLIENT RECORDS	AVERAGE PER CLIENT
Number of total phone calls made to reach client		3.3
Number of phone calls made to contact persons (n= 233)		1.4
Clients who called in	37.0%	
<i>Clients who called in and completed survey</i>	33.0%	
<i>Clients who called in and completed survey after receiving the initial client mailing</i>	10.9%	
Contact persons who called in	6.5%	
At least one text message was sent to client	3.9%	
At least one text message was sent to contact person	1.7%	
Number of mailings sent to client		1.7
Handwritten note was sent	9.6%	
Returned mail from client's address	16.5%	
Number of mailings sent to contact persons		0.1
Returned mail from contact person's address	2.2%	
Client level of searching:		
Light (verification, VINE, Whitepages)	39.1%	
Medium (Facebook, Ancestry, USsearch, etc.)	40.0%	
In-depth (other in-depth databases)	24.8%	
Contact searched in any way	30.0%	

Because of study inclusion criteria, a complete client phone number was listed on 100.0% of the records. Less than one-third of these were working numbers for the client (28.7%), 15.2% were working numbers for a contact who knew the client, and 7.8% were working numbers but the contact did not know the client (i.e., wrong number). Less than one-fifth of the phone numbers (18.7%) listed never resulted in contact (e.g., voicemail, busy signal, not receiving incoming calls, etc.) and 18.3% were disconnected. The majority of records also listed one unique, complete address for the client (93.0%; see Table AB.2).

Most of the clients provided the name of at least one other person that they thought would know how to get in touch with them in the next six months (93.5%). In addition, 1 in 10 also provided a unique and complete address and a majority (60.5%) provided at least one unique phone number for a contact.

TABLE AB.2. QUALITY OF CONTACT INFORMATION FOR ALL FILES (N = 230)

LOCATING EFFORTS	% OF CLIENT RECORDS	AVERAGE PER CLIENT
<i>Client Contact Information</i>		
Client phone number listed	100.0%	
Client phone number was:		
Working number for client	28.7%	
Working number, person knew client	15.2%	
Working number, but no one knew the client	7.8%	
Called but did not reach a person (e.g., voicemail, busy signal, not receiving incoming calls)	18.7%	
Disconnected	18.3%	
Never called	11.3%	
Complete client address listed	93.0%	
<i>Locator Contact Information</i>		
Number of contact persons listed		1.2
0	6.5%	
1	68.7%	
2	24.8%	
Number of unique, complete addresses listed for contact persons		0.1
0	89.1%	
1	10.4%	
2	0.4%	
Number of unique, complete phone numbers listed for contact persons		0.8
0	39.6%	
1	44.8%	
2	15.7%	

**APPENDIX C.****CLIENT CHARACTERISTICS AT INTAKE FOR THOSE WITH COMPLETED FOLLOW-UP INTERVIEWS AND THOSE WITHOUT COMPLETED FOLLOW-UP INTERVIEWS**

Youth who completed a follow-up interview are compared in this section with youth who did not complete a follow-up interview for any reason<sup>101</sup> (e.g., not selected into the follow-up sample, ineligible for follow-up, and interviewers were unable to locate the client for the follow-up survey).

**DEMOGRAPHIC CHARACTERISTICS**

The majority of the sample for this annual report was male and White (see Table AC.1). The average client age was around 15 years old. There were no significant differences in age, gender, or race by follow-up status.

TABLE AC.1. COMPARISON OF DEMOGRAPHICS FOR CLIENTS WHO WERE FOLLOWED UP AND CLIENTS WHO WERE NOT FOLLOWED UP<sup>102,103</sup>

	FOLLOWED UP	
	NO n = 270	YES n = 181
AGE	15.5 years	15.5 years
GENDER		
Male	73.3%	70.2%
Female	26.7%	29.8%
RACE		
White	79.2%	79.6%
African American	11.5%	9.9%
Other or multiracial	9.3%	10.5%

**EDUCATION**

Table AC.2 describes clients' school involvement and academic performance when entering treatment. The vast majority were enrolled in school when they entered treatment and also reported they had attended school the last 3 months school was in session. The mean GPA was equivalent to a C. Significantly more youth who did not complete a follow-up reported they had ever repeated a grade in school compared to those who were followed up. Among those who attended school in the last 3 months school was in session, clients who did not complete a follow-up survey reported 16.4 school absences and clients who completed a follow-up survey reported 13.3; however, this difference in average was not statistically significant. There was no difference by follow-up status of clients who reported they were suspended, in detention, or expelled.

<sup>101</sup> Significance is reported for  $p < .05$ .

<sup>102</sup> Four clients who were not followed-up had a missing date of birth, age could not be calculated.

<sup>103</sup> One client who was not followed-up had missing data for race.

TABLE AC.2. CLIENTS' SCHOOL INVOLVEMENT AND ACADEMIC PERFORMANCE AT INTAKE

	FOLLOWED UP	
	NO n = 270	YES n = 181
Enrolled in school (e.g., public, private, home school, alternative, GED classes)	97.0%	97.8%
Average GPA	2.1	2.2
Ever repeated a grade in school*	38.5%	30.4%
Attended school in the last 3 months school was in session	86.3%	86.2%
Among those who attended school in the last 3 months school was in session:	n = 233	n = 156
Average number of days missed school for any reason in the last 3 months school was in session	16.4	13.3
Client was suspended or expelled in the last 3 months school was in session	65.2%	56.4%

\*p &lt; .05

There were no significant differences in primary caregiver or living situation by follow-up status. The majority of youth reported their primary caregiver was a biological parent (see Table AC.3). Just over one-fifth of individuals stated their primary caregiver was other family members. Clients were asked to report with whom or where they had lived in the 12 months before entering treatment. They could report as many places as were applicable in the 12 month period, thus the percentages sum to greater than 100%. The majority reported they had lived with their biological parents, with about one-fourth stating they had lived with other family members. A quarter of clients reported living in an institutional facility in the past 12 months. A small percentage of the sample reported they had been in foster care or that they had lived independently in the past 12 months.

TABLE AC.3 LIVING SITUATION OF CLIENTS BEFORE ENTERING TREATMENT<sup>104,105</sup>

	FOLLOWED UP	
	NO n = 270	YES n = 181
<b>CURRENT PRIMARY CAREGIVER</b>		
Biological parent	70.4%	77.3%
Other family including adoptive family	21.1%	21.0%
Foster parent or DCBS	5.9%	1.7%
<b>WHERE THE CLIENT LIVED IN THE 12 MONTHS BEFORE ENTERING THE PROGRAM</b>		
Home with biological parent	61.9%	69.6%
With other family (including adoptive family)	24.3%	23.5%

<sup>104</sup> Two clients who were not followed up and two clients who were followed up had missing data.<sup>105</sup> Two clients who were not followed up and two clients who were followed up had missing data. The version of the intake survey used during this point included kinship care as foster care. Later versions of the intake survey have been updated to include kinship foster care as separate from non-kinship foster care.

	FOLLOWED UP	
	NO n = 270	YES n = 181
In an institutional facility (e.g., group home, residential treatment, juvenile detention)	27.8%	25.4%
Foster care	4.1%	1.1%
Lived independently (including in a school dormitory)	3.0%	1.7%

## SUBSTANCE USE AT INTAKE

Use of illegal drugs, alcohol, and tobacco in the 12 months before entering treatment is presented by follow-up status in Table AC.4. The majority of the clients reported using any illegal drug in the 12 months before entering the program. The drug class used by the greatest percentage of clients was marijuana with over 87% of youth reporting marijuana use in the 12 months before entering treatment. The next most commonly reported drug used was synthetic drugs, with no difference by follow-up status. Significantly more clients who did not complete a follow-up survey reported opioid use (e.g., prescription opiates, methadone, and buprenorphine) compared to those who completed a follow-up survey in the 12 months before treatment intake. Around one-fifth of clients used non-prescribed CNS depressants and less than one-sixth of clients reported using stimulants in the 12 months before intake. About 1 in 5 youth reported using other illegal drugs (e.g., hallucinogens and inhalants). A small number of youth reported using heroin in the 12 months before intake. The majority of youth reported using alcohol and tobacco in the 12 months before intake.

TABLE AC.4. PERCENTAGE OF INDIVIDUALS REPORTING SUBSTANCE USE IN THE 12 MONTHS BEFORE ENTERING TREATMENT

SUBSTANCES	FOLLOWED UP	
	NO n = 270	YES n = 181
Any illegal drug	90.7%	91.7%
Marijuana	87.4%	90.6%
Synthetic drugs (synthetic marijuana, bath salts)	27.4%	30.9%
Opioids (other than heroin)*	30.7%	23.2%
CNS depressants	19.6%	19.9%
Stimulants	15.6%	13.8%
Heroin	5.2%	2.2%
Other illegal drugs (e.g., hallucinogens, inhalants)	20.0%	16.0%
Alcohol	65.2%	67.4%
Smoking tobacco	72.6%	72.4%

\*p < .05

Similar patterns were found in the past-30-day substance use measures with fewer individuals reporting use of each substance (not depicted in a Table or Figure). Clients who were not followed-up reported using opiates significantly more in the past 30 days than those clients who completed a follow-up survey.

Alcohol and drug composite severity scores were calculated from items included in the intake survey. Because the ASI composite severity scores are based on past-30-day measures, it is important to take into account

clients being in a controlled environment all 30 days when examining composite severity scores and having no opportunity to use substances in the 30 day period. Thus, alcohol and drug severity composite scores are presented in Table AC.5 for only those individuals who were not in a controlled environment all 30 days before treatment intake. The highest composite score is 1.0 for each of the two substance categories.

Of the individuals who were not in a controlled environment all 30 days, a minority met or surpassed the Addiction Severity Index (ASI) composite score (CS) cutoff for alcohol and/or drug severe SUD, with no difference by follow-up status (41.7% for not followed up and 40.9% for followed up; see Table AC.5). Among individuals who were not in a controlled environment all 30 days before entering the program, average scores for the alcohol severity composite score and the drug severity composite score were not different by follow-up status.

TABLE AC.5. SEVERE SUBSTANCE USE DISORDER AT INTAKE

Severe Substance Use Disorder among individuals	Not in a controlled environment all 30 days before entering treatment	
	FOLLOWED UP	
	NO n = 270	YES n = 181
Percent of Individuals with ASI CS equal to or greater than cutoff score for ...		
severe alcohol or drug use disorder	41.7%	40.9%
severe alcohol use disorder	27.1%	25.0%
severe drug disorder	29.6%	25.6%
Average Addiction Severity Index composite score for alcohol use <sup>-a</sup>	.16	.15
Average Addiction Severity Index composite score for drug use <sup>-b</sup>	.13	.12

-a Score equal to or greater than .17 is indicative of severe alcohol use disorder.

-b Score equal to or greater than .16 is indicative of severe drug use disorder.

## BEHAVIORAL HEALTH AT INTAKE

There were no significant differences in the percentage of followed-up and not followed-up clients who met criteria for the behavioral health problems measured in the intake survey (see Table AC.6).

TABLE AC.6. MET CRITERIA ON BEHAVIORAL HEALTH PROBLEMS AT INTAKE

	FOLLOWED UP	
	NO n = 270	YES n = 181
Depression Symptoms	39.6%	40.3%
Anxiety Symptoms	34.4%	33.7%
Traumatic Stress Symptoms	42.6%	38.1%
Attention Deficit Symptoms	58.5%	53.0%
Aggressive Behavior	54.1%	49.2%
General Crime Activity	48.5%	48.6%
Suicidal Ideation/Attempted Suicide	17.4%	13.8%

## JUSTICE SYSTEM INVOLVEMENT AT INTAKE

The majority of adolescents in the sample reported being referred to treatment by the justice system, with no difference between those who were followed up and those who were not (56.2% vs. 62.5% respectively; not depicted in a Table or Figure).

Less than half of the youth in the sample (45.9% of those not followed up and 42.5% of those followed up) reported they had been arrested in the 12 months before entering treatment (see Table AC.7). Of the individuals who reported being arrested, they reported an average of 2.3-2.9 arrests in the 12 months before entering treatment. Among adolescents who reported an arrest in the 12 months before intake, there were no significant differences in the percentage of adolescents arrested for different type of offenses by follow-up status. About one half of clients were under supervision by the justice system (e.g., in Drug Court or on probation) when they entered treatment.

TABLE AC.7. JUSTICE SYSTEM INVOLVEMENT WHEN ENTERING TREATMENT

	FOLLOWED UP	
	NO n = 270	YES n = 181
Arrested for any charge in the 12 months before entering treatment	45.9%	42.5%
Of those with an arrest,	n = 124	n = 77
Average number of arrests	2.9 arrests	2.3 arrests
Charged with a status offense	36.3%	41.6%
Charged with a drug offense	41.1%	40.3%
Charged with probation violation	39.5%	39.0%
Charged with a property crime	32.3%	22.1%
Charged with crime against persons	23.4%	16.9%
Charged with a DUI	7.3%	6.5%
Charged with other criminal offense	35.5%	24.7%
Currently under supervision by the justice system	51.1%	52.5%

There was no difference in follow-up status for clients who reported being incarcerated for at least one day in the 12 months before entering treatment (See Table AC.8). Among the individuals who were incarcerated at least one night, the average incarceration time in the 12 months before entering treatment was 31.4 days for individuals who were not followed up and 30.3 days for individuals who were followed up, with no significant difference by follow-up status.

TABLE AC.8. INCARCERATION HISTORY IN THE 12 MONTHS BEFORE ENTERING TREATMENT

	FOLLOWED UP	
	NO n = 270	YES n = 181
Incarcerated at least one day	37.4%	31.5%
Of those incarcerated	(n = 101)	(n = 57)
Average number of days incarcerated	31.4	30.3

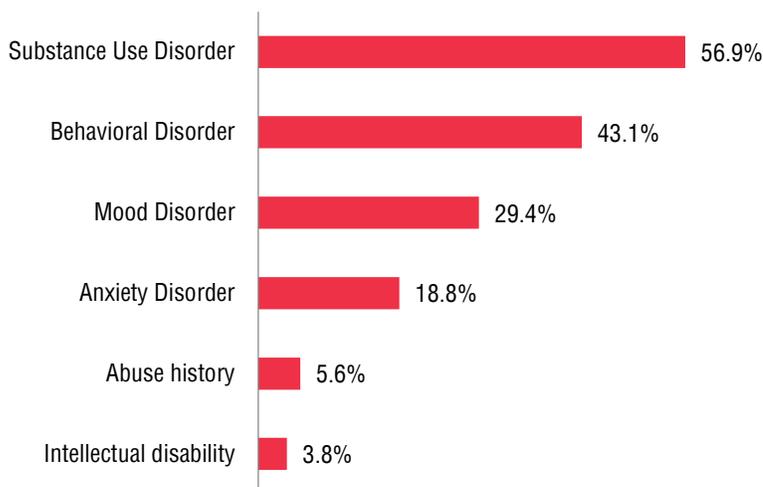
## APPENDIX D.

# DIAGNOSTIC AND CLINICAL SERVICE INFORMATION

Using the diagnostic and 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 included in this report. The data set is managed by the University of Kentucky Institute for Pharmaceutical Outcomes and Policy (UK IPOP). Twenty-one clients (11.6% of the AKTOS follow-up sample) had no services or diagnoses in the data set during the time period under review. 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. Thus, diagnostic and service event data was available for 160 follow-up clients.

Figure AD.1 shows the percentage of clients diagnosed with various categories of mental health disorders. Clients can have multiple diagnoses, for example, alcohol dependence and cannabis abuse. More than half of clients (56.9%) had a diagnosis of substance use disorder (abuse or dependence). The next most commonly found diagnosis type was for behavior disorders (43.1%; e.g., impulse-control disorder, conduct disorder, disruptive behavior disorder, oppositional defiant disorder, ADHD). More than one fourth (29.4%) had a diagnosis of a mood disorder (e.g., depression or non-psychotic bipolar disorder), and 18.8% had a diagnosis of anxiety disorder (such as generalized anxiety, panic disorder, or obsessive-compulsive disorder).<sup>106</sup>

FIGURE AD.1. DSM-IV DIAGNOSES FOR ADOLESCENT KTOS CLIENTS IN TREATMENT DURING FY 2013 AND FY 2014 (n=160)

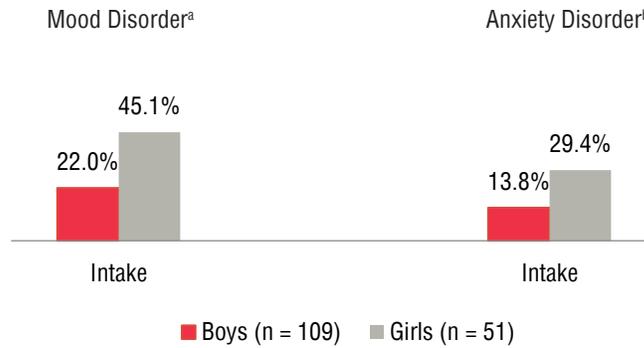


Behavioral, mood, other non-psychotic, anxiety, other psychotic, and personality disorders were combined into one category of non-substance use-related psychiatric disorders to examine substance use and comorbid psychiatric disorders. A little more than one-third of adolescents (35.5%) had diagnoses in their records indicating comorbid substance use disorders and other psychiatric disorders (not depicted in a figure).

Significantly more girls than boys had a recorded mood disorder diagnosis (45.1% vs. 22.0%), and anxiety disorder (29.4% vs. 13.8%; see Figure AD.2).

<sup>106</sup> Small numbers of adolescents had other types of diagnoses: other non-psychotic disorder (1.9%), personality disorder (1.9%), and other psychotic and developmental disorder (0.6%).

FIGURE AD.2. GENDER DIFFERENCES IN MOOD DISORDER AND ANXIETY DISORDER DIAGNOSIS



a—Significant difference by gender,  $p < .01$ .

b—Significant difference by gender,  $p < .05$ .

The 160 adolescent clients with matching service event data received a total of 8,990 services between intake and follow-up. Bluegrass Community Mental Health Center (CMHC) clients received the highest total number of services and Seven Counties Regional Community Mental Health Center clients received the highest average number of services per client (see Table AD.1).

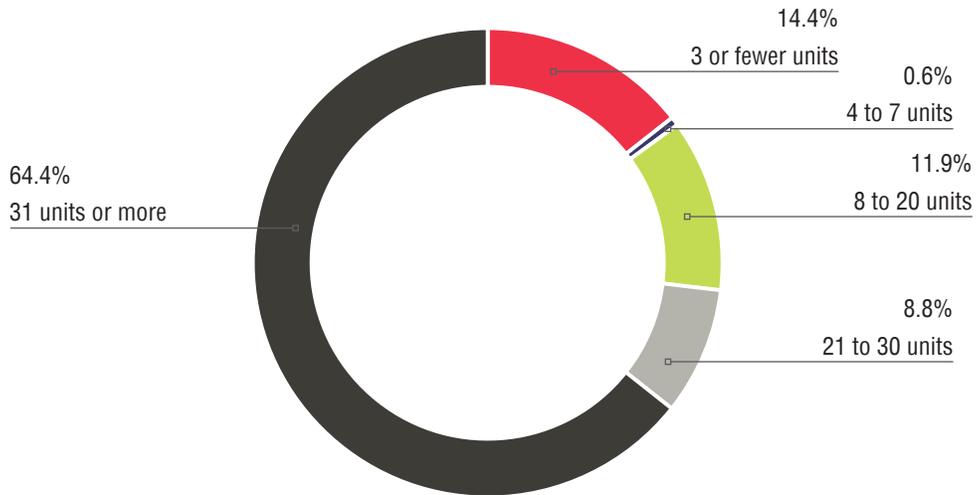
TABLE AD.1. DISTRIBUTION OF SERVICES REPORTED BY CMHC REGIONS FOR ADOLESCENT CLIENTS IN TREATMENT DURING FY 2013 AND FY 2014 (n = 160)

	TOTAL NUMBER OF SERVICES	N	AVERAGE NUMBER OF SERVICES PER CLIENT
Four Rivers	56	9	9.2
Pennyroyal	910	10	91.0
RiverValley	96	4	24.0
LifeSkills	77	4	19.3
Communicare	163	5	32.6
Seven Counties	2,198	12	183.2
NorthKey	0	0	0
Comprehend	28	5	5.6
Pathways	1,167	16	72.9
Mountain	1,118	14	79.9
Kentucky River	114	4	28.5
Cumberland River	119	2	59.5
Adanta	352	11	32.0
Bluegrass	2,592	64	40.5
TOTAL	8,990	160	56.2

Figure AD.3 shows the range of the number of units<sup>107</sup> of clinical services received by AKTOS clients. Considering only the 160 clients with diagnostic and/or service event data, 14.4% received 3 or fewer units of service, 0.6% received 4 to 7, 11.9% received 8 to 20, 8.8% received 21 to 30, and 64.4% received 31 or more units of service.

<sup>107</sup> Units of service is a separate measure from number of services.

FIGURE AD.3. THE NUMBER OF UNITS OF CLINICAL SERVICES RECEIVED BY ADOLESCENT CLIENTS (n = 160)



The majority of clients (71.3%) received individual therapy services, 59.4% evaluation and diagnostic services, 31.3% received group therapy services, 16.9% received psychiatric individual therapy, 15.0% received case management, 10.6% received substance abuse case management, and 8.1% received substance abuse residential services (see Figure AD.4). Fewer than 5% of the cases had the following services in the client-level Treatment Episode Data Set (TEDS): therapeutic rehabilitation, non-residential crisis, residential crisis, and other services not classified into other categories.

FIGURE AD.4. PERCENTAGE OF CLIENTS RECEIVING EACH CATEGORY OF TREATMENT FOR THOSE RECEIVING SERVICES (n = 160)

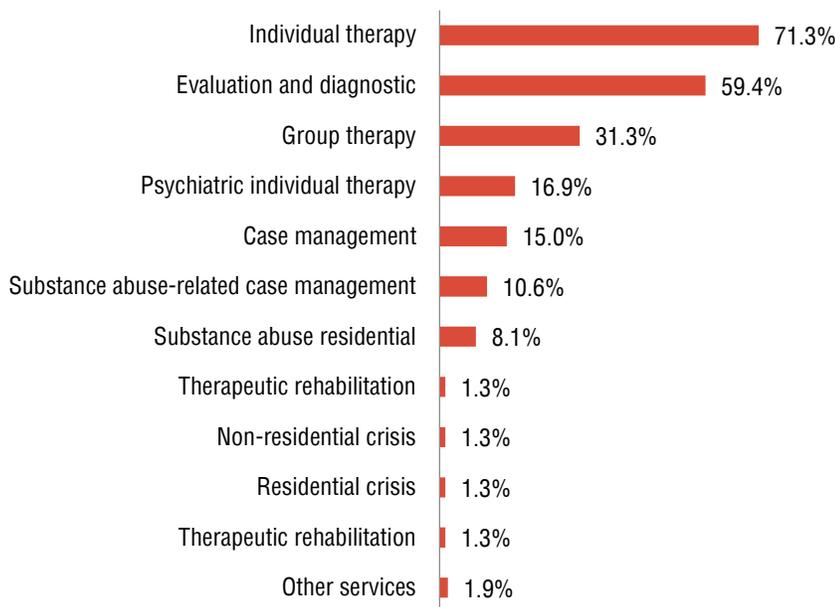


Figure AD.5 shows the average units of service for each type of service among those clients who received at least one unit of those service types. Services that fewer than 5% of adolescents received are not presented in Figure AD.5. An average of 164.9 units of substance abuse residential treatment services, 190.6 group therapy units of service, and 60.7 units of individual therapy service were provided to those who received these types of services.

FIGURE AD.5. AMONG CLIENTS RECEIVING AT LEAST ONE SERVICE IN THE CATEGORY, AVERAGE NUMBER OF UNITS OF CLINICAL SERVICES

