Adolescent Substance Abuse Treatment in Kentucky

Executive Summary

Given Kentucky's unique sociocultural context, research on adolescent substance abuse treatment specific to the state is critical. The purpose of this report is to provide a snapshot of adolescents as they entered substance abuse treatment from three large samples in Kentucky (n = 1,968)[1], and to examine change in targeted factors from treatment intake to 12-month follow-up for 376 adolescents.

At Treatment Intake

- Adolescents entered substance abuse treatment with complex and interrelated risk factors, such as high rates of adverse childhood experiences, mental health problems, and involvement with the juvenile justice system.
  - Two-thirds of clients were male and 78% were White/Caucasian. The average age of clients at treatment entry was 15.8 years old. The majority of clients reported their biological parent was their primary caregiver
  - A little more than half of individuals resided in a county that was classified as a metropolitan community.
  - Over one hundred counties are represented in the client residence map suggesting this analysis provides a statewide picture of adolescent substance use.
  - The majority of clients were referred to treatment by the court system (46.4%) or the child welfare system (17.8%).
  - A little more than half of clients were under supervision by the juvenile justice system at the time of treatment intake.
  - Most clients were early initiators of alcohol, drug use, and smoking tobacco (i.e., before the age of 14).
  - Marijuana was the most commonly used substance; reported by more clients at treatment intake than all other classes of drugs, alcohol, tobacco, and vaporized nicotine.
- There were several important gender differences. Female clients entered treatment with more adverse childhood experiences, more alcohol use, more internalizing problems, more disordered eating, and less involvement with the justice system when compared to male clients.
  - Compared to male clients, higher numbers of female clients reported all kinds of victimization (e.g., emotional maltreatment, physical maltreatment, emotional neglect, physical neglect, and sexual abuse) as well as other childhood adversities such as witnessing intimate partner violence against a parent, substance abuse by a household member, and mental illness of a household member. This finding suggests that even within a population of youth with less stable family environments, female clients presenting for treatment may have even greater vulnerabilities to mental health and substance use problems.
  - Compared to male clients, female clients had more internalizing problems and more female clients reported disordered eating and

[1] Because 93% of the clients who completed an intake interview were under the age of 18 years old, the term "adolescent" will be used to refer to clients in this report. The follow-up sample was restricted to clients who were under the age of 18 when they entered treatment.

suicidal ideation and/or attempts when entering treatment.
- Significantly more male than female clients were under supervision by the juvenile justice system when they entered treatment.

Treatment Outcomes

Of the 436 adolescents eligible for follow-up, follow-up interviews were completed on 376 for a follow-up rate of 86%. Outcome data showed significant improvement from treatment intake to 12-month follow-up on the targeted factors:

- Significant decreases in substance use and severity of substance use.
- Significant decreases in the number of adolescents with clinically significant attention problems, internalizing behavior, and externalizing behavior.
- Significant decrease in the number of individuals with disordered eating symptoms and suicidal ideation and/or attempts.
- Significant improvement in GPA and significant decreases in the number of school absences for any reason as well as school absences for disciplinary reasons were found for those enrolled in school at intake and follow-up.
- Decreased involvement with the juvenile justice system over time.
- Increased recovery supports and increased satisfaction with social support.

Conclusion

Adolescents entered substance abuse treatment with complex and interrelated risk factors, such as high rates of adverse childhood experiences, mental health problems, school disciplinary issues, and involvement with the juvenile justice system.

Findings from Kentucky's statewide substance abuse treatment outcome evaluations with adolescent clients indicate successful treatment experiences for many adolescents. Specifically, there were improvements in four core domains of client functioning: (1) substance use and severity of substance use, (2) mental health, (3) school attendance and performance, and (4) juvenile justice system involvement. Outcome data showed significant decreases in substance use and severity of substance use over time. This study is one of the first to present a statewide portrait of Kentucky adolescents entering substance abuse treatment and examining treatment outcomes.

"It really helped me and they invested time in me. They understood my feelings and made me feel important."

- ADOLESCENT FOLLOW-UP CLIENT

Contents

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Introduction

Adolescence is a critical period of vulnerability to substance use. Adolescents' tendencies toward risk-taking and greater susceptibility to peer influences contribute to greater experimentation with substance use in adolescence.[2] In Kentucky, about 23,000 adolescents (6.9% of all adolescents) per year from 2009-2013 reported using illicit drugs and 82,000 people aged 12-20 (16.0% of all people in this age group) reported binge alcohol use in the month before they were surveyed in the National Survey of Drug Use and Health (NSDUH).[3] Neurodevelopment renders the adolescent brain more vulnerable to addiction than the adult brain.[4, 5] 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.[6, 7, 8]

Kentucky's unique sociocultural context includes some of the highest rates in the United States for drug overdose fatalities among 12- to 25-year old individuals, smoking, teen births, obesity in 10- to 17-year-old individuals, along with the fourth highest proportion of adolescents on disability in the U.S. Furthermore, youth in Kentucky begin smoking at younger ages when compared to youth in the U.S. Kentucky also ranks low in financial opportunity, financial well-being, and has a high percentage of children living in poverty (see Figure 1).[9, 10, 11, 12, 13, 14] Given this context, research on adolescent substance abuse treatment specific to Kentucky is critical.

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[2] Stagman, S., Schwarz, S. W., & Powers, D. (2011). *Adolescent substance use in the U.S.: Facts for policymakers.* New York: National Center for Children in Poverty, Columbia University, Mailman School of Public Health.

[3] Substance Abuse and Mental Health Services Administration (SAMHSA). (2015). *Behavioral Health Barometer: Kentucky, 2014.* (HHS Publication No. SMA-15-4895KY). Rockville, MD: Substance Abuse and Mental Health Services Administration. http://www.samhsa.gov/data/sites/default/files/State_BHBarometers_2014_1/BHBarometer-KY.pdf

[4] Volkow, N., & Li, T.K. (2004). Drug addiction: The neurobiology of behavior gone awry. *Neuroscience, 5*, 963-970.

[5] Casey, B. J., & Jones, R. M. (2010). Neurobiology of the adolescent brain and behavior: Implications for substance use disorders. *Journal of the American Academy of Child & Adolescent Psychiatry, 49*(12), 1189-1201.

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[8] 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.

[9] Centers for Disease Control and Prevention. (2016). Kentucky 2015 and United States 2015 Results, High School Youth Risk Behavior Survey. Retrieved September 14, 2016 from https://nccd.cdc.gov/youthonline/app/Results.aspx?LID=KY

[10] Centers for Disease Control and Prevention, National Center for Health Statistics. (2012). *National Survey of Children's Health (NSCH) 2011/12.* Data query from the Child and Adolescent Health Measurement Initiative, Data Resource Center for Child and Adolescent Health website. Retrieved September 14, 2016 from www.childhealthdata.org.

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[13] Gallup Polls. (2015). *State of American well-being: 2015 state well-being rankings.* Retrieved from http://info.healthways.com/hubfs/Well-Being_Index/2015_Data/Gallup-Healthways_State_of_American_Well-Being_2015_State_Rankings.pdf?t=1454003500629.

[14] United Health Foundation. (2015). *America's health rankings: Annual report.* Retrieved September 7, 2016 from http://cdnfiles.americashealthrankings.org/SiteFiles/Reports/2015AHR_Annual-v1.pdf.

FIGURE 1.
KENTUCKY CONTEXT

7th highest in the nation for **DRUG OVERDOSE DEATHS AMONG 12- TO 25-YEAR OLDS**

3rd highest in the nation for **SMOKING RATE AMONG HIGH SCHOOL STUDENTS**

27th lowest in the nation for **EDUCATION**

4th highest in the nation for **DISABILITY AMONG 15-20 YEAR OLDS**

2nd highest in the nation for **CHILDREN IN POVERTY**

35th lowest in the nation for **OVERALL CHILD WELL-BEING**

38th lowest in the nation for **ECONOMIC WELL-BEING**

37th lowest in the nation for **FAMILY AND COMMUNITY**

The purpose of this report is to provide a snapshot of adolescents as they enter substance abuse treatment from three large samples in Kentucky (n = 1,968), and to examine change in targeted factors from treatment intake to 12-month follow-up for 376 adolescents. Details about the samples which were from treatment outcome evaluation studies commissioned by the Kentucky Department for Behavioral Health, Developmental and Intellectual Disabilities (DBHDID) are presented in Appendix A. See the comparison of the AKTOS clients vs. the KY Kids Recovery/AHARTT clients in Appendix B.[15]

Details about the evidence-based assessments used at treatment intake and 12-month follow-up are presented in the Evidence Base for the Adolescent Kentucky Treatment Outcome Study (AKTOS) Assessment and Methods.[16] Two of the outcome evaluation study reports have been published and are available at the UK CDAR Behavioral Outcome Studies website: http://cdar.uky.edu/KKRP/ and http://cdar.uky.edu/AHARTT/.[17, 18]

[15] For more information about AKTOS, please see Cole, J., Logan, T., Miller, J., Scrivner, A., & Walker, R. (2016). Findings from the Adolescent Kentucky Treatment Outcome Study (AKTOS) 2016 Report. Lexington, KY: University of Kentucky, Center on Drug and Alcohol Research.

[16] Cole, J., Logan, T., Miller, J., & Scrivner, A. (2016). *Evidence base for the Adolescent Kentucky Treatment Outcome Study (AKTOS): Assessment and Methods*. Lexington, KY: University of Kentucky, Center on Drug and Alcohol Research, Behavioral Health Outcome Studies.

[17] Cole, J., Logan, T., Miller, J., & Scrivner, A. (2017). *Adolescent Health and Recovery Treatment and Training (AHARTT) Outcome Evaluation*. Lexington, KY: University of Kentucky, Center on Drug and Alcohol Research.

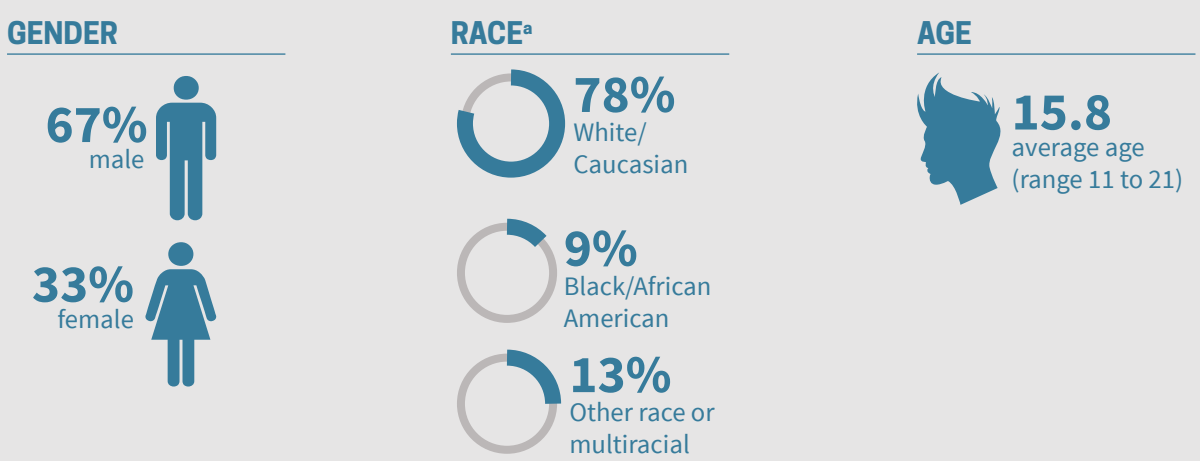
[18] Cole, J., Logan, T., Miller, J., & Scrivner, A. (2017). *KY Kids Recovery Program Outcome Evaluation*. Lexington, KY: University of Kentucky, Center on Drug and Alcohol Research.

Part I.
Snapshot of Adolescent Clients in Substance Abuse Treatment in Kentucky

This report describes the characteristics of 1,968 adolescent clients receiving treatment services in Kentucky.[19]

Two-thirds of clients were male, about one-third were female, and a fraction of a percent were transgender. Over three-fourths were White/Caucasian, less than 1 in 10 were Black/African American, and the remaining percent reported their race was other (e.g., Asian, Native American, Hispanic) or multiracial (see Figure 2).

FIGURE 2. DEMOGRAPHIC INFORMATION ON ADOLESCENT TREATMENT CLIENTS (n = 1,968)



a—Three clients had missing values for race

The majority of clients reported their primary caregiver was a biological parent, 1 in 4 reported their primary caregiver was another family member (such as a grandparent, aunt, stepparent, or kinship care), and 1 in 20 reported their primary caregiver was a foster parent or the Department for Community-Based Services (DCBS), which is the child welfare agency. A little more than half of individuals resided in a county that was classified as a metropolitan community. A little more than one-third of individuals resided in a county that was classified as non-metropolitan, and 1 in 10 resided in a very rural county (see Figure 3). In the 12 months before entering treatment, most individuals resided with family members, nearly one-third resided in an institutional setting, and a small minority lived on their own or with peers at some point.

[19] For state Fiscal Years 2015 – 2016, there were 347 adolescent (unduplicated) clients who received treatment services in Community Mental Health Centers across the state and completed an intake assessment (i.e., AKTOS clients). During the funding period for the Kentucky Kids Recovery Program/AHARTT from October 1, 2014 – September 30, 2016, there were intake interviews with 1,621 (unduplicated) clients who received treatment services at the 19 programs. There were 2,010 completed intake interviews; however, 42 were for individuals for whom there were multiple completed intake surveys. Only one intake survey per person was kept in the data set.

FIGURE 3. LIVING SITUATION FOR SUBSTANCE ABUSE TREATMENT CLIENTS (n = 1,968)

PRIMARY CAREGIVER

66% Biological parent

26% Other family member

5% Foster parent or Department for Community Based Services

TYPE OF COMMUNITY IN WHICH CLIENT RESIDED[a]

54% Metropolitan

35% Non-metropolitan

11% Very rural

LIVING SITUATION, PAST 12 MONTHS

92% Lived with family members

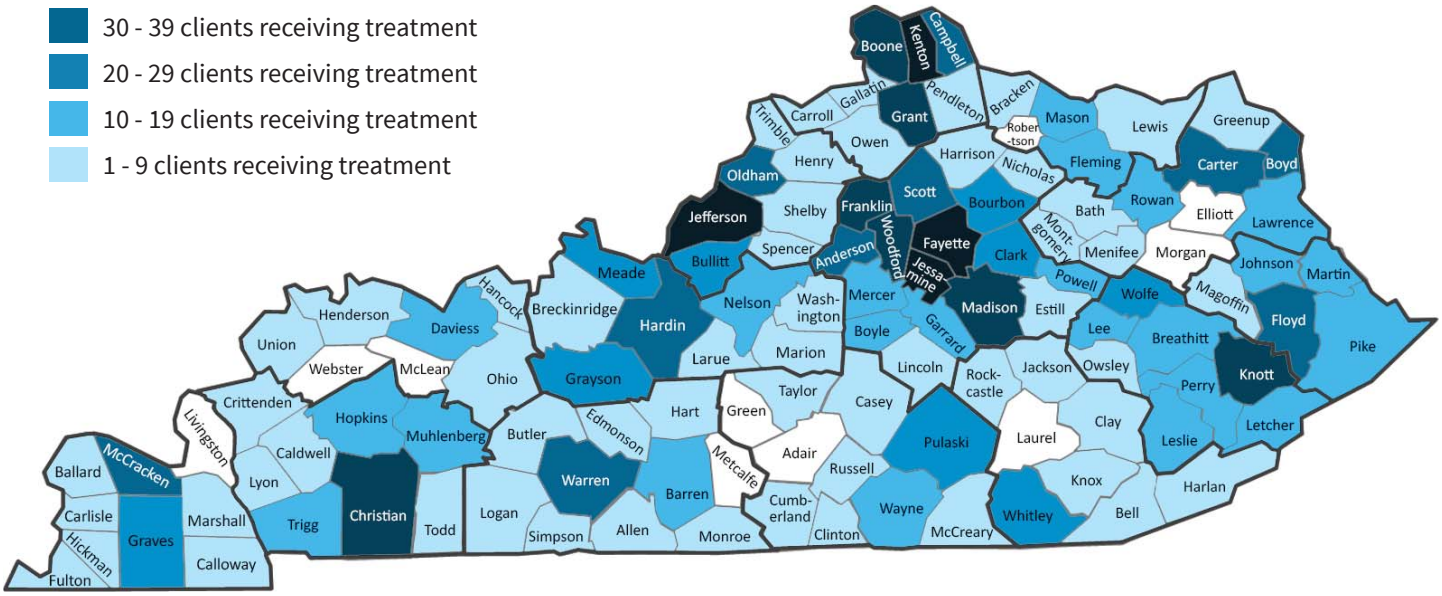
32% Lived in an institutional setting

7% Lived with friends or on their own

a—Thirty individuals have missing values on this variable. Seven individuals had missing data for the county in which they resided and 24 individuals resided in counties outside of Kentucky.

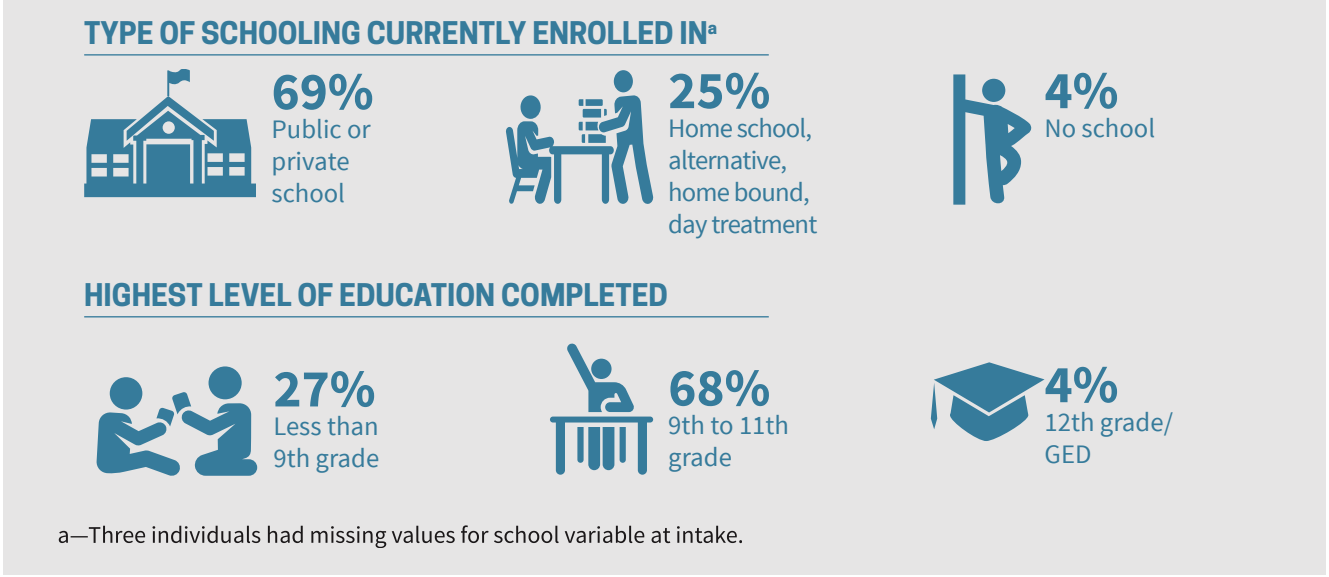
Clients reported at treatment intake the county in which they resided. One hundred and ten of the 120 counties in Kentucky are represented in the client residence map suggesting this sample is a statewide picture of adolescent substance use (see Figure 4).

FIGURE 4. COUNTY OF RESIDENCE REPORTED BY CLIENTS WHO RECEIVED TREATMENT IN KENTUCKY (N = 1,968)



Most of the individuals were enrolled in school at the time of the intake interview. About 7 in 10 were enrolled in public or private school, 1 in 4 were enrolled in home school, alternative school, home bound, or day treatment school (see Figure 5). Only a small percentage were not enrolled in school. Most individuals were in high school at treatment intake, with about one-fourth having completed a grade lower than 9th grade.

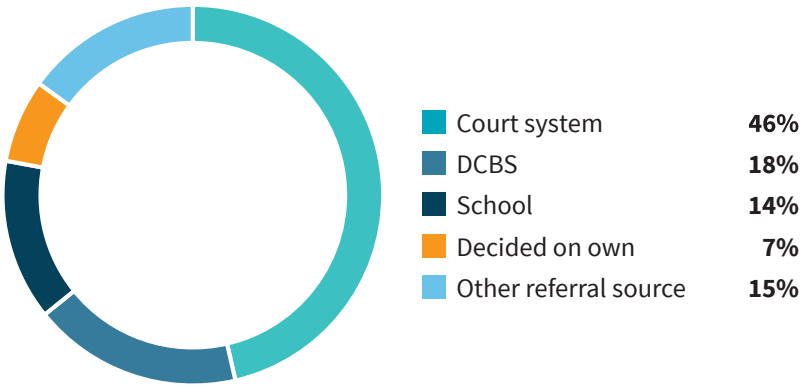
FIGURE 5. EDUCATION AND SCHOOLING FOR TREATMENT CLIENTS (n = 1,968)



a—Three individuals had missing values for school variable at intake.

Nearly one-half of adolescent clients were referred to treatment by the court system (see Figure 6). The next most frequently mentioned referral source was the state child welfare agency Department for Community Based Services (DCBS), followed by the school system.

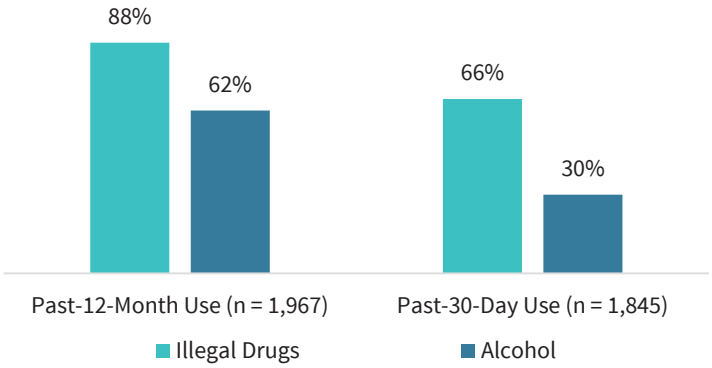
FIGURE 6. TYPE OF REFERRAL TO SUBSTANCE ABUSE TREATMENT (n = 1,968)



Substance Use History

In the 12 months before entering treatment nearly 9 in 10 clients reported they had used illegal drugs and three-fifths used alcohol (see Figure 7). In the 30 days before entering treatment, about two-thirds reported they had used illegal drugs and 3 in 10 reported they had used alcohol (see Figure 7).

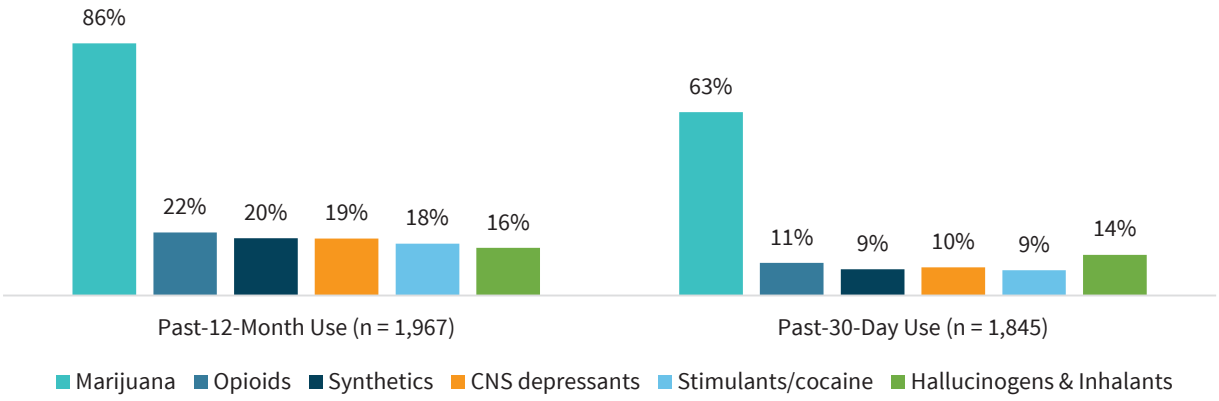
FIGURE 7. ALCOHOL AND DRUG USE AMONG CLIENTS NOT IN A CONTROLLED ENVIRONMENT ALL 365 DAYS (n = 1,967) OR 30 DAYS (n = 1,845) BEFORE PROGRAM ENTRY



For comparison to the general population of adolescents, among high school students surveyed in the Youth Risk Behavior Survey (YRBS) in Kentucky in 2015, in the month before the survey, 9% had at least one drink of alcohol.[20]

When examining substance use as adolescents entered the program, marijuana was by far the most commonly used illegal drug in the 12-month and 30-day periods before adolescents entered treatment (see Figure 8). In the 12 months before entering treatment, similar percentages of adolescents—about 1 in 5—reported using opioids (including prescription opiates/opioids, methadone, and buprenorphine), synthetic drugs (e.g., bath salts, synthetic marijuana, spice), and Central Nervous System depressants (including benzodiazepines, sedatives, tranquilizers, and hypnotics). Slightly lower percentages of clients reported using stimulants (including prescription stimulants, methamphetamine, and cocaine) and other illegal drugs such as inhalants and hallucinogens. Only a small minority of clients reported using heroin in the 12-months (5%) and 30-days (2%) before entering treatment (not depicted in a figure).

FIGURE 8. MOST COMMONLY USED ILLEGAL DRUGS AMONG CLIENTS NOT IN A CONTROLLED ENVIRONMENT ALL 365 DAYS (n = 1,967) OR 30 DAYS (n = 1,845) BEFORE PROGRAM ENTRY[21]



[20] Kentucky Department of Education (KDE), Kentucky Department for Public Health (KDPH), and Centers for Disease Control and Prevention (CDC). Kentucky Youth Risk Behavior Surveillance system. Frankfort, KY: Cabinet for Health and Family Services, Kentucky Department of Education, 2015.

[21] Clients who reported they had not used any illegal drugs, including marijuana, in the 12 months before entering treatment (10.9% of boys and 15.4% of girls in Figure 10) are not depicted in Figure 8.

Among high school students surveyed in the Youth Risk Behavior Survey (YRBS) in Kentucky in 2015, in the month before the survey, 17% had used marijuana at least one time[20] compared to 63% of the sample in this report.

Clients who reported using illegal drugs in the 12 months before intake were asked how old they were when they first used illegal drugs. They reported they were, on average, 12.9 years old when they first began using illegal drugs. The majority of clients (59%) reported they first used illegal drugs before they were 14 years old (see Figure 9).

FIGURE 9. AVERAGE AGE CLIENTS FIRST USED ILLEGAL DRUGS (n = 1,688)[22]

Less than 12 years old	**18%**
12 – 13 years old	**41%**
14 – 15 years old	**33%**
16 – 18 years old	**8%**

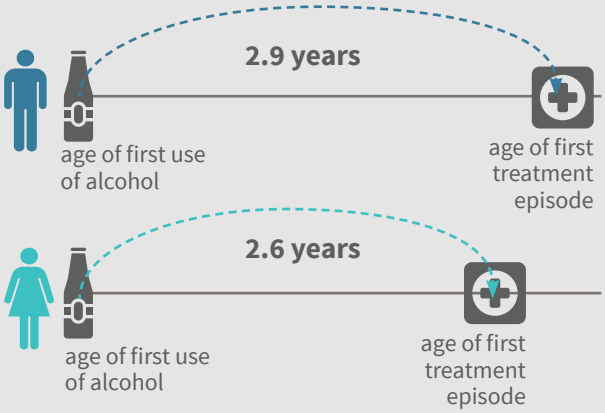
Clients were classified into one of four groups based on their self-reported use of marijuana and other illegal drugs in the 12 months before entering treatment. A significant gender difference was found for the groups (see Figure 10). Specifically, significantly more male clients than female clients reported that they had used only marijuana and significantly more female than male clients reported they had not used any illegal drugs in the 12-month period.

Gap Between Age of First Use and Age of Treatment Episode

The average number of years between clients' age and treatment intake and age of first use of alcohol and age of first use of illegal drugs was 2.8 years and 3.0 years, respectively.

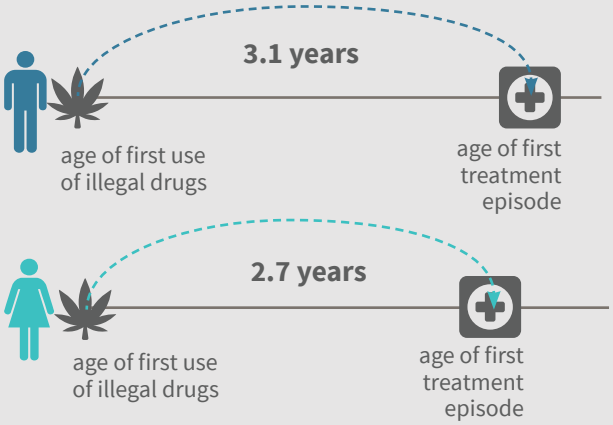
Alcohol Use

Male clients had a significantly higher gap in age of entering treatment and age of first alcohol use (2.9 vs. 2.6).



Illegal Drug Use

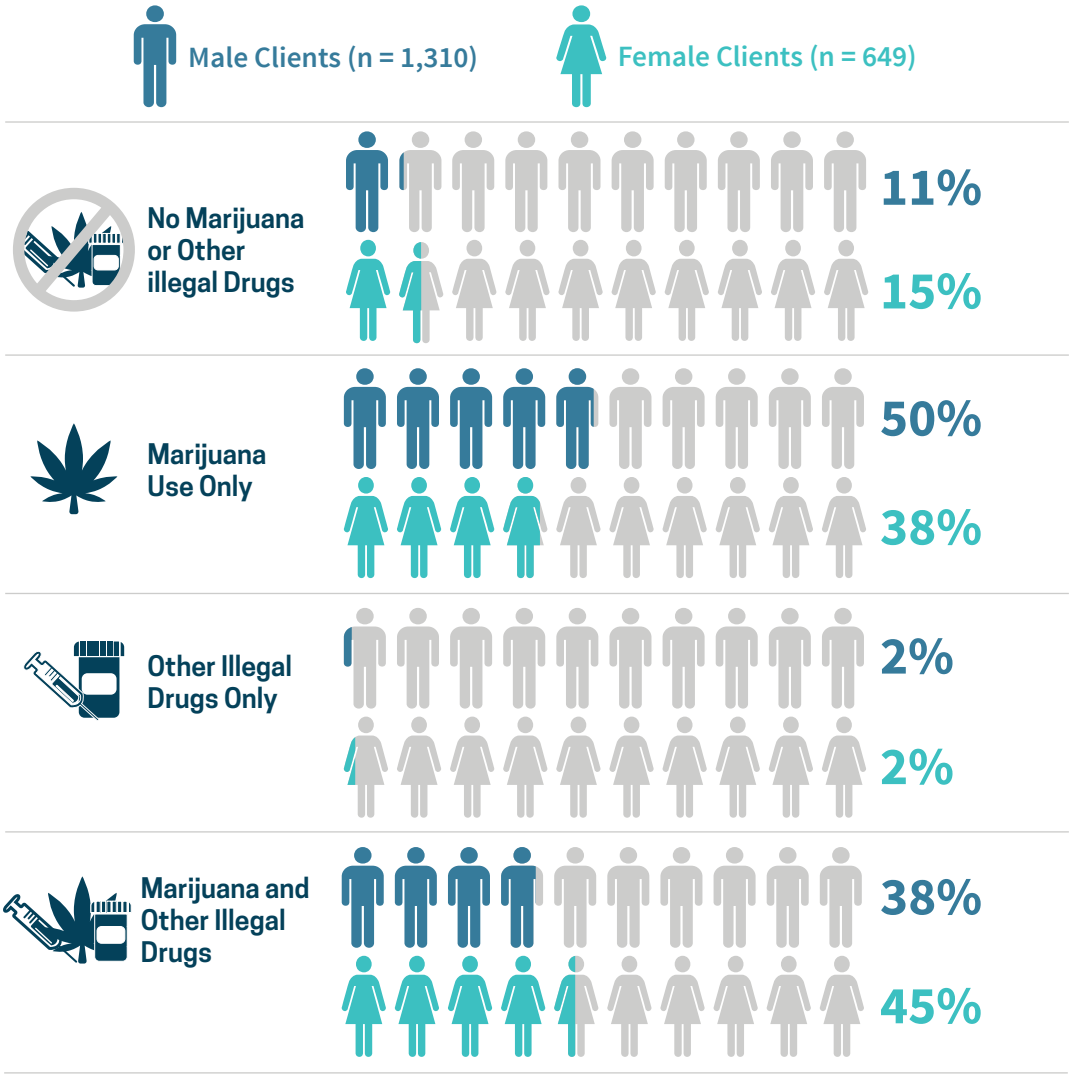
Male clients had a significantly higher gap in age of entering treatment and age of first illegal drug use (3.1 vs. 2.7).



There was no difference by race.

[22] Age of first use of illegal drugs was missing for 37 clients.

FIGURE 10. MARIJUANA AND OTHER ILLEGAL DRUG USE IN THE 12 MONTHS BEFORE ENTERING TREATMENT BY GENDER (n = 1,959)***[23]

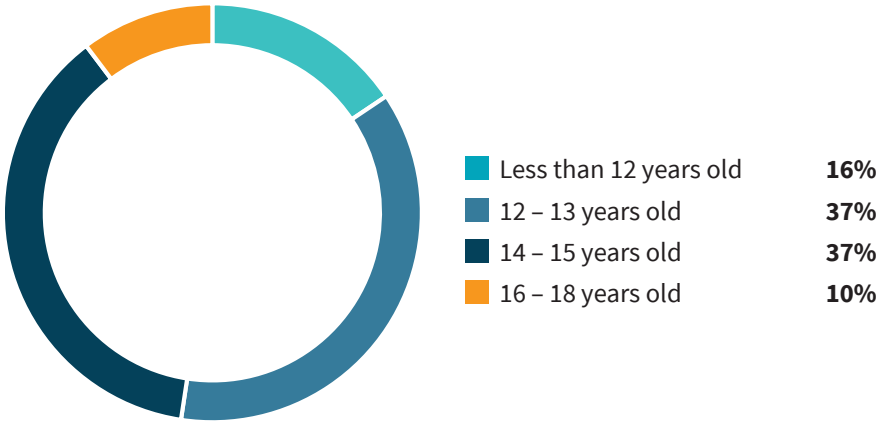


***p < .001; Gender difference tested with chi square test of independence .

As shown in Figure 7, 66% had used alcohol in the 12 months before beginning treatment. Of the clients who reported using alcohol in the 12 months before intake, they reported being, on average, 13.1 years old when they first had a drink of alcohol (other than a few sips; see Figure 11 for age distribution).

[23] Eight individuals who reported they were transgender were not included in this analysis because a group of 8 is too small upon which to run statistical significance testing.

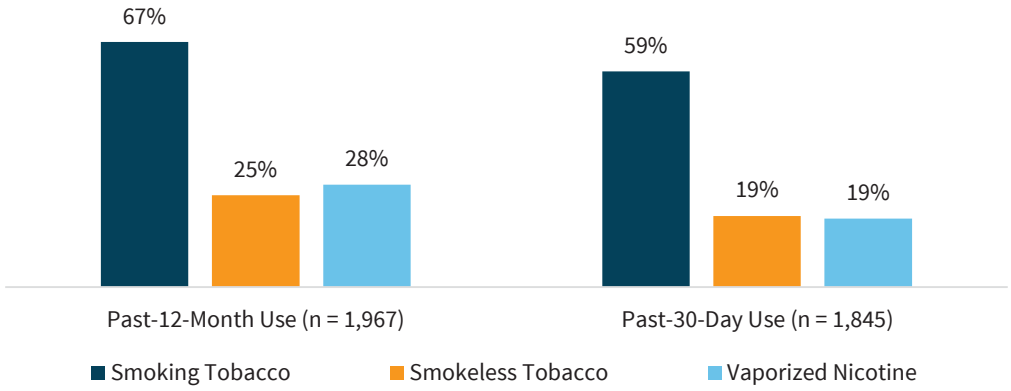
FIGURE 11. AVERAGE AGE CLIENT HAD FIRST DRINK OF ALCOHOL (n = 1,213)[24]



Tobacco and Vaporized Nicotine Use

In the 12 months before entering treatment, two-thirds of clients had smoked tobacco, one-fourth used smokeless tobacco, and a little more than one-fourth used vaporized nicotine (see Figure 12). In the 30 days before entering treatment, more than half of clients had smoked tobacco and nearly 1 in 5 had used smokeless tobacco and vaporized nicotine (see Figure 12).

FIGURE 12. TOBACCO AND VAPORIZED NICOTINE USE AMONG CLIENTS NOT IN A CONTROLLED ENVIRONMENT ALL 365 DAYS (n = 1,967) OR 30 DAYS (n = 1,845) BEFORE PROGRAM ENTRY[25]



The percent of high school students in Kentucky who reported they smoked cigarettes at least one day in the past 30 is higher than the percent of high school students in the U.S. (18% vs. 10%).[26] It is even higher in this sample of adolescents (59%).

Of the treatment clients who reported smoking tobacco products in the 12 months before entering treatment, the average age they began smoking tobacco regularly was 12.9 years old. One in five

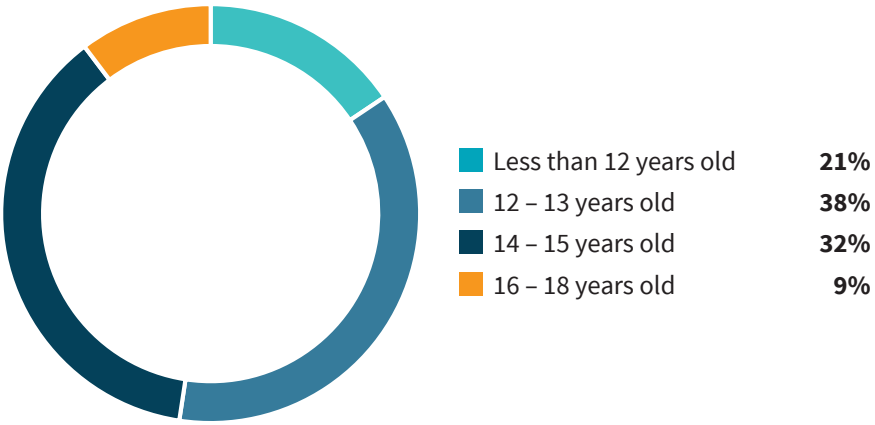
[24] Age of first use of alcohol was missing for 6 clients.

[25] Questions about vaporized nicotine products were added in July 2015. Thus, data for use of vaporized nicotine products is available for 1,427 individuals for the 12-month period and for 1,333 individuals for the 30-day period.

[26] Centers for Disease Control and Prevention. (2016). *1991-2015 High School Youth Risk Behavior Survey Data*. Retrieved June 30, 2016, from http://nccd.cdc.gov/YouthOnline/App/Default.aspx

smokers reported they began smoking tobacco products before they were 12 years old, and a little under two-fifths began smoking tobacco when they were 12 or 13 years old (see Figure 13).

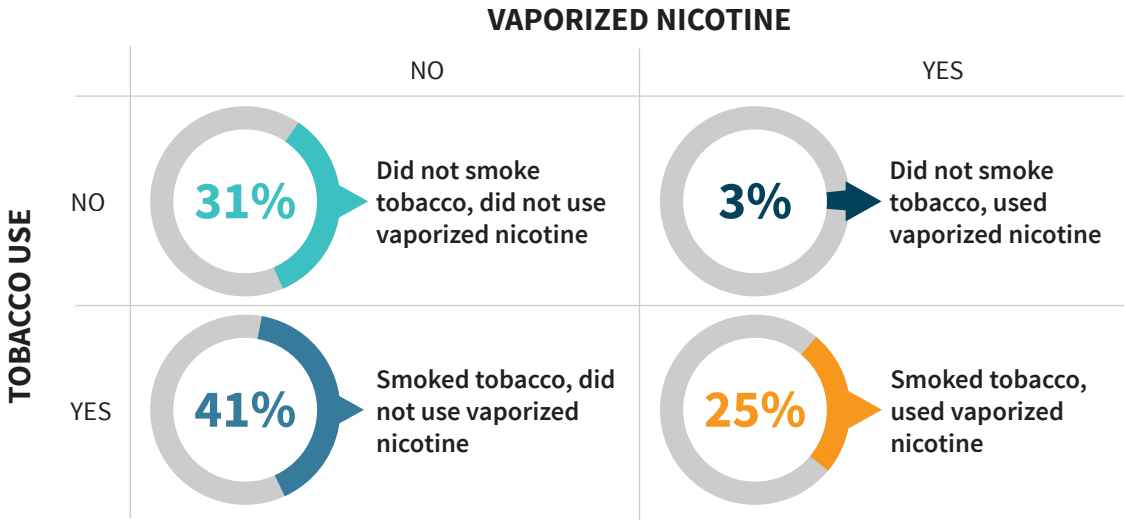
FIGURE 13. AVERAGE AGE CLIENTS FIRST BEGAN SMOKING, AMONG CLIENTS WHO HAVE SMOKED REGULARLY (n = 1,238)[27]



Two-thirds of clients reported smoking tobacco and a little more than one-fourth reported using vaporized nicotine in the 12 months before entering treatment. The correlation between smoking tobacco and use of vaporized nicotine products in the 12 months before entering treatment was examined. The correlation was statistically significant, even if small ($r = .210$, $p < .001$).

Another way to examine the association was to analyze what proportion of individuals who smoked tobacco also used vaporized nicotine in the same period. Among the 1,427 individuals who were asked questions about vaporized nicotine as well as smoking tobacco products in the 12 months before treatment, 31% reported not using smoking tobacco or vaporized nicotine, 41% smoked tobacco but did not use vaporized nicotine products, 25% reported smoking tobacco products and using vaporized nicotine products, and only 3% reported not smoking tobacco but using vaporized nicotine (see Figure 14).

FIGURE 14. USE OF SMOKING TOBACCO AND VAPORIZED NICOTINE PRODUCTS IN THE 12 MONTHS BEFORE TREATMENT (n = 1,427)[28]



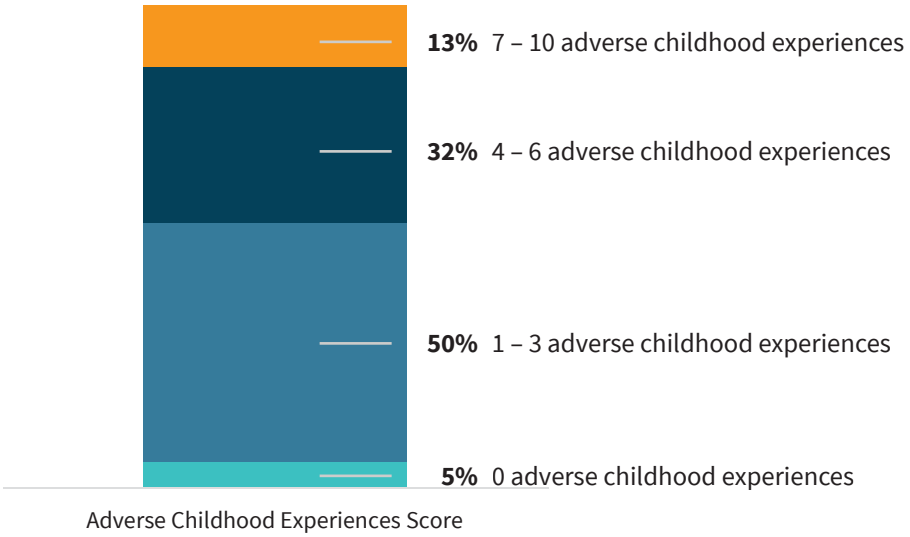
[27] Among the 1,315 individuals who smoked tobacco in the 12 months before intake, 77 reported they had never smoked regularly.

[28] Questions about vaporized nicotine products were added in July 2015. Thus, data for use of vaporized nicotine products is available for 1,427 individuals for the 12-month period.

Adverse Childhood Experiences

Included in the intake interviews of the adolescent Kentucky treatment outcome studies were questions about ten childhood adversities included in the Adverse Childhood Experiences (ACE) Study.[29, 30, 31, 32] Among 1,968 treatment clients who completed an intake interview, the average score was 3.5 (median = 3.0).

FIGURE 15. THE NUMBER OF ADVERSE CHILDHOOD EXPERIENCES (n = 1 ,968)



Only small percentages of male and female clients reported 0 of the 10 adverse childhood experiences (see Figure 16). Female clients reported having significantly more adverse childhood experiences when compared to male clients (4.4 vs. 3.1).

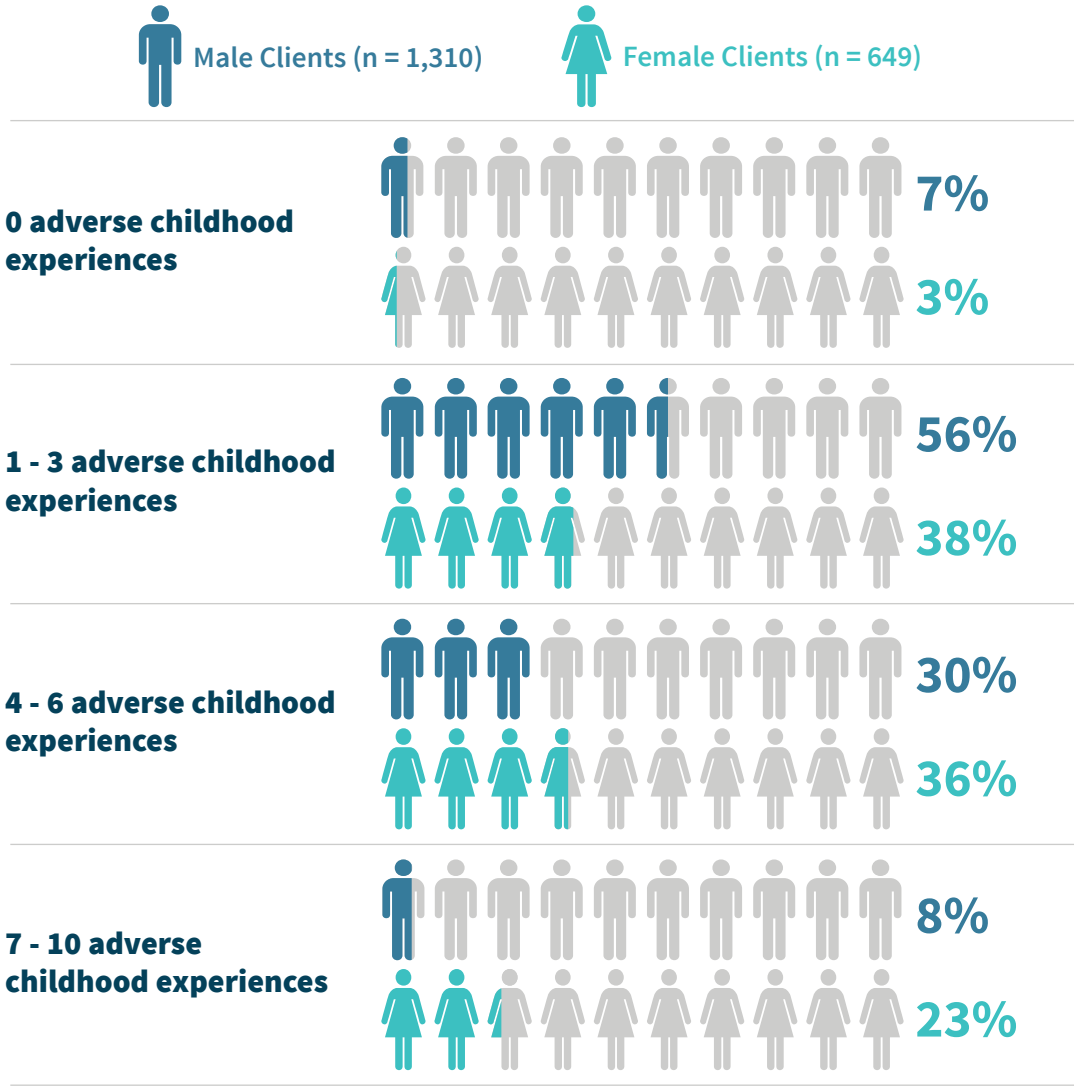
[29] Centers for Disease Control and Prevention. (2014). *Prevalence of individual adverse childhood experiences*. Atlanta, GA: National Center for injury Prevention and Control, Division of Violence Prevention. http://www.cdc.gov/violenceprevention/acestudy/prevalence.html

[30] 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.

[31] 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.

[32] The Intake assessment asked about 10 major categories of childhood adverse experiences: (a) three types of abuse (e.g., emotional maltreatment, physical maltreatment, and sexual abuse), (b) two types of neglect (e.g., emotional neglect, physical neglect), and (c) five types of family risks (e.g., witnessing partner violence victimization of a parent, a household member who was an alcoholic or drug user, a household member who was incarcerated, a household member diagnosed with a mental disorder or had committed suicide, and parents who were separated/ divorced).

FIGURE 16. NUMBER OF ADVERSE CHILDHOOD EXPERIENCES BY GENDER (n = 1 ,968)[33]



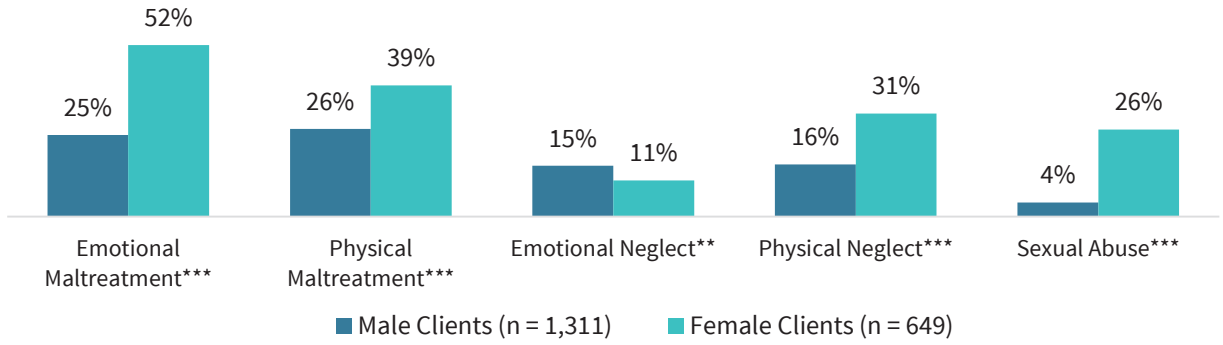
MALTREATMENT AND VICTIMIZATION

Significant numbers of adolescents experienced interpersonal victimization in their lifetime (see Figure 17). Significantly more female than male clients reported experiencing all types of victimization, except emotional neglect: emotional maltreatment, physical maltreatment, physical neglect, and sexual abuse by any type of perpetrator.[34] Not depicted in a figure, significantly more female than male clients reported they had experienced both physical maltreatment and sexual abuse (17% vs. 3%, $p < .001$).

[33] 8 individuals who reported their gender as transgender were excluded because 8 cases is too few to present across 4 categories.

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

FIGURE 17. ADVERSE CHILDHOOD EXPERIENCES OF MALTREATMENT AND ABUSE AT INTAKE BY GENDER (n = 1,960)

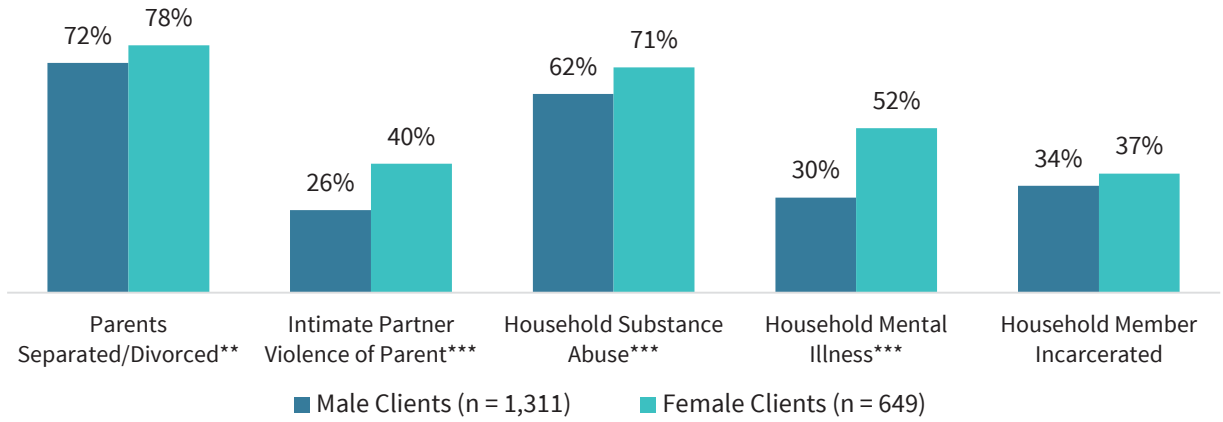


**p < .01, ***p < .001

HOUSEHOLD RISKS

Most clients reported their parents were divorced or lived separately and that a household member abused alcohol and/or used illegal drugs (see Figure 18). Compared to male clients, significantly more female clients reported their parents were divorced/lived separately, a parent had experienced intimate partner violence (IPV), a household member had a substance abuse problem and a household member had a mental illness or attempted suicide. The only household risk that was similar for male and female clients was having a household member who was incarcerated.

FIGURE 18. ADVERSE CHILDHOOD EXPERIENCES OF HOUSEHOLD RISK AT INTAKE BY GENDER (n = 1,960)



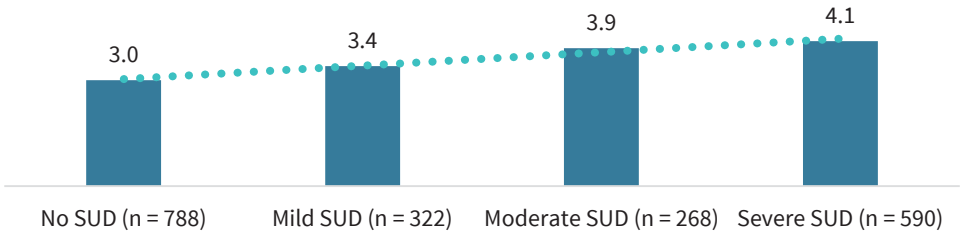
THE ASSOCIATION OF ADVERSE CHILDHOOD EXPERIENCES AND SEVERITY OF SUBSTANCE USE

In existing research a greater number of adverse childhood experiences is associated with greater risk of drug abuse and alcohol abuse, including initiating use in adolescence, as well as smoking

tobacco in adolescence.[35, 36] The association of substance use disorder with the number of adverse childhood experiences was examined among the 1,968 individuals who received treatment in FY 2015 – FY 2016.

The number of adverse childhood experiences clients reported was significantly different by severity of substance use disorder (see Figure 19). Specifically, individuals with no substance use disorder had significantly fewer adverse childhood experiences than individuals with mild SUD, moderate SUD and severe SUD.[37] Additionally, individuals with mild SUD had significantly fewer adverse childhood experiences than individuals with moderate SUD and individuals with severe SUD.

FIGURE 19. AVERAGE NUMBER OF ADVERSE CHILDHOOD EXPERIENCES BY DSM-5 SUBSTANCE USE DISORDER SEVERITY (n = 1,968)



Mental Health

Because of the significant gender differences, results for behavioral health problems at treatment intake are presented separately for male and female clients.

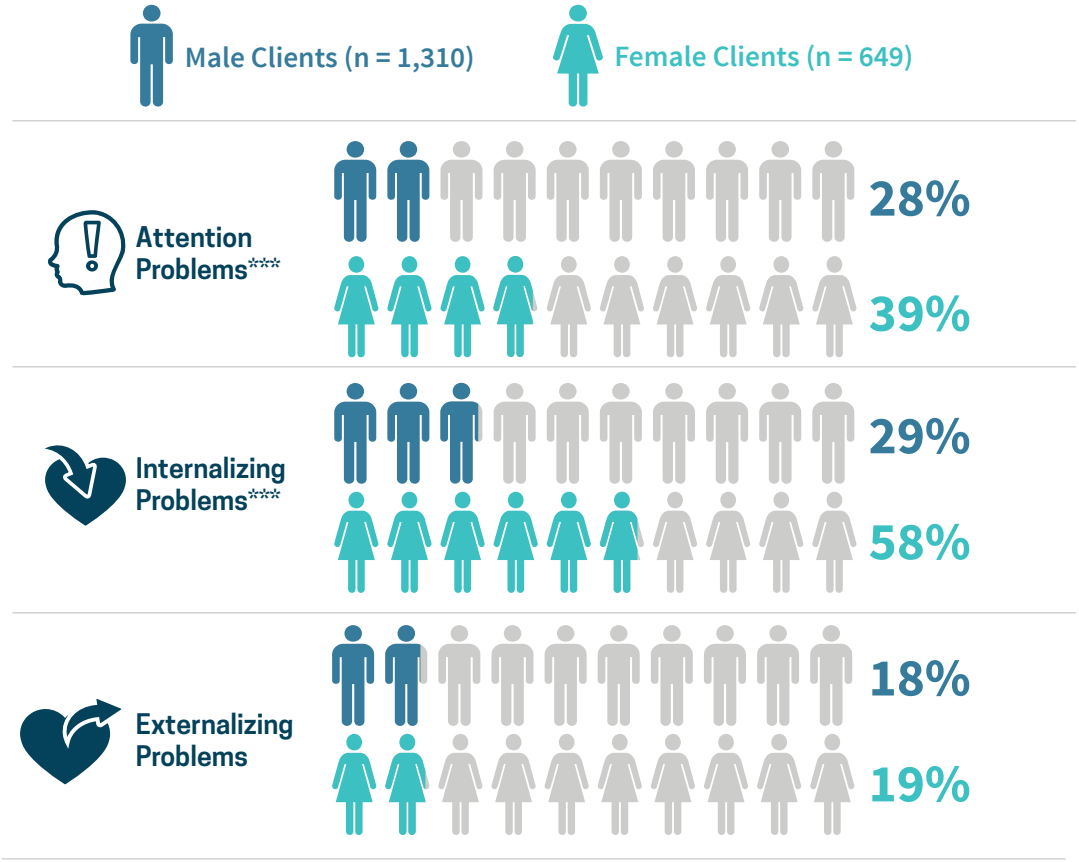
Figure 20 presents the percent of male and female clients who had scores on the Pediatric Symptom Checklist (PSC-17) that suggest significant impairments in attention, internalizing, and externalizing behavior. Significantly more female clients than male clients had scores on the PSC subscales that indicated significant impairment in attention problems and internalizing problems.

[35] Dube, S. R., Felitti, V. J., Dong, M., Chapman, D. P., Giles, W. H., & Anda, R. F. (2003). Childhood abuse, neglect and household dysfunction and the risk of illicit drug use: The Adverse Childhood Experience Study. *Pediatrics, 111*(3), 564-572.

[36] Anda, R. F., Croft, J. B., Felitti, V. J., Nordenberg, D., Giles, W. H., Williamson, D. F., & Giovino, G. A. (1999). Adverse childhood experiences and smoking during adolescence and adulthood. *JAMA, 282*, 1652-1658.

[37] Clients were asked if they experienced the 11 symptoms listed in the DSM-5 for substance use disorder. The severity of substance use disorder is based on the self-reported number of criteria met: none (0-1), mild (2-3), moderate (4-5), or severe (6+).

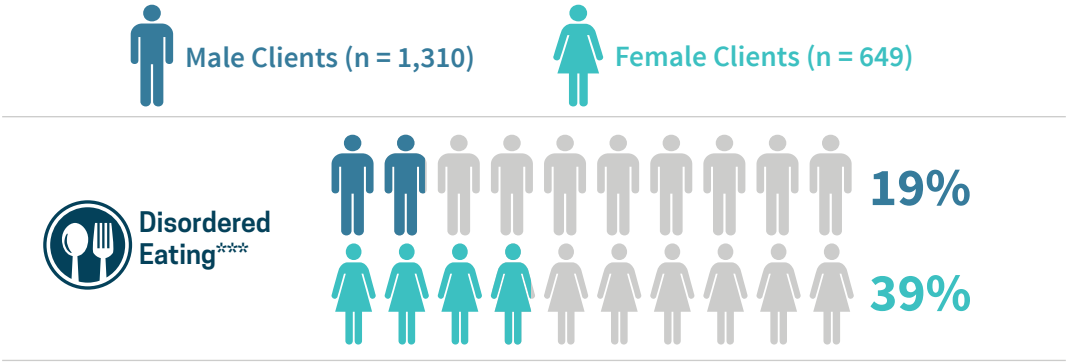
FIGURE 20. HAD SCORES ON PEDIATRIC SYMPTOM CHECKLIST (PSC-17) THAT INDICATED SIGNIFICANT PROBLEMS IN MENTAL HEALTH AT TREATMENT INTAKE BY GENDER (n = 1,968)



***p < .001

About 1 in 4 clients reported at least one symptom of disordered eating, with significantly more female clients than male clients reporting disordered eating (see Figure 21).

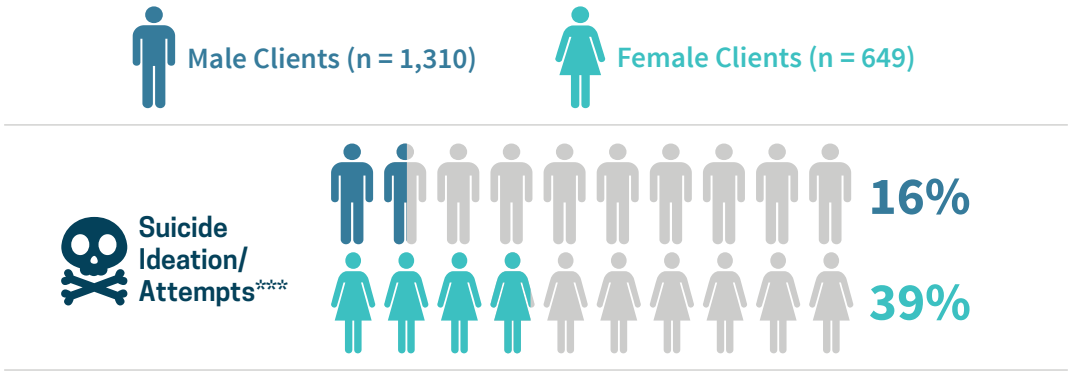
FIGURE 21. HAD SYMPTOMS OF DISORDERED EATING AT INTAKE BY GENDER (n = 1,960)



***p < .001

Significantly more female clients than male clients reported having thoughts of suicide or suicide attempts in the 12 months before entering treatment (see Figure 22).

FIGURE 22. HAD SUICIDAL IDEATION/ATTEMPTS AT INTAKE BY GENDER (n = 1,960)

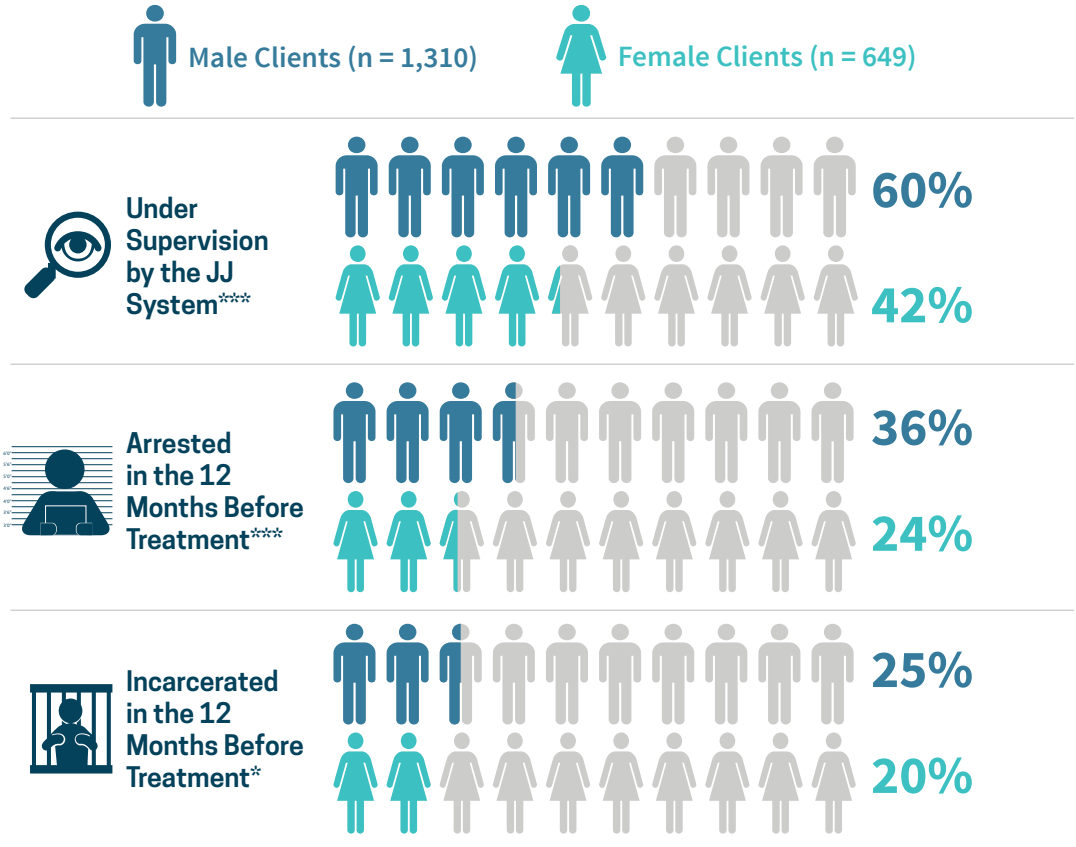


***p < .001

Juvenile Justice System Involvement

Because of the significant gender differences, results are presented separately for male and female clients. A little more than half of clients were under supervision by the juvenile justice system at the time of treatment intake.[38] Significantly more male clients than female clients were under supervision by the juvenile justice system at treatment intake as well as were arrested and incarcerated in the 12 months before entering treatment (see Figure 23).

FIGURE 23. INVOLVEMENT WITH THE JUVENILE JUSTICE SYSTEM AT TREATMENT INTAKE BY GENDER (n = 1,960)



*p < .05, ***p < .001

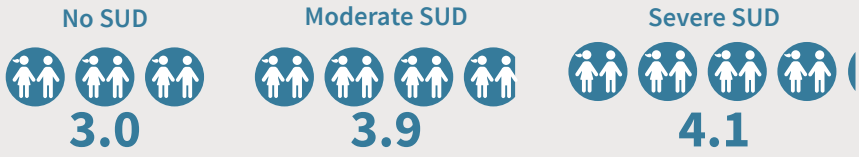
[38] Though there could be a small number of individuals who were involved with the adult criminal justice system, we refer to the juvenile justice system given the sample is composed predominately of minors.

The Association of Adverse Childhood Experiences with Substance Use and Mental Health

A greater number of adverse childhood experiences is associated with greater risk of drug abuse and alcohol abuse, including initiating use in adolescence, as well as smoking tobacco in adolescence.[35,36] Significant associations were found:

1 The number of adverse childhood experiences clients reported was significantly different by severity of substance use disorder, even after controlling for gender.

Clients with no substance use disorder had significantly lower number of adverse childhood experiences than individuals with moderate SUD and severe SUD.



Additionally, individuals with severe SUD (4.1) had significantly greater adverse childhood experiences than individuals with mild SUD (3.3).[39]

2 The number of adverse childhood experiences individuals reported was significantly associated with:

Number of months individuals reported using opioids/opiates ($r = .138$, $p < .001$)

Number of months individuals reported using CNS depressants ($r = .144$, $p < .001$)

Number of months individuals reported using stimulants/cocaine ($r = .148$, $p < .001$)

Smoking tobacco ($r = .157$, $p < .001$) in the 12 months before entering treatment

In other words, individuals who reported more adverse childhood experiences reported more months of using opioids/opiates, CNS depressants, stimulants/cocaine, and smoking tobacco.

3 Clients with more adverse childhood experiences had more:

Attention problem symptoms ($r = .354$, $p < .001$)

Internalizing symptoms ($r = .449$, $p < .001$)

Externalizing symptoms ($r = .282$, $p < .001$)

[39] A one-way ANCOVA was conducted to determine a statistically significant difference between DSM 5 severity of SUD on the study ACES score controlling for gender. There was a significant effect of DSM 5 SUD severity and the number of adverse childhood experiences after controlling for gender, $F(3, 1960) = 25.714$, $p < .001$. The means presented above are adjusted means.

Part II.
The Impact of Treatment

The primary treatment outcomes for adolescents (ages 11 – 17 years old)[40] who received publicly funded substance abuse treatment in Community Mental Health Centers in FY 2015 and 2016 and in programs funded through the Kentucky Kids Recovery funding initiative from October 2014 – October 2015 are presented in this section.[41] Follow-up interviews were conducted by staff at the University of Kentucky, Center on Drug and Alcohol Research via telephone about 12 months after treatment intake (an average of 330.4 days). Clients' responses in the follow-up interviews were confidential to help facilitate honest evaluation of client outcomes and satisfaction with program services. Of the 992 treatment clients who were younger than 18 years old at intake[42] and who completed an intake interview between July 2014 and October 2015, 59% (n = 587) agreed to be contacted for the follow-up interview. Of the 485 individuals included in the follow-up sample, 49 individuals were ineligible for participation at the time of follow-up because they were in detention or incarcerated or in residential treatment. Thus, of the 436 individuals who were eligible for follow-up, follow-up interviews were completed with 376 individuals—a follow-up rate of 86%.

86%
follow-up rate

Statistical tests comparing adolescents who did not complete a follow-up interview (for any reason) and those who did complete a follow-up interview revealed few differences. Significantly more female clients completed a follow-up interview than did not. Differences in substance use between followed up and not followed up clients may be due to the gender difference within the followed-up sample. For example, significantly more followed-up clients reported they had smoked tobacco and used alcohol in the 12 months before entering treatment. Other significant differences between the two groups included followed-up clients reported more use of illegal drugs, in general, and specifically, marijuana and synthetic drugs. There were no sociodemographic, living situation, school, mental health, and juvenile justice system differences between the followed-up and not followed-up clients.

Substance Use

The clear majority of clients reported using alcohol and/or drugs in the 12 months before entering treatment. There was a significant decrease in the number of individuals who reported alcohol and/or drug use in the 12 months before follow-up (see Figure 24).

The number of adolescents reporting alcohol and/or drug use decreased significantly from intake to follow-up by 56%

[40] Some of the programs funded through the Kentucky Kids Recovery initiative provided treatment services to young adults (up to 23 years old); however, because the emphasis of this analysis is on adolescents, treatment outcomes were examined for individuals who were under 18 years at treatment intake.

[41] Follow-up interviews were targeted for 12 months after the treatment intake interview was completed. Because data for this report was pulled in October 2016, only individuals who had completed an intake interview between the beginning of the data collection period (July 2014 for the CMHC sample and December 2014 for the KY Kids Recovery sample) and October 2015 and thus have a target follow-up interview before November 2015 were eligible to be included in this analysis of treatment outcomes.

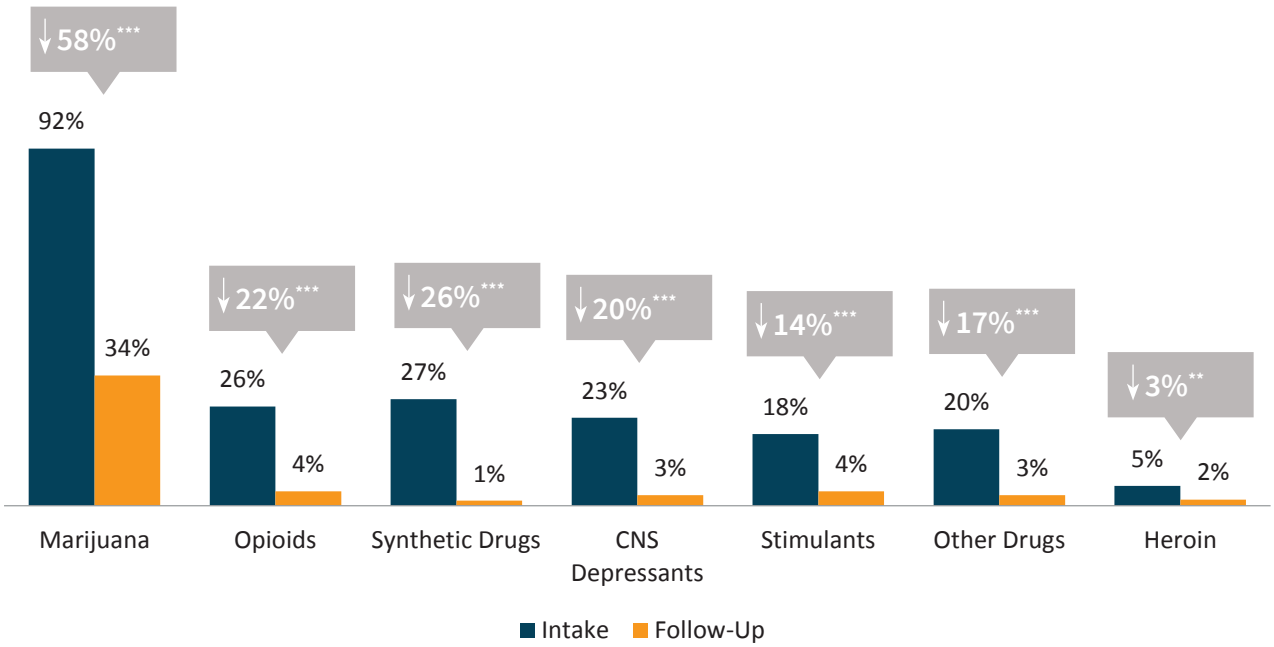
[42] Of the 1,968 unduplicated clients who completed an intake interview, 137 were 18 years old or older at treatment intake; thus, they were ineligible to be included in the follow-up sample.

FIGURE 24. PERCENT OF CLIENTS REPORTING ALCOHOL AND/OR DRUG USE AT INTAKE AND FOLLOW-UP (n = 376)

***p < .001

The number of adolescents who reported using marijuana, opioids (other than heroin), synthetic drugs (including bath salts, synthetic marijuana, spice), CNS depressants (including benzodiazepines, sedatives, tranquilizers, hypnotics), stimulants (including cocaine), other drugs (inhalants, hallucinogens), and heroin decreased significantly from intake to follow-up (see Figure 25). The decrease was greatest for marijuana—a decrease of 58%--which was also the substance used by the most clients at intake.

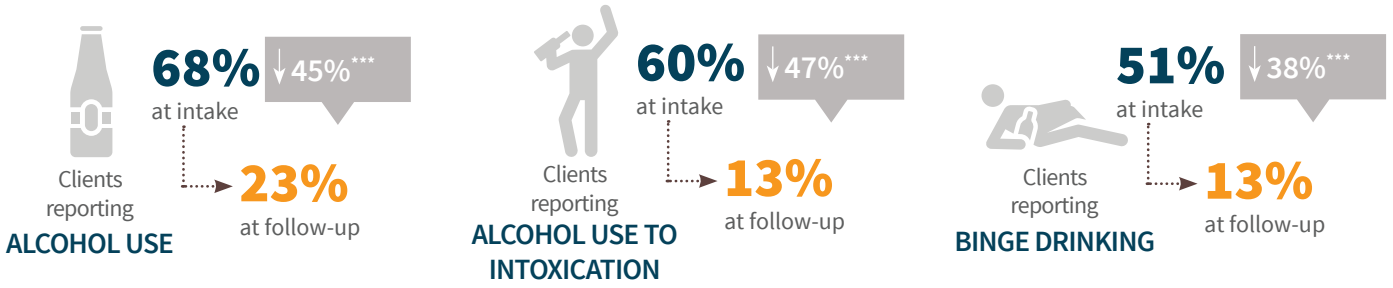
FIGURE 25. PERCENT OF CLIENTS REPORTING USE OF DIFFERENT TYPES OF ILLEGAL DRUGS AT INTAKE AND FOLLOW-UP (n = 376)



**p < .01, ***p < .001.

The number of individuals who reported using alcohol, alcohol use to intoxication, and binge drinking in the past 12 months decreased significantly from intake to follow-up (see Figure 26).

FIGURE 26. PERCENT OF CLIENTS REPORTING ALCOHOL USE, ALCOHOL USE TO INTOXICATION, AND BINGE DRINKING AT INTAKE AND FOLLOW-UP (n = 376)



***p < .001

Self-reported Severity of Substance Use Disorder (SUD)

Another way to examine overall change in degree of severity of substance use is to ask participants to self-report whether they met the 11 criteria included in the DSM-5 for diagnosing substance use disorder (SUD). The DSM-5 diagnostic criteria for substance use disorders included in the adolescent intake and follow-up interviews are similar to the criteria for DSM-IV, which has evidence of excellent test-retest reliability and validity.[43, 44] However, the DSM-5 does away with the distinction between substance abuse and dependence, substituting severity ranking instead as well as deleting the criterion about legal problems arising from substance use and adds a new criterion about craving and compulsion to use.[45] Under DSM-5, anyone meeting any two of the 11 criteria during the same 12-month period would receive a diagnosis of substance use disorder. The severity of the substance use disorder (i.e., none, mild, moderate, or severe) is based on the number of criteria met.

The number of adolescents who met criteria for no SUD increased significantly from intake to follow-up

Change in the severity of SUD in the prior 12 months was examined for adolescents at intake and follow-up. Figure 27 displays the change in the percent of individuals in each SUD severity classification, based on self-reported criteria in the preceding 12 months. At intake, 36% met criteria for no substance use disorder (meaning they reported 0 or 1 DSM-5 criteria for SUD), while at follow-up, the clear majority (92%) met criteria for no SUD. At the other extreme of the continuum, one-third of individuals (33%) met criteria for severe SUD at intake, while at follow-up, only 4% met criteria for severe SUD.[46]

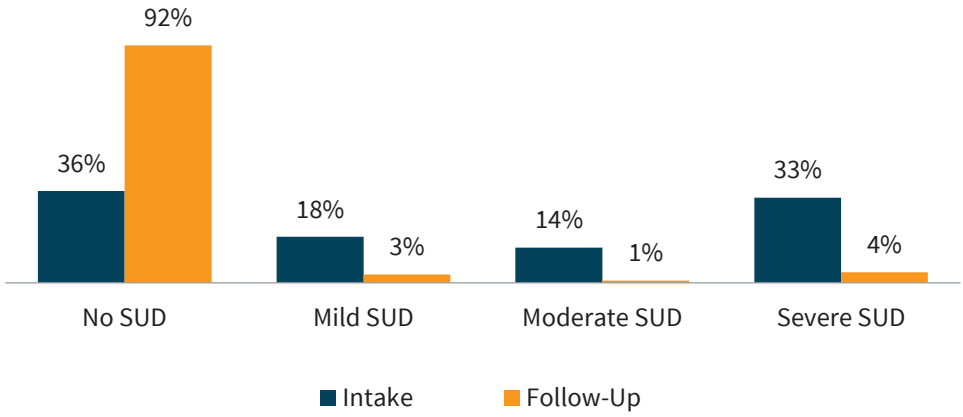
[43] Hasin, D., & Paykin, A. (1999). Alcohol dependence and abuse diagnoses: Concurrent validity in a nationally representative sample. *Alcoholism: Clinical and Experimental Research, 23*(1), 144-150.

[44] Hasin, D., Trautman, K., Miele, G., Samet, S., Smith, M., & Endicott, J. (1996). Psychiatric Research Interview for Substance and Mental Disorders (PRISM): Reliability for substance abusers. *American Journal of Psychiatry, 153*(9), 1195-1201.

[45] Malone, M., & Hoffmann, N. (2016). A comparison of DSM-IV versus DSM-5 substance use disorder diagnoses in adolescent populations. *Journal of Child & Adolescent Substance Abuse, 25*(5), 399-408.

[46] Because the McNemar test can be conducted on dichotomous variables only, individuals were classified into one of two categories to examine change in severity of SUD from intake to follow-up: (1) No SUD and (2) Mild, Moderate, or Severe SUD. There was a significant increase in the number of individuals who met criteria for No SUD (not depicted in a figure).

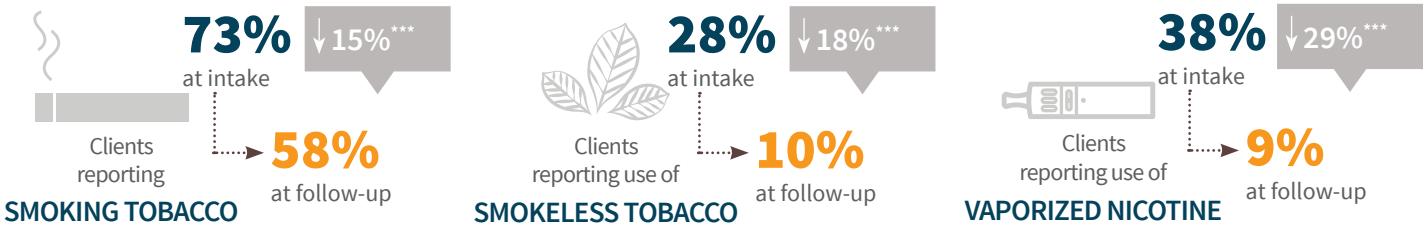
FIGURE 27. DSM-5 SUD SEVERITY AT INTAKE AND FOLLOW-UP (n = 376)



Tobacco and Vaporized Nicotine Use

There were significant decreases in the number of adolescents who reported smoking tobacco, using smokeless tobacco, and using vaporized nicotine from intake to follow-up (see Figure 28). Nonetheless, more than half of the adolescents had smoked tobacco in the 12 months before follow-up.

FIGURE 28. PERCENT OF CLIENTS REPORTING SMOKING TOBACCO, SMOKELESS TOBACCO, AND VAPORIZED NICOTINE USE AT INTAKE AND FOLLOW-UP (N = 376)



Mental Health

The brief 17-item version of the Pediatric Symptom Checklist (PSC-17), which was included in this study to measure mental health problems, has been validated in detecting psychosocial impairment among youth.[47, 48, 49]

[47] Borowsky, I. W., Mozayeny, S., & Ireland, M. (2003). Brief psychosocial screening at health supervision and acute care visits. *Pediatrics, 112*(1 Pt 1), 129-33.

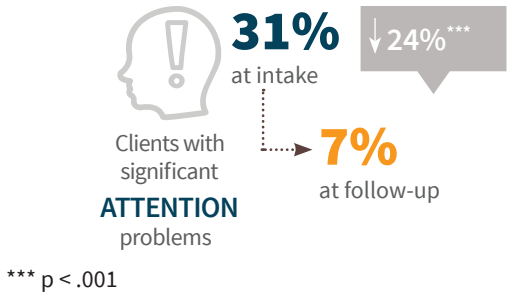
[48] Duke, N., Ireland, M. & Borowsky, I.W. (2005). Identifying psychosocial problems among youth: factors associated with youth agreement on a positive parent-completed PSC-17. *Child: Care, Health, and Development, 31*(5), 563-573.

[49] Gardner, W., Lucas, A., Kolko, D. J., & Campo, J. V. (2007). Comparison of the PSC-17 and alternative mental health screens in an at-risk primary care sample. *Journal of the American Academy of Child & Adolescent Psychiatry, 46*(5), 611-618.

ATTENTION PROBLEMS

Figure 29 presents the percent of adolescents who had scores of 7 or higher on the Attention Problems subscale, which suggests clinically significant attention deficits, at intake and follow-up.[50]

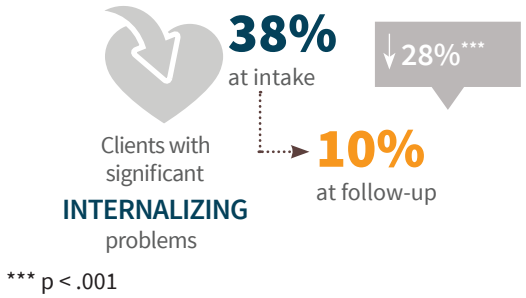
FIGURE 29. HAD SIGNIFICANT ATTENTION PROBLEMS AT INTAKE AND FOLLOW-UP (n = 376)



INTERNALIZING PROBLEMS

Figure 30 presents the percent of adolescents who had scores of 5 or higher on the Internalizing Problems subscale at intake and follow-up.[51]

FIGURE 30. HAD SIGNIFICANT INTERNALIZING PROBLEMS AT INTAKE AND FOLLOW-UP (n = 376)



GENDER DIFFERENCES IN INTERNALIZING PROBLEMS

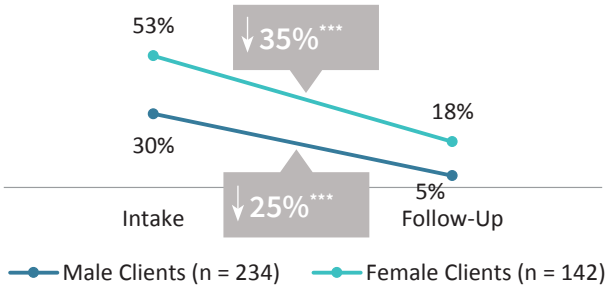
Compared to male clients, significantly more female clients met study criteria for internalizing problems at intake and follow-up (see Figure 31). The number of male and female clients who met criteria for internalizing problems decreased significantly from intake to follow-up.

Significantly more girls met criteria for internalizing problems at intake and follow-up when compared to boys

[50] For the Attention Problems subscale, the lowest possible score is 0 and the highest possible score is 10. Children with scores of 7 or higher usually have significant impairments in attention.

[51] For the Internalizing Problems subscale, the lowest possible score is 0 and the highest possible score is 10. Children with scores of 5 or higher usually have significant impairments in attention.

FIGURE 31. GENDER DIFFERENCES IN MEETING CRITERIA FOR INTERNALIZING PROBLEMS[a]

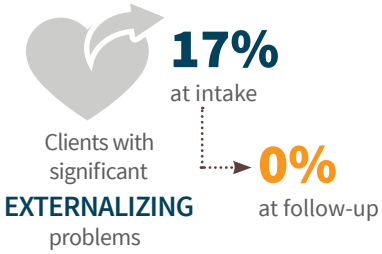


a—Statistical difference by gender at intake and follow-up ($p < .001$).
***$p < .001$.

EXTERNALIZING PROBLEMS

Figure 32 presents the percent of adolescents who had scores of 7 or higher on the Externalizing Problems subscale, which suggests clinically significant externalizing behavior, at intake and follow-up.[52]

FIGURE 32. HAD SIGNIFICANT EXTERNALIZING PROBLEMS AT INTAKE AND FOLLOW-UP (n = 376)[a]



a—No measure of association could be computed for the crosstabulation because there was a cell value of 0 for the variable, Had a score of 7 or higher on the externalizing problems subscale of the PSC-17 at follow-up.

DISORDERED EATING

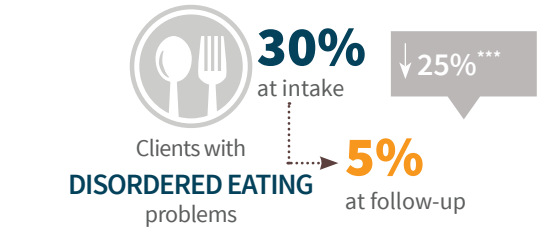
An answer of "Yes" for any of the three items was a positive screening for disordered eating. There was a significant decrease in the percent of individuals who had a positive screen for disordered eating (see Figure 33).

"My counselor actually talked to me. It helped me with my problems and it had an impact on me."

- ADOLESCENT FOLLOW-UP CLIENT

[52] For the Externalizing Problems subscale, the lowest possible score is 0 and the highest possible score is 14. Adolescents with scores of 7 or higher usually have significant impairments with conduct.

FIGURE 33. POSITIVE SCREEN FOR DISORDERED EATING AT INTAKE AND FOLLOW-UP (n = 376)

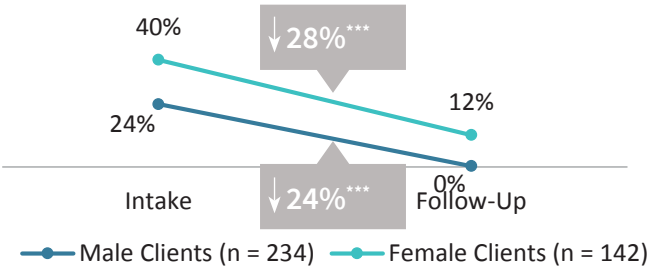


***p < .001

GENDER DIFFERENCES IN DISORDERED EATING

Compared to male clients, significantly more female clients had a positive screen for disordered eating at intake and follow-up (see Figure 34). The number of male and female clients who had a positive screen for disordered eating decreased from intake to follow-up.

FIGURE 34. GENDER DIFFERENCES IN POSITIVE SCREEN FOR DISORDERED EATING[a]

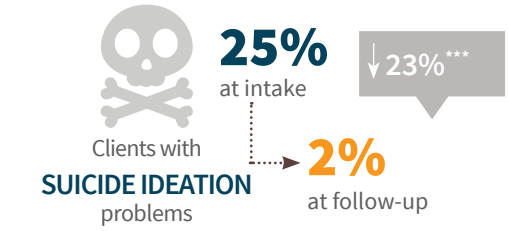


a—Statistical difference by gender at intake (p < .01) and at follow-up (p < .001).
***p < .001.

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 individuals who reported suicidality decreased significantly from intake to follow-up (see Figure 35).

FIGURE 35. ADOLESCENTS REPORTING SUICIDAL IDEATION AND/OR ATTEMPTS AT INTAKE AND FOLLOW-UP (n = 376)

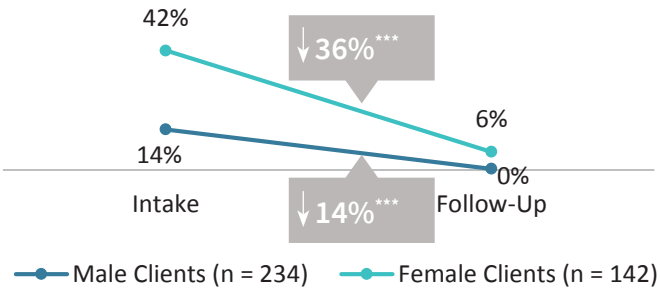


***p < .001

GENDER DIFFERENCES IN SUICIDAL IDEATION AND/OR ATTEMPTS

Compared to male clients, significantly more female clients reported they had suicidal ideation and/or attempts in the 12 months before intake and follow-up (see Figure 36). The number of male and female clients who reported suicidal ideation and/or attempts decreased from intake to follow-up.

FIGURE 36. GENDER DIFFERENCES IN SUICIDAL IDEATION AND/OR ATTEMPTS[a]



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

Multivariate Analysis of Adverse Childhood Experiences, Internalizing Problems, and Substance Use Disorder Severity at Follow-Up

The association of the number of adverse childhood experiences, internalizing problems and number of substance use disorder criteria at follow-up, while controlling for gender and age, was examined among the 376 individuals who completed a follow-up interview.

A significant association was found:

The number of internalizing problems reported was significantly associated with the number of DSM-5 substance use disorder criteria reported in the 12-months before the follow-up interview ($\beta = .291$, $p < .001$). Individuals with more internalizing problems reported more SUD symptoms during the follow-up period.

However, not all examined factors were related to substance use disorder criteria at follow-up:

Gender, age, and number of adverse childhood experiences were not associated with DSM-5 substance use disorder criteria reported in the 12 months before the follow-up interview.

School Attendance and Performance

ATTENDING SCHOOL

At intake, eighteen individuals had a high school diploma or GED. Of the remaining 358 adolescents, the majority reported they were currently attending school or taking GED classes, with less than 1 percent reporting they were officially withdrawn from school (see Figure 36). At follow-up, 86 had a high school diploma or GED. Of the remaining 287 individuals, the majority were currently attending school or taking GED classes (see Figure 36).

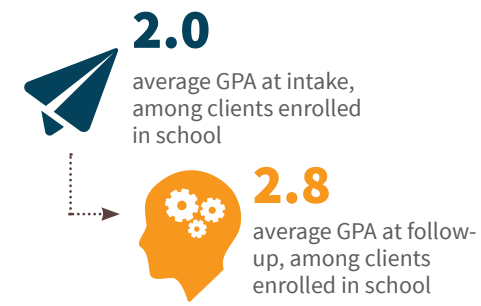
FIGURE 36. AMONG INDIVIDUALS WITH LESS THAN A HIGH SCHOOL DIPLOMA OR GED AT EACH PERIOD, THE PERCENT ATTENDING SCHOOL AT INTAKE AND FOLLOW-UP

GRADE POINT AVERAGE

Among individuals who were enrolled in school at intake and follow-up, students' academic performance was assessed by examining their self-reported grade point average (GPA; see Figure 37). 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 2.0 (a C). At follow-up, adolescents' average GPA had increased significantly to 2.8 (closer to a B than a C).

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

FIGURE 37. AMONG THOSE ENROLLED IN SECONDARY SCHOOL AT INTAKE AND FOLLOW-UP (N = 235)[53], SELF-REPORTED AVERAGE GPA

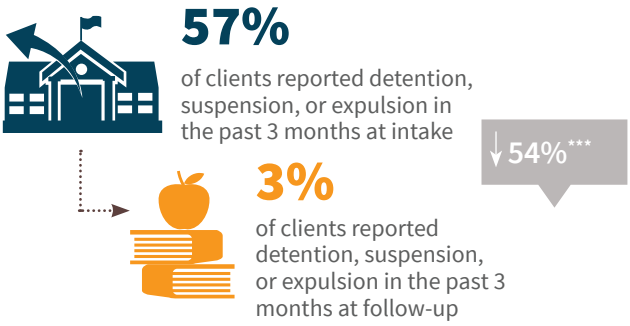


DETENTION, SUSPENSION, AND EXPULSION

The number of adolescents who reported being in detention, suspended, or expelled in the past 3 months that school was in session decreased dramatically (see Figure 38). At intake, more than half of the students reported they had been in detention, suspended, or expelled, whereas at follow-up, this had decreased to 3.2%.

[53] 267 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 32 students at follow-up: they responded they did not know their average grade.

FIGURE 38. AMONG THOSE ENROLLED IN SCHOOL IN THE PAST 3 MONTHS SCHOOL WAS IN SESSION AT INTAKE AND FOLLOW-UP (n = 252), THE PERCENT OF CLIENTS WHO WERE IN DETENTION OR EXPELLED



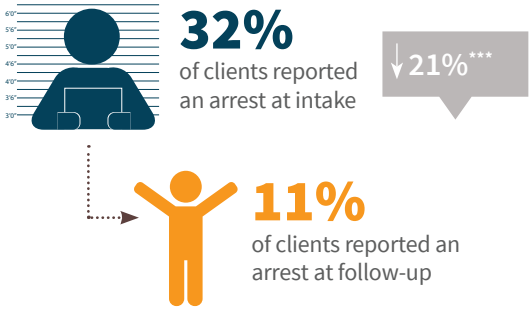
***p < .001

Juvenile Justice System Involvement

ARRESTS

At intake clients were asked about their arrests in the 12 months before they entered treatment. At follow-up, individuals were asked about their arrests in the 12 months prior to the follow-up interview. Less than one-third of the adolescents reported an arrest in the 12 months before entering treatment, with a significant decrease in the follow-up period (see Figure 39).

FIGURE 39. PERCENT OF CLIENTS REPORTING ARRESTS IN THE PAST 12 MONTHS AT INTAKE AND FOLLOW-UP (n = 374)[54]



***p < .001

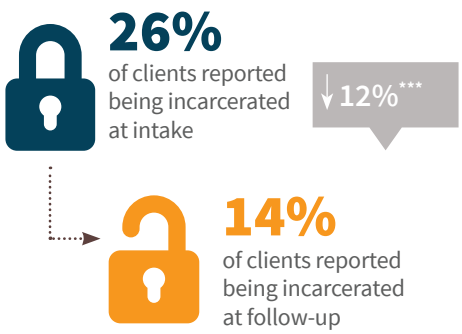
INCARCERATION

About 1 in 4 adolescents reported spending at least one night incarcerated in the 12 months prior to entering treatment (See Figure 40). At follow-up, there was a statistically significant decrease in the number of adolescents who had been incarcerated.

The number of adolescents who reported being incarcerated in the past 12 decreased significantly

[54] Two individuals had missing values for arrests at follow-up.

FIGURE 40. PERCENT OF CLIENTS REPORTING INCARCERATION IN THE 12 MONTHS BEFORE INTAKE AND FOLLOW-UP (n = 375)[55]

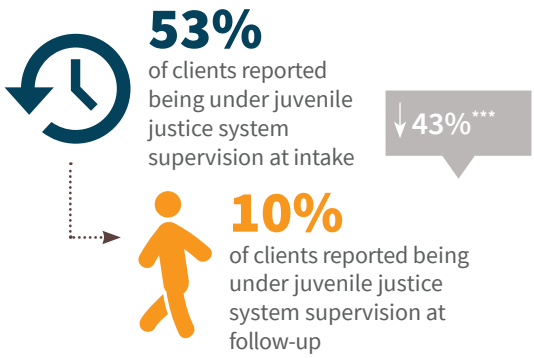


***p < .001

SELF-REPORTED JUVENILE JUSTICE SYSTEM SUPERVISION

The number of adolescents who self-reported they were under the juvenile justice system supervision (e.g., drug court or probation) decreased significantly from a little more than half at intake to just under 10% at follow-up (see Figure 41).

FIGURE 41. PERCENT OF CLIENTS REPORTING SUPERVISION BY THE JUVENILE JUSTICE SYSTEM AT INTAKE AND FOLLOW-UP (n = 376)



***p < .001

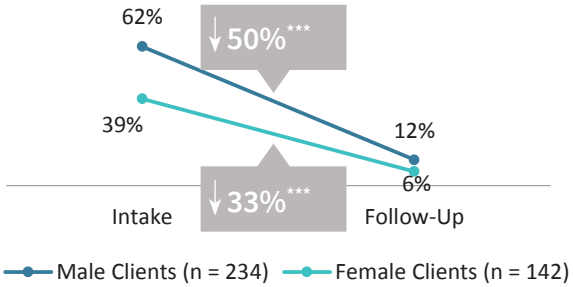
GENDER DIFFERENCES IN JUVENILE JUSTICE SYSTEM SUPERVISION

At intake, significantly more male clients than female clients reported they were currently under supervision by the juvenile justice system (see Figure 42). The number of male clients and female clients who reported being under supervision by the juvenile justice system decreased significantly from intake to follow-up.

> *"I liked that they weren't barking orders at me. It was an eye-opening experience."*
>
> *- ADOLESCENT FOLLOW-UP CLIENT*

[55] One individual had a missing value for number of days incarcerated in the 12 months before follow-up.

FIGURE 42. GENDER DIFFERENCES IN JUVENILE JUSTICE SYSTEM SUPERVISION[a]



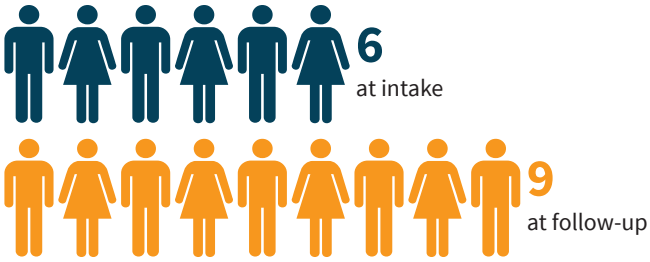
a—Statistical difference by gender at intake ($p < .001$).
***$p < .001$.

Recovery Supports

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 significantly from intake to follow-up (see Figure 43).

FIGURE 43. AVERAGE NUMBER OF PEOPLE ADOLESCENTS COULD COUNT ON FOR RECOVERY SUPPORT AT INTAKE AND FOLLOW-UP (n = 369)***[56]



***$p < .001$

SATISFACTION WITH RECOVERY SUPPORT

Individuals were asked to rate their satisfaction with the level of recovery support they had in their life at intake and follow-up. Response options ranged from 1 (Extremely dissatisfied) to 6 (Extremely satisfied). Figure 44 shows individuals' ratings of their satisfaction with their recovery support, which increased significantly.

FIGURE 44. AVERAGE RATING OF SATISFACTION WITH RECOVERY SUPPORT AT INTAKE AND FOLLOW-UP (n = 371)***[57]

***$p < .001$

[56] Seven individuals had missing values for the number of people clients could count on for recovery support at follow-up.

[57] Five individuals had a missing value for their rating of satisfaction with their recovery support at follow-up.

Conclusion

Adolescents entered substance abuse treatment with interrelated risk factors, such as high rates of adverse childhood experiences, mental health problems, school disciplinary problems, and involvement with the juvenile justice system. The majority of the clients were male and White/Caucasian. Clients were, on average, 15.8 years old and the majority of clients reported their biological parent was their primary caregiver. Almost half of clients were referred to substance abuse treatment by the court system. A little more than half of individuals resided in a county that was classified as a metropolitan community. Over one hundred counties are represented in the client residence map suggesting this analysis provides a statewide picture of adolescent substance use.

Of the adolescents eligible for follow-up, follow-up interviews were completed with 86% of clients. Findings from Kentucky's statewide substance abuse treatment outcome evaluations with adolescent clients indicate successful treatment experiences for many adolescents, with significant improvements in four core domains of functioning: (1) substance use and severity of substance use, (2) mental health, (3) school attendance and performance, and (4) juvenile justice system involvement. Outcome data showed significant decreases in substance use and severity of substance use over time. Adolescents' self-reported mental health symptoms also had significant decreases in attention problems, internalizing problems, disordered eating, and suicidal ideation/attempts from intake to follow-up. Among the adolescents who were enrolled in school at intake and follow-up, which was the majority of the sample, there was a significant increase in GPA and decreases in the number of school absences for disciplinary reasons. Adolescents' involvement with the juvenile justice system decreased over time with significantly fewer adolescents reporting at follow-up they had been arrested, incarcerated (detained), or were under the supervision of the juvenile justice system than at intake. A supplemental domain examined, recovery support, also showed significant improvement from intake to follow-up.

Limitations

There are several limitations to the outcome evaluations presented in this report. First, the outcome evaluations examined adolescents who received substance abuse treatment in calendar years 2014 – 2016 but did not examine a comparison group of similar adolescents who did not receive treatment, which prevents an inference that changes in adolescents 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 adolescents. Second, both the intake and follow-up data are self-reported. Third, therapists may have had varying interview skills and this may have impacted the reliability and validity of the data they collected in the intake interviews. Even with these limitations, this study is one of the first to present a statewide portrait of Kentucky adolescents entering substance abuse treatment and an examination of their treatment outcomes.

Substance use disorders in adolescence have long-term health, social, developmental, and economic consequences. Engaging and retaining adolescents in interventions to reduce problematic substance use and effectively treat substance use disorders is essential to reducing the substantial and severe consequences to adolescents, their families, and communities. These findings indicate positive outcomes of treatment for adolescents.

Appendix A.
Outcome Evaluation Study Methods

The treatment outcome evaluation studies discussed in this brief report were commissioned by the Kentucky Department for Behavioral Health, Developmental and Intellectual Disabilities (DBHDID) through a contract with the University of Kentucky Center on Drug and Alcohol Research (UK CDAR). Three large Kentucky samples constitute the youth included in this report. First, the Adolescent Kentucky Treatment Outcome Study (AKTOS), initiated in 2004, is a statewide outcome evaluation designed to examine substance abuse treatment outcomes for adolescent clients receiving publicly-funded treatment in a Community Mental Health Center (CMHC). AKTOS data is collected each fiscal year, beginning July 1st and ending June 30th. Second, in 2014, one-time funding from the state based on settlements from lawsuits against pharmaceutical companies was awarded to 19 programs to develop or expand substance abuse treatment for adolescents and young adults: the Kentucky Kids Recovery Programs (KY Kids Recovery). Third, one of the 19 funded programs, the University of Kentucky Department of Psychiatry, trained therapists from across the state in two evidence-based therapies (Functional Family Therapy and ENCOMPASS Cognitive Behavioral Therapy Plus): Adolescent Health and Recovery Treatment and Training (AHARTT). KY Kids Recovery Programs, including AHARTT, were funded from October 1, 2014 – September 30, 2016.[58]

The statewide outcome evaluation studies, AKTOS and KY Kids Recovery/AHARTT, had multiple purposes including to provide: (1) a count of the number of adolescent clients who were in treatment funded by the Kentucky Kids Recovery initiative and in publicly-funded treatment in community mental health centers (CMHC); (2) characteristics and level of functioning for adolescents served with these funding sources; and (3) an examination of pre-treatment to post-treatment change in substance use and other key targeted outcomes using an evidence-based intake and follow-up assessment for adolescent clients in these programs. A secure, online evidence based assessment was used by clinicians to provide treatment intake data for the outcome evaluation. Furthermore, UK CDAR provided clinicians with a narrative report to be used in clients' records, if clinicians opted to create the report from the intake assessment data.[59] The research team at UK CDAR, operating independently of the treatment programs, conducted the follow-up interviews (i.e., 12-month follow-up interviews) with consenting individuals about 12 months after they completed the intake assessment.

[58] The data collection system for KY Kids Recovery Programs was operational in December 2014. Programs were informed that all data should be entered in the Client Information System (CIS) by the end of September 2016.

[59] Cole, J., Logan, T., Miller, J., & Scrivner, A. (2016). *Evidence base for the Adolescent Kentucky Treatment Outcome Study (AKTOS): Assessment and methods*. Lexington, KY: University of Kentucky, Center on Drug and Alcohol Research, Behavioral Health Outcome Studies.

Appendix B.
Comparison of AKTOS and KY Kids Recovery/AHARTT Clients at Treatment Intake

Clients who received substance abuse treatment in programs funded through the KY Kids Recovery initiative were compared to adolescent clients who received publicly-funded treatment in a community mental health center (CMHC) and were eligible for participation in the Adolescent Kentucky Treatment Outcome Study (AKTOS). AKTOS clients were significantly older than clients in the KY Kids Recovery and AHARTT sample. A higher percentage of the KY Kids Recovery clients were female than the AKTOS clients. Significantly more of the AKTOS clients resided in non-metropolitan counties than KY Kids Recovery and AHARTT clients. There were no other statistically significant differences between the two samples.

TABLE B1. DEMOGRAPHIC INFORMATION ON SUBSTANCE ABUSE TREATMENT CLIENTS BY SAMPLE (AKTOS VS. KY KIDS RECOVERY /AHARTT)

	AKTOS Clients (n = 347)	KY Kids Recovery / AHARTT Clients (n = 1,621)
Average age*	16.0 (12 – 17 years old)	15.8 (11 – 21 years old)
Gender*		
Male	72.8%	65.6%
Female	27.2%	34.4%
Race		
White/Caucasian	75.2%	78.8%
Black/African American	11.2%	8.9%
Other or multiracial	13.5%	12.3%
Type of community resided in:***		
Metropolitan	42.9%	56.7%
Non-metropolitan	48.9%	32.4%
Very rural	8.2%	10.9%
Primary caregiver		
Biological parent	68.6%	65.3%
Other family including grandparent, kinship care, stepparent, and adoptive family	24.8%	26.5%
Foster parent or Department for Community-Based Services	4.0%	5.3%
Other guardian	0.6%	1.0%
No caregiver—adult or emancipated minor	2.0%	2.0%

***p < .001, * p < .05.