Published in final edited form as:

Soc Sci J. 2008 December ; 45(4): 619–632. doi:10.1016/j.soscij.2008.09.004.

Mental Health Care for Youth: Predictors of Use are not always the same as Predictors of Volume

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Abstract

This study identifies determinants of adolescents' propensity to use outpatient mental care as well as factors predicting number of visits after contact with a provider was made. We examined three types of treatment outlets: day treatment program (DTP); mental health clinic (MHC); and private specialty services (PSS). Among youth, 1.6% visited DTP; 2.3% visited MHC; and 11.1% had PSS; with overlaps in services utilization. Results from multivariable logistic regressions indicate that most of the individual characteristics differentiated youth on odds of using MHC and PSS, but not DTP. Health status, alcohol dependence, drug dependence, and problematic conduct behaviors and having Medicaid increased the odds of using all three services. Censored regressions used to model number of visits among service users found that girls consistently used more visits than boys. The results suggest that policies that encourage seeking help to a mental care provider may be in instances different from those aimed at motivating retention in treatment.

Keywords

mental health care; youth mental health; adolescent health; health services utilization

1. Introduction

Twenty percent of children and adolescents in the US meet criteria for a mental disorder diagnosis and ten percent suffer from an emotional disturbance that may lead to functional impairment (Department of Health and Human Services [DHHS], 1999). Studies have indicated the availability of a variety of prevention, medication, and behavioral treatments services for mental illnesses; but evidence suggests that a large proportion of adolescents do not receive needed care (Leaf et al., 1996; Cuffel, Held, & Goldman, 2002). Untreated adolescent mental disorders can be very costly to families, communities, and the health care system. Utilization of mental health services in adolescence may be particularly salient for preventing persistence of psychopathology into adulthood (Harrington, Rutter, & Fombonne, 1996).

Studies on mental health service utilization by youths generally investigate which variables are associated with whether or not help is sought (Saunders, Resnick, Hoberman, & Blum, 1994; Sourander et al., 2001; 2004); however, the process of seeking and receiving appropriate

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mental health services for children and adolescents is more complex (DHHS, 1999). It begins with the youth and his/her families, or other institutions to recognize that behaviors are unusual and severe enough to require treatment; to decide whether or not to seek help and from whom; to be able to access care; and, lastly, to evaluate whether continuation of treatment is warranted (e.g.; Pescosolido & Boyer, 1999; Pescosolido, 1992; Horwitz, 1987). An alarming result in the process is that even when children and adolescents do engage in services, the majority of those who enter outpatient treatment drop out quickly or make only a small number of visits to their providers (Lavigne et al., 1998; Harpaz-Rotem, Leslie, & Rosenheck, 2004). Therefore, to attain a more complete picture of the process, studies should focus on correlates of both the likelihood of service use among the youth in general and the number of visits among services users. We use the 2002 and 2003 National Survey on Drug Use and Health (NSDUH) to (1) Examine patterns of utilization of outpatient mental health services (day treatment program (DTP), mental health clinic (MHC), and private specialty services (PSS)) among youth in the US general population; (2) Identify the determinants of the likelihood of using each type of these services; and (3) Estimate the number of visits among users of each type of these services. The present study further contributes to the literature since previous research on mental health services is mostly based on samples drawn within some special treatment settings, whereas the general population may have quite different underlying characteristics (e.g.; Simon, Ormel, VonKorff, & Barlow, 1995; Olfson & Pincus, 1994).

This study's framework draws from the Andersen's well-validated theoretical social behavioral model and one of the most frequently used frameworks for analyzing the factors that are associated with utilization of healthcare services (Andersen, 1995). Previous studies have offered empirical support for the social behavioral model to investigate utilization of mental health care (e.g.; Elhai & Ford, 2007; Freedenthal, 2007). This conceptual framework uses a system perspective and organizes variables into (1) predisposing factors that shape attitudes toward health care utilization, (2) need factors that encompass the individual's illness or impairment that necessitates utilization, and (3) enabling factors that refer to resources that promote or inhibit service utilization (Jerrell, 1998; Kessler et al., 1999; Jerrell, Wieduwilt, & Macey, 2002). As a framework for analysis, the social behavioral model does not dictate the exact variables and analytical methods that must be used. The appropriateness of variables to be included will vary depending on the research question, the purpose of the study, and data availability (Phillips, Morrison, Andersen, & Aday, 1998). Similar to the "two-part" modeling approach used in the RAND Health Experiment (e.g.; Duan, Manning, Morris, & Newhouse, 1983), this study's analysis starts with commonly used salient predisposing, need, and enabling variables but allows to distinguish the determinants of whether individuals seek care from the determinants of how much care is used among service users (e.g.; Holmes & Deb, 1998).

2. Methods

2.1. Participants/Subjects

The study sample is adolescents aged 12 to 17 years who were interviewed in the 2002 and 2003 National Household Survey on Drug Use and Health (NSDUH). The 2002 and 2003 NSDUH are the twenty-second and twenty-third surveys on a series that started in 1971 and has since been the primary source of information on the prevalence and incidence of illicit drug use, alcohol use, and tobacco use in the civilian population age 12 years and older. A major change in NSDUH questionnaire design was initiated in 1994, which placed more emphasis on health status and health care, access to care, and mental health (Substance Abuse and Mental Health Services Administration [SAMHSA], 2004). The NSDUH is comparable to a variety of other national surveys, including the National Health Interview Survey, the National Longitudinal Study of Adolescent Health, the National Longitudinal Alcohol Epidemiologic

Survey, and other national surveys (e.g.; SAMHSA, 2004). Public use files are available for selected years before 1990 and each year thereafter.

The sampling design is a nationally stratified multistage area probability sample of the non-institutionalized household population in the 50 states of the U.S. In 1999 the screening sample was expanded almost fourfold from the previous years to nearly 70,000 individuals. A small segment of the population is excluded from the sampling frame, including individuals who have no fixed household address such as homeless transients not in shelters and those who were in jails and hospitals. The interviews are conducted using a combination of computer-assisted personal interviewing (CAPI) conducted by an interviewer and audio computer-assisted self-interviewing (ACASI). The average weighted screening response rate is about 90 percent and weighted interview response rate is more than 80 percent. The study sample included 34,885 adolescents aged 12 to 17 years. Gender was almost equally distributed in the study sample, with about 50.28 % boys and 49.72 % girls. The race distribution was 63.61 % Whites, 14.55 % African-Americans; 15.57 % Hispanics, and 6.28 % other ethnic groups (native Americans, Asians, and Pacific Islanders).

2.2. Outcome Measures

We constructed three utilization measures of mental care from the following question: “During the past 12 months, how many times (1) Did you visit a partial day hospital or day treatment program for emotional or behavioral problems that were not caused by alcohol or drugs? (2) Did you visit a mental health clinic or center to receive treatment or counseling for emotional or behavioral problems that were not caused by alcohol or drugs? (3) Did you receive treatment or counseling from a private therapist, psychologist, psychiatrist, social worker, or counselor for emotional or behavioral problems that were not caused by alcohol or drugs? The three outcome variables were mental health services from/at: (1) a partial day hospital/day treatment program (DTP) in past year; (2) mental health clinic/center (MHC) in past year; and (3) private specialty services (PSS) from any other providers, including private or in-home therapist, psychologist, psychiatrist, social worker, or counselor?” To examine the likelihood of using these services, the variables were dichotomized such that the treatment of interest was coded as one; and anything else was zero. We investigated frequency of visits only for respondents who indicated they had at least one visit in the past year.

2.3. Control Variables

The choice of control variables in the multivariable analyses was based on previous findings in the literature. Evidence suggests that, in addition to differential use by age groups, girls and Whites receive more mental health care than their gender or ethnic counterparts (Hu, Snowden, & Jerrell, 1992; Rhodes, Goering, To & Williams, 2002). Immigrants and persons living in rural areas are generally less likely to use services (Laitinen-Krispijn, Van der, Wierdsma, & Verhulst, 1999). Adolescents lacking family support are likely to be more disruptive (Averill, Hopko, Small, Greenlee, & Varner, 2001). Studies indicate a positive relationship between problems behaviors and mental health services utilization (Briggs-Gowan, Horwitz, Schwab-Stone, Leventhal, & Leaf, 2000). Coexistent substance use significantly increases mental health services use (Zwaanswijk, Van der, Verhaak, Bensing, & Verhulst, 2003). Ability to pay, including income and health insurance, is associated with access to mental health care and type of insurance may have differential impacts (Ping et al., 2001; Sourander et al., 2004).

These control variables were coded as follows: age (12–13 years; 14–15 years old; and 16–17 years old); gender (males vs. females); race/ethnicity (Whites/Caucasians, African-Americans, Hispanics, and other racial or ethnic groups); school enrollment (enrolled in school vs. not enrolled in school), country of birth (born in US vs. born elsewhere); city residency (lived in non-metropolitan Statistical Areas/non-metros, lived in small metros; lived in large metros).

We included psychopathological measures of substance use based on the DSM-IV (American Psychiatry Association, 1994), including alcohol dependence (alcohol dependent vs. not alcohol dependent) and drug dependence (drug dependent vs. not drug dependent). To assess acts of delinquency that often signal adolescent-onset behavioral problems, we used indices of problematic conduct behaviors based on six types of delinquent behaviors: (a) gotten into a serious fight at school/work; (b) taken part in fight where group fights group; (c) carried a handgun; (d) attacked someone with intent to seriously hurt him/her; (e) sold illicit drugs; and (f) stolen/tried to steal anything worth more than \$50 (Wu & Howard, 2006; Smith & Davidson, 1986; Hinderlang, Hirschi, & Weis, 1981). These counts of conduct behaviors were grouped into three categories: none; 1–2 types; and 3 or more types of delinquent behaviors within the past year (Wu et al., 2006). Ability to pay was measured using yearly family income (< \$20,000; \$20,000 to \$49,999; \$50,000 to \$74,999; \$75,000 or more) and health insurance status (no insurance; private insurance; Medicaid).

3. Data Analysis

Summary statistics describe patterns of mental health services utilization in the study sample. Multivariable logistic regressions identified correlates of mental health services utilization, adjusting for multiple confounders. We used ‘LOGISTIC’ command in Stata 9 to estimate the adjusted odd ratios for each type of outpatient services (Stata, 2005). We used censored regressions to estimate the number of outpatient visits among services users since the variable was censored from above, in that if the respondent reported 31 or more outpatient visits in the past year the survey simply recorded it as “31 or more”. Because a censored variable is not observed over its entire range, standard estimates of its mean and variance will be biased as well as ordinary least squares (OLS) estimates of its regression on a set of explanatory variables. Unbiased maximum likelihood estimates are obtained from parametric censored regression approach by establishing a statistical model that acknowledges the different contributions of censored and uncensored observations. The first example of censored regression appears in the economic literature with the Tobit model (Tobin, 1958) that studied the demand for capital goods for automobiles and other major household appliances. Recent examples in the economic literature include models for number of hours worked in a week (Quester & Greene, 1982), number of extramarital affairs (Fair, 1977; 1978), arrests after release from prison (Witte, 1980), and vacation expenditures (Melenger & van Soest, 1996). The taxonomy of methods for handling censored data in the biomedical literature is also broad and includes censored regression models (Lynn, 2001; Hughes, 2000) as well as mixture models (Moulton, Curriero, & Barroso, 2002) and statistical imputation (Lynn, 2001). Lau and Gange (2004) demonstrated through simulations that the parametric censored regression approach is the best method and that even at high levels of censoring, the regression estimates remained unbiased. We used ‘CNREG’ in Stata 9 to implement the censored regression analysis.

Finally, to refine the estimation models we used parsimonious enhancement rules based on stepwise selection. We first fitted the model with all explanatory variables. Using a p-value of 0.10 based on the Wald test, the backward elimination algorithm consisted of removing the covariate with the least significant relationship before re-estimating the model. The process stopped when all remaining covariates were significant at 0.10. We derived population estimates using sampling weights to reflect representativeness of the NSDUH and conducted the analyses using the ‘SVY’ commands in Stata.

4. Estimation Results

4.1. Patterns of Services Utilization

The statistics indicate that 1.6% of the adolescents have been at DTP, 2.3% have been at MHC; and 11.1% had PSS for emotional or behavioral problems in past year. Patterns of use showed

significant overlaps. We found that 0.7% of the adolescents have been both at DTP and MHC ($\chi^2=0.004$; $df=1$); 1.1% have been at DTP and PSS ($\chi^2=0.002$; $df=1$); and 1.8% of the adolescents have been at MHC and PSS ($\chi^2=0.004$; $df=1$). Further summary statistics indicate that 0.6% of adolescents received all three types of services; 2.6% had at least two types of services; and 9.8% of the adolescents received at least one of the three types of services.

4.2. Likelihood of Visits: Full Sample

a) Day Treatment Program (DTP)—Adjusting for multiple covariates, the results for the likelihood of DTP visits (Table 2) indicate that adolescents aged 16 and 17 years were 33 percent less likely to visit DTP relative to adolescents aged 12 to 13 years (90%CI=0.67;0.93). Living in a single-family home increased the odds of DTP visit by 1.56 times (90%CI=1.17;2.07). Adolescents with Medicaid were 1.42 times (90%CI=1.19;1.68) as likely to visit a DTP as adolescents with no insurance. Compared to adolescents in excellent health, those in good health and poor health were respectively 1.39 times (90%CI=1.16;1.64) and 2.91 times (90%CI=2.19;3.88) as likely to visit a DTP. Being alcohol dependent increased the odds of a DTP visit by 1.69 times (90%CI=1.22;2.33) relative to not being alcohol dependent. Drug dependence increased the odds of a DTP visit by 2.85 times (90%CI=2.19;3.72) relative to no drug dependence. Compared to adolescents who reported no type of conduct problems, adolescents with 1 or 2 types of conduct problems and those with more than 2 types of conduct problems were respectively 1.85 times (90%CI=1.55;2.21) and 2.67 times (90%CI=2.19;3.72) as likely to visit a DTP for behavioral problems in past year.

b) Mental Health Clinic (MHC)—The estimates of the odds ratios of MHC visits are presented in the third column of Table 2. Compared to adolescents aged 12–13 years, those aged 14–15 years and 16–17 years were respectively 1.49 times (90%CI=1.27;1.75) and 1.67 times (90%CI=1.41;1.95) as likely visit a MHC in past year. Girls were 1.51 times (90%CI=1.34;1.72) as likely to visit a MHC relative to boys. Compared to Whites, African-Americans were 36 percent (90%CI=0.52;0.78) less likely; Hispanics were 29 percent (90%CI=0.58;0.87) less likely; and the other ethnic groups were 30 percent (90%CI=0.53;0.93) less likely to have MHC visits. Adolescents born in the US were 1.80 times (90%CI=1.26;2.57) as likely to use MHC as those born elsewhere. Living in a single-family home increased the odds of being at MHC by 1.61 times (90%CI=1.27;2.04). Having Medicaid increased the odds of receiving treatment at MHC by 1.77 times (90%CI=1.54;2.04) relative to no insurance. Compared to adolescents who reported being in excellent health, adolescents in good or poor health were respectively 1.38 times (90%CI=1.20;1.60) and 2.46 times (90%CI=1.91;3.17) as likely to receive treatment at a MHC. Alcohol dependence increased the odds of being at MHC by 1.66 times (90%CI=1.27;2.17) while drug dependence increased the odds by 2.13 times (90%CI=1.69;2.68). Compared to adolescents who reported no type of conduct problems, adolescents with 1–2 types of conduct problems were 1.80 times (90%CI=1.55;2.08) as likely to use MHC and those with more than 2 types or problematic conduct behaviors were 2.47 times (90%CI=2.10;2.90) as likely to use MHC.

c) Private Specialty Services (PSS)—The adjusted odds ratios from the logistic regression models for PSS are presented in the last column of Table 2. Adolescents aged 14–15 years were 1.12 times (90%CI=1.06;1.20) as likely to have PSS, compared to adolescents 12–13 years old. Girls were 1.72 times (90%CI=1.61;1.84) as likely to have PSS. Compared to Whites, African-Americans were 50 percent (90%CI=0.44;0.55) less likely, Hispanics were 32 percent (90%CI=0.61;0.76) less likely, and other racial/ethnic groups were 26 percent (90%CI=0.64;0.85) less likely to receive PSS. Enrolment in school increased the odds of receiving PSS by 1.58 times (90%CI=1.32;1.90). Adolescents born in the US were 1.41 times (90%CI=1.19;1.66) as likely to use PSS as adolescents born elsewhere. Relative to living in non-metros, living in small metros increased the odds of using PSS by 1.30 times (90%

CI=1.19;1.42) while living in large metros increased the odds by 1.50 times (90% CI=1.37;1.63). Living in a single-family home increased the odds of having PSS by 1.72 times (90% CI=1.48;1.98). Adolescents living in households with an annual income exceeding \$75,000 were 1.17 times (90% CI=1.09;1.27) as likely to have PSS as those living in household making less than \$20,000 a year. Relative to no insurance, private insurance increased the odds of PSS by 1.25 times (90% CI=1.12;1.39) and Medicaid by 1.47 times (90% CI=1.31;1.65). Relative to adolescents in excellent health, adolescents in good health were 1.42 times (90% CI=1.32;1.53) as likely to have PSS and those in poor health were 2.18 times (90% CI=1.87;2.56) as likely to use PSS. Alcohol-dependent adolescents were 1.46 times (90% CI=1.22;1.74) as likely to use PSS as non-alcohol dependent adolescents. Drug-dependent adolescents were 1.85 times (90% CI=1.59;2.15) as likely to use PSS, compared to non drug-dependent adolescents. Relative to adolescents with no problematic conduct behaviors, adolescents with 1–2 types of problematic conduct behaviors were 1.67 times (90% CI=1.55;1.81) and those with more than 2 types of conduct problems were 1.98 times (90% CI=1.79;2.18) as likely to have PSS.

4.2. Frequency of Visits: Service Users Only

a) Day Treatment Program (DTP)—The estimation results for number of visits among DTP users are presented in the second column of Table 3. They indicate that among DTP users, adolescents aged 16–17 years had 1.59 more visits (90% CI=0.42;2.75) than the 12–13 years old. Girls had 1.27 more DTP visits (90% CI=0.20;2.34) than boys. Adolescents from family making more than \$75,000 a year had 1.52 more DTP visits (90% CI=0.08;2.96) than those whose family income was less than \$20,000. Compared to DTP users who had no insurance, those with private insurance had 1.55 additional DTP visits (90% CI=0.02;3.09) while those covered under Medicaid had 1.96 more visits (90% CI=0.33;3.61). DTP users who reported more than 2 types of problematic conduct behavior had 2.21 more visits than DTP users who reported no conduct problem.

b) Mental Health Clinic (MHC)—Estimation results are presented in the third column of Table 3. MHC users aged 14–15 years had 1.37 fewer visits (90% CI=−2.44;−0.29) than MHC users who were 12–13 years old. Girls received 1.38 more visits (90% CI=0.34;2.43) than boys. School enrolment increased MHC use by 2.42 visits (90% CI=0.28;4.57) among MHC users. Drug dependent MHC users had 1.78 fewer visits (90% CI=−3.44; −0.11) relative to MHC users who were not drug dependent.

c) Private Specialty Services (PSS)—The estimation results for number of visits among PSS users are presented in the fourth column of Table 3. PSS users aged 16–17 years had 1.67 more visits (90% CI=1.08;2.26) than those who were 12–13 years old. Girls had 1.00 more visit (90% CI=0.43;1.56) than boys. Compared to Whites, African-Americans had 1.59 fewer visits (90% CI=−2.58;−0.59) and Hispanics had 0.90 fewer visits (90% CI=−1.78;−0.01). Relative to PSS users living in non-metros, PSS users living in small metros and large metros had 1.86 more visits (90% CI=1.12;2.59) and 1.50 more visits (90% CI=0.76;2.24), respectively. PSS users with Medicaid had 1.53 more visits (90% CI=0.82;2.24) than those without insurance. PSS users in poor health had 2.95 more visits (90% CI=1.74;4.16) than those in excellent health. Alcohol dependent PSS users had 1.55 more visits (90% CI=0.23;2.88) than those who were not alcohol dependent. Finally, we found that PSS users who reported 3 or more types of problematic conduct behaviors had 1.10 more visits (90% CI=0.37;1.84) than PSS users who reported no problematic conduct behaviors.

5. Discussion

Several predisposing characteristics including age, gender, race/ethnicity, and place of birth were associated with the likelihood of using MHC and PSS, but not DTP. Except for gender, the associations with the number of visits were less consistent. Girls had a higher likelihood of using MHC and PSS; but among service users, girls had more visits in all three service sectors. Whites were more likely to visit a MHC and PSS compared to all other races; among the subgroups of users, whites had more PSS visits than either African-Americans or Hispanics. Enrolled adolescents were more likely to use PSS; but among services users enrolled students had more MHC visits. Being born in the US increased the likelihood of using both MHC and PSS; but had not effect on number of visits among users. Engaging the US mental health care system seems to pose greater barriers to immigrants; but after contact with a provider, country of birth had no effect on number of visits. Previous research on gender, cultural, and ethnic issues in treatment services for mental disorders suggests that there are gender and cultural differences (Dakof, 2000; Robbins et al., 2002). As more girls and more adolescents of diverse racial and ethnic backgrounds are identified to be in need for mental health treatment services, more questions arise about the degree to which treatment should be tailored to engage and retain specific genders, ethnic, or cultural groups. Living in a single-family home increases the likelihood of services use in all of the sectors analyzed, which may indicate psychosocial problems arising from disfunctioning household; but living in a single-family home did not predict number of visits among service users.

Adolescents from families making at least \$75,000 as well as those with private health insurance were more likely to use PSV, suggesting that individuals who were financially capable opted to receive services in a more private setting. Medicaid significantly increased the odds of using services across all service types as well as increased the number of DTP visits and PSS visits among services users. From a public policy standpoint, Medicaid seems an important tool for increasing engagement and retention to mental treatment for adolescents (Johnson, 1999). Financing for mental disorders has not increased commensurately with the rise in the numbers of adolescents affected (American Academy of Pediatrics, 2001). Medicaid benefits for treatment of mental disorders vary widely across states and the emphasis is often on acute care services rather than on the relapsing condition of mental illness (Johnson, 1999). As the financing burden continues to shift from the private to the public sector, new research is needed to examine the effects of Medicaid and other publicly-funded insurance schemes on the accessibility and effectiveness of service delivery systems for adolescents with mental disorders.

Consistent with previous studies identifying co-morbidities as significant determinant of mental health services utilization (e.g. Booth, Cook, Blow, & Bunn, 1992); the results indicate that health status, alcohol dependence, drug dependence, and problematic conduct behaviors significantly predict the likelihood of using all three types of mental health services. This suggests an opportunity for clinicians and other health professionals to consider interventions to reduce substance abuse since integrated interventions for youth with comorbid mental and conduct disorders and substance abuse have shown to increase engagement and retention in treatment (Hser et al., 2001; McCambridge & Strang, 2004). We obtained no consistent results on the associations between substance disorders and number of visits for services users. Interestingly, we found that drug dependence reduced the number of MHC visits among services users; a plausible explanation is that when drug dependence problems was detected at MHC, patients were referred to more suitable treatment programs such as residential or inpatient services. Indeed, a limitation of the study is that we did not control for illness severity and appropriateness of care received. PSS and MHC treat persons with mild to moderate mental illness and DTP treat persons with more severe or acute forms of mental disorders. Due to environmental factors such as parent resource, neighborhood resources,

beliefs regarding effectiveness of treatment options, youth may be limited in terms of type of services received (Kataoka, Zhang, & Wells, 2002). As for all studies based on self-reported information, there are also questions regarding validity and reliability of the data. The NSDUH procedures are designed to maximize honesty and recall, but ultimately the value of the data depends on respondents' truthfulness and memory. It is, however, encouraging that studies have examined the validity of data collected for the NSDUH and found that the use of ACASI and CAPI methods produce more valid results than other self-report methods (Harrison & Hughes 1997; Aquilino, 1994).

With few exceptions, there was no general consistency in terms of specific factors being associated with both the likelihood of using a specific outpatient mental health provider and number of visits to that provider among services users. This is in line with recent empirical studies of behavioral healthcare demand studies that represent utilization behavior in two parts: the first part identifying factors related to any care use and the second part determining how much care is demanded among the subgroup of users (e.g., Deb & Trivedi, 2002; Deb & Holmes, 2000;). These results suggest that policies that encourage seeking help for mental problems may in instances differ from those aimed at motivating retention in treatment.

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Table 1

Definitions and Weighted percentages of Control Variables (N=34,885)

Variable	Definition	Percent
Age 12–13	Equals 1 if respondent is 12 or 13 years old; 0 otherwise	33.57
Age 14–15	Equals 1 if respondent is 14 or 15 years old; 0 otherwise	34.61
Age 16–17	Equals 1 if respondent is 16 or 17 years old; 0 otherwise	31.82
female	Equals 1 if respondent is male; 0 if female	49.72
White	Equals 1 if respondent is White; 0 otherwise	63.61
African-American	Equals 1 if respondent is African-American; 0 otherwise	14.55
Hispanic	Equals 1 if respondent is Hispanic; 0 otherwise	15.57
Other ethnic groups	Equals 1 if respondent is Native American, Pacific Islander, Asian; 0 otherwise	6.28
Enrolled in school	Equals 1 if respondent was enrolled in a school; 0 if not enrolled	96.03
Born in United States	Equals 1 if respondent was born in the United States; 0 if born elsewhere	93.67
Lived in a large Metropolitan Statistical Area (MSA)	Equals 1 if respondent lived in a large MSA with 1 million or more persons; 0 otherwise	37.12
Lived in a small MSA	Equals 1 if respondent lived in a MSA with fewer than 1 million persons; 0 otherwise	35.66
Lived in a non-MSA	Equals 1 if respondent lived in a non-MSA; 0 otherwise	27.32
Excellent health	Equals 1 if respondent reported being in excellent health; 0 otherwise	36.29
Good health	Equals 1 if respondent reported being in good health; 0 otherwise	60.17
Poor health	Equals 1 if respondent reported being in poor health; 0 otherwise	3.54
Alcohol dependent	Equals 1 if respondent is alcohol dependent; 0 otherwise	2.13
Drug dependent	Equals 1 if respondent is drug dependent; 0 otherwise	2.88
No type of conduct behaviors	Equals 1 if respondent reported no type of conduct behaviors; 0 otherwise	65.26
1–2 types of conduct behaviors	Equals 1 if respondent reported 1 to 2 types of conduct behaviors; 0 otherwise	22.28
3–4 types of conduct behaviors	Equals 1 if respondent reported more than 3 types of conduct behaviors; 0 otherwise	12.47
Family income ≤\$20,000	Equals 1 if household income is less than \$20,000; 0 otherwise	17.93
Family income from \$20,000 to \$49,999	Equals 1 if household income is between \$20,000 and \$49,999; 0 otherwise	35.61
Family income from \$50,000 to \$74,999	Equals 1 if household income is between \$50,000 and \$74,999; 0 otherwise	19.72
Family income ≥\$75,000	Equals 1 if household income is equal to or over \$75,000; 0 otherwise	26.74
No insurance	Equals 1 if respondent had no health insurance; 0 otherwise	10.34
Private insurance	Equals 1 if respondent had private health insurance; 0 otherwise	73.71
Medicaid	Equals 1 if respondent was covered under Medicaid; 0 otherwise	18.11

Table 2

Logistic Regressions (Odds ratios) for outpatient mental health services (N=34,885)

Variable	Day Treatment Program Yes=558 No=34,327	Mental Health Clinic Yes=803 No=34,082	Private Specialty Services Yes=3,872 No=31,013
Age 14–15 ^a	---	1.49 *** [1.27;1.75]	1.12 *** [1.06;1.20]
Age 16–17 ^a	0.79 ** [0.67;0.93]	1.67 *** [1.41;1.95]	---
Female	---	1.51 *** [1.34;1.72]	1.72 *** [1.61;1.84]
African-American ^b	---	0.64 *** [0.52;0.78]	0.50 *** [0.44;0.55]
Hispanic ^b	---	0.71 *** [0.58;0.87]	0.68 *** [0.61;0.76]
Other ethnic groups ^b	---	0.70 ** [0.53;0.93]	0.74 *** [0.64;0.85]
Enrolled	---	---	1.58 *** [1.32;1.90]
Born in U.S.	---	1.80 *** [1.26;2.57]	1.41 *** [1.19;1.66]
Lived in a small MSA ^c	---	---	1.30 *** [1.19;1.42]
Lived in a large MSA ^c	---	---	1.50 *** [1.37;1.63]
Single Family Home	1.56 ** [1.17;2.07]	1.61 *** [1.27;2.04]	1.72 *** [1.48;1.98]
Family income from \$20,000 to \$49,999 ^d	---	---	---
Family income from \$50,000 to \$74,999 ^d	---	---	---
Family income ≥\$75,000 ^d	---	---	1.17 *** [1.09;1.27]
Private Health Insurance ^e	---	---	1.25 *** [1.12;1.39]
Medicaid ^e	1.42 *** [1.19;1.68]	1.77 *** [1.54;2.04]	1.47 *** [1.31;1.65]
Good health ^f	1.39 *** [1.16;1.64]	1.38 *** [1.20;1.60]	1.42 *** [1.32;1.53]
Poor health ^f	2.91 *** [2.19;3.88]	2.46 *** [1.91;3.17]	2.18 *** [1.87;2.56]
Alcohol dependent	1.69 *** [1.22–2.33]	1.66 *** [1.27;2.17]	1.46 *** [1.22;1.74]
Drug dependent	2.85 *** [2.19;3.72]	2.13 *** [1.69;2.68]	1.85 *** [1.59;2.15]
1–2 types of conduct problems ^g	1.85 *** [1.55;2.21]	1.80 *** [1.55;2.08]	1.67 *** [1.55;1.81]
3 or more types of conduct problems ^g	2.67 *** [2.19;3.72]	2.47 *** [2.10;2.90]	1.98 *** [1.79;2.18]

Notes: 95% Confidence Intervals reported in brackets.

*
p<0.05;**
p<0.01^aReference category: Age 12–13;^bReference: White;^cReference: Lived in non-Statistical Metropolitan Areas (SMA);^dReference: Family income below \$20,000;^eReference: No health insurance;^fReference: Excellent health;^gReference: No types of conduct problems

Table 3

Censored regression estimates of number of outpatient mental health visits among services users

Variable	Day Treatment Program (N=558)	Mental Health Clinic (N=803)	Private Specialty Services (N=3,872)
Age 14–15 ^a	---	-1.37 ** [-2.44; -0.29]	---
Age 16–17 ^a	1.59 ** [0.42;2.75]	---	1.67 *** [1.08;2.26]
Female	1.27 * [0.20;2.34]	1.38 ** [0.34;2.43]	1.00 *** [0.43;1.56]
African-American ^b	---	---	-1.59 *** [-2.58; -0.59]
Hispanic ^b	---	---	-0.90 * [-1.78; -0.01]
Other ethnic groups ^b	---	---	---
Enrolled	---	2.42 * [0.28;4.57]	---
Born in U.S.	---	---	---
Lived in a small MSA ^c	---	---	1.86 *** [1.12;2.59]
Lived in a large MSA ^c	---	---	1.50 *** [0.76;2.24]
Single Family Home	---	---	---
Family income from \$20,000 to \$49,999 ^d	---	---	---
Family income from \$50,000 to \$74,999 ^d	---	---	---
Family income ≥ \$75,000 ^d	1.52 * [0.08;2.96]	---	---
Private Health Insurance ^e	1.55 ** [0.02;3.09]	---	---
Medicaid ^e	1.96 ** [0.33;3.61]	---	1.53 *** [0.82;2.24]
Good health ^f	---	---	---
Poor health ^f	---	---	2.95 *** [1.73;4.16]
Alcohol dependent	---	---	1.55 * [0.23;2.88]
Drug dependent	---	-1.78 * [-3.44; -0.11]	---
1–2 types of conduct problems ^g	---	---	---
3 or more types of conduct problems ^g	---	---	1.10 ** [0.37;1.84]
Constant	2.21 ** [0.64;3.77]	4.31 *** [2.13;6.48]	4.19 *** [3.47;4.92]

Notes: 95% Confidence Intervals reported in brackets.

*
p<0.05;**
p<0.01^aReference category: Age 12–13;^bReference: White;^cReference: Lived in non-Statistical Metropolitan Areas (SMA);^dReference: Family income below \$20,000;^eReference: No health insurance;^fReference: Excellent health;^gReference: No types of conduct problems