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## Perceived Need for Substance Abuse Treatment among Illicit Stimulant Drug Users in Rural Areas of Ohio, Arkansas, and Kentucky

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### Abstract

Non-medical drug use in rural communities in the United States is a significant and growing public health threat. Understanding what motivates drug users in rural areas to seek substance abuse treatment may help in addressing the problem. Perceived need for treatment, a construct indicative of problem recognition and belief in problem solution, has been identified as an important predictor of help-seeking behavior. This cross-sectional study used data collected through face-to-face interviews to examine factors associated with perceived need for drug abuse treatment among not-in-treatment, adult, illicit stimulant drug users (n=710) in rural areas of Ohio, Kentucky, and Arkansas. More than one-quarter of the sample perceived a need for treatment. Results from a stepwise multiple regression analysis showed that white users, users with better physical and mental health status, and occasional users of methamphetamine were significantly less likely to see a need for treatment. Users with higher Addiction Severity Index composite scores for family/social problems or legal problems, and users with prior drug abuse treatment experience were significantly more likely to perceive a need for treatment. These findings have practical implications for efforts addressing substance abuse in rural areas.

### Keywords

perceived need for treatment; substance abuse; treatment; rural; methamphetamine; cocaine

### 1. Introduction

Traditionally, illicit drug use has been associated with densely populated urban areas, but mounting evidence suggests that it is significant problem in rural areas as well. For example, crack cocaine use has been identified as a serious public health issue in a very rural area in the

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east of England (Vivancos et al., 2006), where the estimated prevalence of problematic drug use exceeds that of the United Kingdom as a whole (Holland et al., 2006). Young people in rural South Africa abuse not only alcohol, tobacco, and marijuana but also drugs like cocaine and amphetamines (Peltzer and Cherian, 2000). Heroin injection and the plethora of problems associated with it now threaten the public health of rural counties in southern China (Liu et al., 2006). Research conducted in New South Wales, Australia, found that opiate users in rural areas were more likely to have injected opioids and amphetamines than their urban counterparts, as well as have higher levels of alcohol, cannabis, and tranquilizer use (Lawrinson et al., 2006).

Illicit drug use is now recognized as pervasive in rural areas throughout the United States (Cronk and Sarvela, 1997; Robertson and Donnermeyer, 1998; Logan et al., 1999; National Center on Addiction and Substance Abuse 2000; Johnston et al., 2006). Findings from the 2005 US National Survey on Drug Use and Health show that 43.4% of persons 18 years of age or older living in non-metropolitan counties report the lifetime use of at least one illicit drug (Substance Abuse and Mental Health Services Administration, 2006). Drugs long associated with urban areas, like heroin; rediscovered drugs, like methamphetamine; and newer drugs, such as controlled-release oxycodone, are now abused by people residing in rural areas of the US (Hays 2004; Falck et al., 2005; Booth et al., 2006). This changing "street" pharmacopeia challenges rural treatment providers to confront substance abuse problems with which they may be unfamiliar and often lack the resources to address (Brown et al., 2004; Falck et al., 2005). It may also impact drug users' perceived need for treatment.

Perceived need for treatment is fundamental to explanations of health service use (Mojtabai et al., 2002; Edlund et al., 2006). One well-known model of health care use considers perceived need, in addition to predisposing factors such as sociodemographic characteristics and health beliefs, and enabling factors such as income, to be critically important determinants of service utilization (Andersen and Newman, 1973; Aday and Anderson 1974; Andersen 1995; Goodwin and Andersen, 2002). Conceptually, perceived need for substance abuse treatment is a construct that embodies drug problem recognition, the desire for professional help, and a belief in problem solution (Forentine and Anglin, 1994; Longshore et al., 1997; Neff and Zule, 2002; Kim and Fendrich, 2002; Nwakese et al., 2002). For adults suffering drug abuse and dependency disorders, seeing a need for treatment may well be the necessary first step in the help-seeking process (Forentine and Anglin, 1994; Kertesz et al., 2006). Indeed, persons perceiving a need for drug abuse treatment are more likely to enter treatment than those who do not (Kertesz et al., 2006; Siegal et al., 2002; Charuvastra et al., 2002; Zule and Desmond, 2000). In addition, there is some evidence to suggest that perceiving a need for treatment is predictive of staying in treatment as well as having better outcomes (Shen et al., 2000; Longshore and Teruya, 2006). Knowing which factors are associated with perceived need can shed additional light on who seeks substance abuse treatment and why.

Several studies exploring perceived need for drug abuse treatment used Drug Use Forecasting (DUF) program data, collected in Los Angeles from adult arrestees in the early to mid-1990s. One of these studies used urine test results from male and female arrestees (n=1255) and found that those who tested positive for cocaine, amphetamine, or opiates were more likely to perceive a need for treatment than were users of other drugs or younger users (Fiorentine and Anglin, 1994). Another study focused on female arrestees (n=390) found that whites were more likely than other racial/ethnic groups to see a need for treatment, as were those women who had used heroin or cocaine more frequently (Baldwin et al., 1995). The last DUF study found that arrestees (n=1170) who had used heroin in the last 30 days were more likely to perceive a need for treatment than were non-users (Longshore et al., 1993).

Other factors have been linked to perceived need for drug abuse treatment. For instance, previous treatment for a substance abuse disorder has been positively associated with perceived need in several studies (Fiorentine and Anglin, 1994; Baldwin et al., 1995; Zule et al., 1997; Nwakeze et al., 2002), as has, perhaps not surprisingly, the presence of legal problems in another (Longshore et al., 1993). One study of cocaine users found that perceived need was affected by duration of use, with those expressing a need for treatment having used the drug significantly longer (Carroll and Rounsaville, 1992).

To date, nearly all of the studies examining perceived need for substance abuse treatment have been conducted in urban settings, often involving arrestees or persons entering treatment. To the best of our knowledge, no study has examined perceived need among non-incarcerated, not-in-treatment drug users in rural settings. This multi-site, cross-sectional study will help fill that knowledge gap by exploring the influence of various sociodemographic characteristics, social and legal problems, self-reported health status, and recent drug use practices on perceived need for drug abuse treatment. Understanding perceived need for treatment can inform efforts to better address the problem of substance abuse in rural areas.

## 2. Methods

### 2.1 Sample

The subjects in this study were 710 people residing in nine rural counties -- three each in west-central Ohio (n=248), east-central Arkansas (n=237), and western Kentucky (n=225) -- who agreed to participate in a natural history research study examining non-medical, illicit stimulant drug use, and health services utilization. The research locations were chosen for practical reasons. The states are the homes of the universities of study investigators, and the counties are within reasonable driving distances of the universities, thereby facilitating direction and management of field site operations.

The Ohio and Arkansas counties were contiguous and the Kentucky counties very close to one another. Defined as non-metropolitan in the 2000 US Census, Ohio counties ranged in population size from 46,000-53,000 people; Kentucky counties from 12,000-40,000; and Arkansas counties from 12,000 - 27,000. The most densely populated Ohio county contained 88.8 persons per square mile compared to 77.5 and 44.3 persons per square mile in Kentucky and Arkansas, respectively. No county had a town with more than 20,000 people. The counties were very largely farmland, dotted with small towns that sometimes had industrial plants on their outskirts. The cities with populations having more than 100,000 inhabitants to which the Ohio counties were closest were Dayton and Columbus, Ohio, while for the Kentucky and Arkansas counties it was Nashville and Memphis, Tennessee, respectively.

Within each state, the counties were essentially sociodemographically homogeneous. For instance, in terms of racial composition, non-whites constituted 1.9-4.0% of the population in the target counties in Ohio, 0-2% in Kentucky, and 49-57% in Arkansas. The counties varied socioeconomically by state, with higher levels of poverty (defined as a household income under \$10,000 per year) in Arkansas (22-24%) and Kentucky (14-18%) than in Ohio (4-5%) (United States Census Bureau, 2000). Considered as a whole, this study's counties encompass a racially and ethnically diverse mix of people found in communities in rural America.

To be eligible for study entry, participants had to meet the following criteria: 1) age 18 or older; 2) reside in one of the targeted counties; 3) not in drug abuse treatment or incarcerated; and 4) report the use of crack cocaine, cocaine HCl, and/or methamphetamine, by any route of administration, at least once in the 30 days before the baseline interview.

Participants were recruited using respondent-driven sampling (RDS), a variant of chain-referral sampling (Heckathorn, 1997, 2002; Wang et al., 2005, 2007). RDS was used because, theoretically, it is capable of generating a more representative sample of a “hidden” population than more traditional methods such as snowball and targeted sampling. This is due chiefly to the controls on volunteerism and masking imposed on the recruitment process (Heckathorn et al., 2002; Wang et al., 2005).

Ethnographic methods were used to recruit a small group of people who met the eligibility criteria for study participation. In Ohio, for instance, the project ethnographer frequented a bar and developed a relationship with the bartender who eventually introduced him to a person who used crack cocaine. This person became a “seed.” Seeds were then asked to distribute referral coupons to others they felt might be eligible for the study (Draus et al., 2005). In turn, each new eligible participant gave referral coupons to their friends and acquaintances, and so on. This recruitment method is considered a Markov process, and the sample compositions reach equilibrium, or stabilize, as the recruitment process unfolds (Heckathorn, 1997). Participants were compensated \$10 each for up to three referrals that presented at a field site office for an eligibility determination. Study recruitment continued until the desired sample size was reached in each state. Recruitment was initiated in Ohio in October 2002 and concluded in Kentucky in August 2004. More details on the implementation of RDS in the Ohio site of this study can be found elsewhere (Draus et al., 2005; Falck et al., 2005; Wang et al., 2007).

## 2.2 Data Collection

Upon presentation at a field site office, each participant signed an informed consent document following a protocol that had been approved by the study-affiliated university Institutional Review Board in that participant's state of residence. Face-to-face, computer-assisted, structured questionnaires were then administered by interviewers who were trained by senior researchers, who periodically monitored the interview process. Questionnaire items and the order in which they were asked was not at the discretion of the interviewers. The baseline questionnaire consisted of author-generated and standardized items that covered a range of areas, including sociodemographics, current drug use practices, family/social and legal problems, and health status. In addition to remuneration for their recruitment efforts, participants received \$50 for the time they spent responding to the initial interview, which lasted, about 2-2½ hours.

## 2.3 Measures

To measure the study's dependent variable, perceived need for treatment, participants were read the following statement: “I now need to get into a drug abuse treatment program.” They were asked to answer along on a 5 point scale, with options ranging from “strongly disagree” to “strongly agree.” These options were converted into a dichotomous variable with “strongly agree” and “agree” affirming the need for treatment (1) and “neutral,” “disagree,” and “strongly disagree” denying the need (0) .

Explanatory variables included site (Kentucky was treated as the reference group, Ohio and Arkansas were coded as dummy variables), gender (0 = female, 1 = male), race/ethnicity (0 = non-white, 1 = white), education (0 = ≤ high school graduate, 1 = graduate, 2 = ≥ high school graduate), and current full time employment (0 = no, 1 = yes). Age was treated as a continuous variable.

Current family/social problems and legal problems were assessed with Addiction Severity Index (ASI) composite scores. ASI composite scores are weighted measures of items from

specified problems areas. Scores can range from 0 to 1, with higher scores indicating greater problem severity in the domain assessed. (McLellan et al., 1992).

Treatment history was determined by asking the following question: “In your lifetime, on how many occasions, if ever, have you been a patient or client in a drug abuse treatment program?” with responses condensed into a dichotomous variable (0 = never; 1 = ever).

Health status was measured by the SF-8 Health Survey (SF-8), a standardized, self-assessment questionnaire of physical and mental health functioning in the last 30 days (Ware et al., 2001). Poor health was defined as having a SF-8 physical or mental health summary score in the lowest quartile, as determined by US population norms (i.e., physical health scores  $\leq 44.0$  and mental health scores  $\leq 44.2$ ). This approach is consistent with other research using similar health status measures where the lowest quartile scores have been deemed indicative of functional impairment (Danziger et al., 2000; Calsyn et al., 2004). Scores above the 25<sup>th</sup> percentile were considered representative of average or better health and participants scoring in this range served as the reference group.

The frequency of use of methamphetamine, amphetamine, crack cocaine, cocaine HCl, heroin, non-prescribed opioids, non-prescribed tranquilizers, marijuana, and alcohol was ascertained by the following question: “On how many days in the past 30 days did you use [the drug]?” Alcohol use referred to heavy drinking and was determined by asking, “How many days in the past 30 did you drink to the point of drunkenness (intoxication)?” Participant responses were subsequently divided into three categories—no use, use on 1-19 days, and use 20 or more days. The cut point of 20 days was used to differentiate daily from non-daily use and is consistent with the methodology of large scale drug epidemiological studies (Johnston et al., 2006). Injection drug use was measured by asking how many times the person had injected drugs within the past 30 days and treated dichotomously (0 = no injection; 1 = injection).

## 2.4 Data Analysis

Univariate and bivariate statistics describe the data. For site comparisons, F-tests were used for continuous variables and chi-squares for categorical variables. SAS 9.1 (SAS Institute, 2004) was used to conduct a stepwise logistic regression to assess the relationship between independent variables and perceived need for drug abuse treatment. Because there is no well-regarded global measure of non-medical drug use frequency, and such data are critical to understanding perceived need for drug abuse treatment, stepwise regression was chosen as the analytical method because it easily accommodated all 16 drug use measures, as well as a set of individual background measures. In the interest of model parsimony, drugs which very few people reported using on a daily basis (amphetamine, heroin, tranquilizers) were collapsed into dichotomous variables (0 = no use; 1 = use in the last 30 days).

## 3. Results

### 3.1 Sociodemographic Characteristics

Table 1 shows the characteristics of the sample, both by site and for the total sample. Most study participants were men (61.4%) and white (67.9%). With a mean age near 33 years, the overwhelming majority (87.0%) had a high school education or less. Only 32.2% were employed on a full-time basis in the 30 days before entering the study. The ASI mean composite scores for family/social (0.18) and legal (0.17) domains were indicative of some problems in these areas. Overall, 45.5% of the sample had a history of drug abuse treatment. Slightly less than one third of the sample had SF-8 physical health status scores indicative of functional impairment while more than half the sample, 56.8%, had mental health scores that indicated the presence of problems.

Bivariate comparisons revealed some cross-site differences. For example, the Arkansas sample had a significantly higher percentage of non-white participants than did the other sites. The Arkansas sample was also older. Overall, the Kentucky subjects had a higher level of educational achievement. The Ohio sample had ASI scores suggesting significantly greater family/social and legal problems. Proportionately more participants in Ohio had been in drug abuse treatment than had those living in Arkansas and Kentucky. Proportionately more participants in Ohio and Kentucky than in Arkansas had SF-8 mental health scores indicative of impairment.

### 3.2 Drug Use Practices

Table 2 presents the 30-day drug use practices of the sample. The only illicit stimulant drug used by more than half the sample (59.2%) in the last 30 days was crack cocaine, which was followed by cocaine HCl (48.6%), methamphetamine (43.4%), and amphetamine (15.1%). The stimulant drug with the largest proportion of daily users was crack (17.6%). The only illicit drug whose use exceeded crack among the sample was marijuana. More than half of the sample (53.1%) drank to intoxication at least once in the last month, and 8.4% did so on a daily basis. The injection of drugs was reported by 13% of the sample.

Substance use varied by site to some extent. For example, the Kentucky sample had proportionately more methamphetamine users and proportionately fewer crack users than did Ohio and Arkansas. Ohio had significantly more participants reporting the non-prescribed use of opioids. There were significantly more daily users of marijuana as well as persons who drank to intoxication in the Ohio sample than in the others.

### 3.3 Perceived Need for Drug Abuse Treatment

Table 3 shows perceived need by site. A significantly larger proportion of participants in the Arkansas sample saw a need for treatment compared to the Ohio and Kentucky samples ( $p \leq .0001$ ). More than one-fourth of the overall sample perceived a need for drug abuse treatment.

### 3.4 Factors Associated with Perceived Need for Treatment

The results of the stepwise logistic regression are presented in Table 4. When controlling for other factors in the regression, six variables were significantly associated with perceived need for treatment. Race/ethnicity was associated, with whites being significantly less likely than non-whites to see a need for treatment ( $p \leq 0.001$ ). People who had been previously treated for substance abuse were significantly more likely to see a need for treatment than people without a treatment history ( $p \leq 0.05$ ). Higher ASI family/social ( $p \leq 0.05$ ) and legal ( $p \leq 0.05$ ) problem composite scores also positively associated with perceived need for treatment. SF-8 health status was related to perceived need with persons scoring above the 25<sup>th</sup> percentile, as defined by national norms, for physical health ( $p \leq 0.01$ ) and mental health ( $p \leq 0.01$ ) less likely to see a need for treatment. Only one drug was associated with perceived need: non-daily users of methamphetamine were significantly less likely to perceive a need for treatment ( $p \leq 0.001$ ). The only other drug variable remotely close to statistical significance in the stepwise regression was daily crack cocaine use ( $p = 0.13$ ), which was positively signed. All other drug variables had  $p$  values  $\geq 0.29$ .

## 4. Discussion

This study is among the first to explore perceived need for drug abuse treatment and its determinants among illicit drug users residing in rural areas of the United States. More than a quarter of the sample population in this study expressed a need for treatment. Statistically significant associations were identified between perceived need and race/ethnicity, history of drug abuse treatment, ASI family/social problems and legal problems, SF-8 physical health

and mental health status, and non-daily methamphetamine use. These results suggest that a range of factors influence perceived need for treatment among rural drug users. And because perceived need is a critical step towards treatment, these findings can help inform policy as well as practice.

The cross-site differences identified in the bivariate analyses very likely result from differences in the contextual features of the geographic regions included in the study. For example, the Arkansas sample had a significantly higher percentage of African Americans than did the Ohio and Kentucky samples because the counties from which its sample was recruited had of a much larger proportion of African Americans. Similarly, the significantly lower rate of employment in the Arkansas sample is consistent with its counties having higher rates of poverty. It is not clear why the Ohio sample had significantly higher ASI family/social and legal composite scores. Its counties were more densely populated than the Arkansas and Kentucky counties and this could result in more social interactions, which might increase the chances for social and legal difficulties. The relative accessibility of drug abuse treatment services in the research locations may partially explain the fact that more users in the Ohio sample had been in treatment at least once. Although all counties in the study had publicly-funded treatment services, only the Ohio counties offered these services at multiple locations.

Interestingly, finding proportionately more users in Ohio and Kentucky with SF-8 mental health status scores indicative of functional impairment may be explained, at least in part, by the racial/ethnic compositions of the site samples. Given that the overwhelming majority of participants in the Ohio and Kentucky samples were white, while the majority in the Arkansas sample was African American, the result is consistent with an evolving literature that suggests white drug users are more likely to manifest mental health problems than are African American drug users (Falck et al., 2004; Compton et al., 2000). The reasons underlying this phenomenon are uncertain, but the finding has emerged again, this time in a multi-site community sample of rural drug users.

From a policy perspective, finding that 26.5% of the sample indicated a need for drug abuse treatment is critically important. Results from national cross-sectional studies, based on data collected in the late 1990s for the Healthcare for Communities (HCC) study (Edlund et al., 2006) and the early 1990s for National Comorbidity Study (NCS) (Mojtabai et al., 2002), suggested 11% -14% of persons with drug abuse disorders perceived a need for treatment. The time frame for perceived need in those studies was 12 months, compared to the immediate time frame (i.e., "now") used in this study. Therefore, the proportion of our rural sample perceiving a need for treatment would likely be larger if a longer time frame had been considered. Regardless, it has been argued that at least two-thirds of the people who perceive a need for treatment actually have an alcohol, other drug, or other mental health disorder (Edlund et al., 2006). Thus, our findings, like those of previous research (Hartley et al., 1999; Booth et al., 2000; Hauenstein et al., 2006; Pringle et al., 2006), again suggest that there is a substantial unmet need for drug abuse treatment services in rural communities.

The result suggesting that white users were significantly less likely to perceive a need for drug abuse treatment compared to non-whites, virtually all of whom were African American, contrasts with the results of the above-referenced HCC and NCS research where no differences between racial/ethnic groups were identified; however, our findings are consistent with another study carried out with HCC data where African Americans were significantly more likely than whites to see a need for drug abuse or mental health care (Wells et al., 2001). It is unclear why whites may be less likely to see a need for treatment. Perhaps they view treatment as stigmatizing in some way and/or are less willing than non-whites to acknowledge the existence of a problem. Offering some support for this explanation are results from a study using NCS

data that found African Americans had much more positive attitudes toward seeking mental health care than did whites (Diala et al., 2001).

Consistent with findings from other studies (Fiorentine and Anglin, 1994; Siegal et al., 2002; Zule et al., 1997; Zule and Desmond, 2000), previous drug abuse treatment was found to be significantly associated with perceived need for treatment. This suggests that those who have been through treatment are likely to have found it sufficiently helpful to see the need for it again, despite of their return to illicit substance use.

Impaired family and social relationships as well as legal difficulties are recognized indicators of drug abuse (American Psychiatric Association, 2000). Research also suggests problems in these areas are often predictive of treatment entry (Siegal et al., 2002; Green-Hennessy, 2002; Haller et al., 2003). Thus, it is not surprising that ASI family/social and legal problem scores were associated with perceived need for treatment. Not unexpectedly, those users with SF-8 physical and mental health status scores above the lowest quartile were significantly less likely to see a need for treatment compared to those users scoring in the lowest, i.e., individuals whose scores are indicative of functional impairment. Logically, users who feel well would be less likely to seek help.

With the exception of the negative association for non-daily methamphetamine use, there appeared to be no link between type or frequency of drug use and perceived need. One possible explanation for this finding is that non-daily users believed their use was under control. Indeed, some of the well-known effects of methamphetamine use, such as increased feelings of self-esteem, self-confidence, and mental enhancement (Gawin and Ellinwood, 1988; Cho, 1990; Albertson et al., 1999), could contribute to users believing that their drug use was under control and that they did not need treatment. Further, such feelings dissipate with heavier use and problems ensue (Albertson et al., 1999), thus partially explaining why daily users were more likely to see a need for treatment than non-daily users.

Finally, since this is a multi-site study, it is worth noting that site location had no significant effect on perceived need. This suggests that rural drug users' perceptions of need were shaped by factors other than those associated with geography. This, in turn, suggests that these factors exert their influence regardless of whether the users reside in Ohio, Arkansas, Kentucky, or somewhere else.

#### 4.1 Limitations

Limitations affect the generalizability of this study's results. First, the sample was not a random one; however, the respondent-driven sampling used in this study to recruit participants is arguably the method most likely to produce a representative sample with a "hidden" population such as illicit drug users (Heckathorn 1997, 2002; Wang et al., 2005, 2007). Second, eligibility criteria required the recent illicit use of a stimulant drug, so the study results may not apply to non-medical drug users in rural areas who are not involved with cocaine or methamphetamine. Third, the study relies, in part, on participants' self-reports of their non-medical drug use. Although self-reports of drug use are not without problems, evidence suggests that they can be valid and reliable (Darke 1998; Adair et al., 1995). Finally, the cross-sectional design of this study complicates interpretation of some of its findings. For instance, it is unclear whether low SF-8 mental health scores reflect problems that are a result of non-medical drug use or problems that caused participants to seek solutions through the use of drugs. Either could influence a person's perception of need. The limitations imposed by a cross-sectional design are shared with virtually all other studies exploring perceived need for treatment among substance abusers.



## 5. Conclusions

Aside from suggesting the existence of a large unmet need for drug abuse treatment services for users residing in rural areas and identifying the determinants of perceived need, the results of this study may have practical implications. They can be used to inform public education as well as outreach-treatment linkage programs. For example, public service educational efforts could highlight the family and legal problems drug users suffer. Such efforts could heighten users' perceived need for treatment and encourage treatment linkage. Outreach workers, using quick health status screens, could help identify people who perceive a need for treatment and then help link them with treatment. The findings on ethnicity indicate that extra efforts may be needed to motivate white users in rural areas to consider treatment. These recommendations follow those of Edlund and colleagues who have suggested that educational activities be implemented to increase public awareness of disorders and increase perceived need for treatment among at-risk populations, along with efforts to address the stigma and denial so often associated with drug abuse and psychiatric disorders (Edlund et al., 2006).

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**Table 1**  
 Characteristics of Rural Illicit Stimulant Drug Users (n=710)

Variable	Ohio (n = 248)		Arkansas (n = 237)		Kentucky (n = 225)		Total (n=710)	
	n	%	n	%	n	%	n	%
Gender								
Male	166	66.9	141	59.5	129	57.3	436	61.4
Female	82	33.1	96	40.5	96	42.7	274	38.6
Race/Ethnicity								
AA/Other	32	12.9	155	65.4	41	18.2	228	32.1
White	216	87.1	82	34.6	184	81.8	482	67.9*
Mean Age (SD)	30.4	(9.24)	36.1	(10.59)	32.8	(10.50)	33.1	(10.36)*
Education								
< HS	102	41.1	112	47.3	80	35.6	294	41.4
High School	122	49.2	87	36.7	115	51.1	324	45.6
> HS	24	9.7	38	16.0	30	13.3	92	13.0*
Employed Full time								
No	161	64.9	190	80.2	130	57.8	481	67.8
Yes	87	35.1	47	19.8	95	42.2	229	32.2*
ASI Family/Social (M/SD)	0.23	(0.21)	0.14	(0.18)	0.18	(0.21)	0.18	(0.20)*
ASI Legal (M/SD)	0.19	(0.22)	0.16	(0.21)	0.15	(0.20)	0.17	(0.21)*
Previous Drug Abuse Tx								
No	107	43.1	139	58.7	141	62.7	387	54.5
Yes	141	56.9	98	41.4	84	37.3	323	45.5*
SF-8 Physical <sup>†</sup>								
≤25 <sup>th</sup> Percentile	76	30.6	73	30.8	80	35.6	229	32.2
> 25 <sup>th</sup> Percentile	172	69.4	164	69.2	145	64.4	481	67.8
SF-8 Mental <sup>†</sup>								
≤ 25 <sup>th</sup> Percentile	159	64.1	108	45.6	136	60.4	403	56.8
> 25 <sup>th</sup> Percentile	89	35.9	129	54.4	89	39.6	307	43.2*

Notes:

\*  $p \leq .01$

$\downarrow$  Converted to a dichotomous measure (i.e., SF-8 scores  $\leq 44.0$  are  $\leq 25^{\text{th}}$  percentile for the physical health summary scale and  $\leq 44.2$  for the mental health summary scale, as defined by general US population norms)

**Table 2**  
30-Day Drug Use Practices of Rural, Illicit Stimulant Drug Users (n=710)

Drug	Ohio (n = 248)		Arkansas (n = 237)		Kentucky (n = 225)		Total (n = 710)	
	n	%	n	%	n	%	n	%
<b>Methamphetamine</b>								
No Use	173	69.8	142	59.9	87	38.7	402	56.6
Non-daily	64	25.8	72	30.4	115	51.1	251	35.4
Daily	11	4.4	23	9.7	23	10.2	57	8.0*
<b>Amphetamine</b>								
No Use	188	75.8	211	89.0	204	90.7	603	84.9
Non-daily	49	19.8	22	9.3	19	8.4	90	12.7
Daily	11	4.4	4	1.7	2	0.9	17	2.4 <sup>†</sup>
<b>Crack</b>								
No Use	78	31.5	81	34.2	131	58.2	290	40.8
Non-daily	125	50.4	88	37.1	82	36.5	295	41.6
Daily	45	18.1	68	28.7	12	5.3	125	17.6*
<b>Cocaine HCl</b>								
No Use	68	27.4	141	59.5	156	69.3	365	51.4
Non-daily	151	60.9	72	30.4	67	29.8	290	40.9
Daily	29	11.7	24	10.1	2	0.9	55	7.7 <sup>†</sup>
<b>Heroin</b>								
No Use	205	82.7	234	98.7	223	99.1	662	93.2
Non-daily	27	10.9	2	0.84	2	0.9	31	4.4
Daily	16	6.4	1	0.42	0	0.0	17	2.4 <sup>†</sup>
<b>Other Opioids</b>								
No Use	82	33.1	172	72.6	131	58.2	385	54.2
Non-daily	115	46.4	55	23.2	77	34.2	247	34.8
Daily	51	20.5	10	4.2	17	7.6	78	11.0*
<b>Tranquilizers</b>								
No Use	157	63.3	207	87.3	156	69.3	520	73.3
Non-daily	84	33.9	25	10.6	58	25.8	167	23.5
Daily	7	2.8	5	2.1	11	4.9	23	3.2 <sup>†</sup>

Drug	Ohio (n = 248)		Arkansas (n = 237)		Kentucky (n = 225)		Total (n = 710)	
	n	%	n	%	n	%	n	%
Marijuana								
No Use	36	14.5	51	21.5	48	21.3	135	19.0
Non-daily	96	38.7	100	42.2	97	43.1	293	41.2
Daily	116	46.8	86	36.3	80	35.6	282	39.8*
Alcohol Drunkenness								
None	70	28.2	136	57.4	127	56.5	333	46.9
Non-daily	144	58.1	87	36.7	86	38.2	317	44.7
Daily	34	13.7	14	5.9	12	5.3	60	8.4*
Drug Injection								
No Use	206	83.1	212	89.5	200	88.9	618	87.0
Use	42	16.9	25	10.5	25	11.1	92	13.0

\*  $p \leq .01$

† Not enough cases in each cell for a valid chi-square test.



**Table 3**  
Perceived Need for Drug Abuse Treatment among Rural Illicit Stimulant Drug Users (n=710)

Site	No Need n (%)	Need n (%)
Ohio	196 (79.0)	52 (21.0)
Kentucky	180 (80.0)	25 (20.0)
Arkansas	146 (61.6)	91 (38.4)*
Total	522 (73.5)	188 (26.5)

\*  $p \leq .0001$

**Table 4**  
 Stepwise Regression Results – Factors Predicting Perceived Need among Rural, Illicit Stimulant Drug Users (n=710)

Variable	Odds Ratio	95% Confidence Interval
White Race/Ethnicity	0.48	0.34, 0.70
Previous Substance Abuse Treatment	1.47	1.07, 2.03
ASI Family/Social Problems	1.12	1.02, 1.24
ASI Legal Problems	1.11	1.02, 1.21
SF-8 Physical Health Status Scores $\geq$ 44.0	0.63	0.45, 0.89
SF-8 Mental Health Status Scores $\geq$ 44.2	0.61	0.43, 0.86
Non-Daily Methamphetamine Use	0.55	0.38, 0.78

Hosmer-Lemeshow Goodness-of-Fit Test

$$\chi^2 = 4.88, DF = 8, p = 0.77$$

Individual background variables included in the analysis were: state, age, gender, race, education, employment status, drug abuse treatment history, ASI composite family/social and legal scores, and SF-8 physical and mental health status. Drug use variables were 30- day measures and included: methamphetamine, amphetamine, crack, cocaine HCl, heroin, non-prescribed opioids, non-prescribed tranquilizers, marijuana, alcohol drunkenness, and drug injection.