Published in final edited form as:

Addict Behav. 2017 February ; 65: 25–32. doi:10.1016/j.addbeh.2016.09.009.

Alcohol Detoxification Completion, Acceptance of Referral to Substance Abuse Treatment, and Entry into Substance Abuse Treatment Among Alaska Native People

Ursula Running Bear, PhD^a, Janette Beals, PhD^a, Douglas K. Novins, MD^{a,b}, and Spero M. Manson, PhD^a

^aUniversity of Colorado Anschutz Medical Campus, Centers for American Indian and Alaska Native Health, Colorado School of Public Health, Mail Stop F800, Nighthorse Campbell Native Health Building, 13055 E. 17th Avenue, Aurora, CO 80045, United States of America

^bUniversity of Colorado Anschutz Medical Campus, Department of Psychiatry, 13055 East 17th Avenue, Aurora, CO 80045, United States of America

Abstract

Background—Little is known about factors associated with detoxification treatment completion and the transition to substance abuse treatment following detoxification among Alaska Native people. This study examined 3 critical points on the substance abuse continuum of care (alcohol detoxification completion, acceptance of referral to substance abuse treatment, entry into substance abuse treatment following detoxification).

Methods—The retrospective cohort included 383 adult Alaska Native patients admitted to a tribally owned and managed inpatient detoxification unit. Three multiple logistic regression models estimated the adjusted associations of each outcome separately with demographic/psychosocial characteristics, clinical characteristics, use related behaviors, and health care utilization.

Corresponding Author: Ursula Running Bear, PhD, University of Colorado Anschutz Medical Campus, Centers for American Indian and Alaska Native Health, Colorado School of Public Health, Mail Stop F800, Nighthorse Campbell Native Health Building, 13055 E. 17th Avenue, Aurora, CO 80045, United States of America, Phone: 303-724-1452, Fax:303-724-1474, Ursula.RunningBear@ucdenver.edu.

Contributions

Dr. Running Bear performed the literature search, completed the statistical analysis, and drafted sections of the manuscript. Drs. Beal and Novins assisted in the design of the study, selection of appropriate statistical analyses, and drafting and edited the manuscript. Dr. Manson assisted in the design of the study, facilitated access to the agency that housed the data, assisted in obtaining the necessary human subjects approvals, and edited the manuscript. All authors contributed to and approved the final manuscript.

Conflict of Interest

Drs. Running Bear, Beals, Novins, and Manson have no actual or potential conflicts that could inappropriately influence their contribution to this manuscript.

Role of Funding Source

The National Institute for Minority Health and Health Disparities (P60 MD000507, SM Manson, PI) provided the infrastructural support that facilitated the management and analyses of the data. There was no involvement by NIMHD in the study design, data collection, analysis, or interpretation of the data, writing of this manuscript, or decision to submit this manuscript for publication.

Publisher's Disclaimer: This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final citable form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

Results—Seventy-five percent completed detoxification treatment. Higher global assessment functioning scores, longer lengths of stay, and older ages of first alcohol use were associated with completing detoxification. A secondary drug diagnosis was associated with not completing detoxification. Thirty-six percent accepted a referral to substance abuse treatment following detoxification. Men, those with legal problems, and those with a longer length of stay were more likely to accept a referral to substance abuse treatment. Fifty-eight percent had a confirmed entry into a substance abuse treatment program at discharge. Length of stay was the only variable associated with substance abuse treatment entry.

Conclusions—Services like motivational interviewing, counseling, development of therapeutic alliance, monetary incentives, and contingency management are effective in linking patients to services after detoxification. These should be considered, along with the factors associated with each point on the continuum of care when linking patients to follow-up services.

Keywords

Alcohol detoxification; Alaska Native; American Indian; substance abuse treatment referral; substance abuse treatment entry; detoxification completion

1. Introduction

The detoxification process has 3 elements: evaluation of medical, psychological, and social conditions, stabilization of the patient through the withdrawal process, and facilitation of substance abuse treatment entry following detoxification (Miller & Kipnis, 2006). This paper focuses on 3 points on the continuum of care critical to substance abuse treatment entry following detoxification: detoxification completion, acceptance of referral to substance abuse treatment, and substance abuse treatment entry. A sample of Alaska Native patients admitted to detoxification is used to study these 3 points.

Nationally, 10% of patients discharged from residential, hospital, or outpatient detoxification facilities transition to substance abuse treatment (SAMHSA, 2010). This suggests improved connections from detoxification services to substance abuse treatment programs are needed (Mark, Dilonardo, Clalk, & Coffey, 2002). Readmission to detoxification is not uncommon, among the general population one year rates ranging from 27%–48% (Callaghan, 2003; X. Li, Sun, Marsh, & Anis, 2008; Mark, Vandivort-Warren, & Montejano, 2006). The one year readmission rate for Alaska Native people is 42% (Running Bear et al., 2014). These high rates imply a failure by the health care system to provide adequate services to detoxification patients. At the patient level, age, gender, unemployment, homelessness, patient functioning, a preferred substance of alcohol, and Medicaid coverage are associated with readmission to detoxification (Callaghan, 2003; Carrier et al., 2011; X. Li et al., 2008; Mark et al., 2006; Running Bear et al., 2014).

Recovery from substance abuse is an important concern for Alaska Native people. Of the 12 Indian Health Service (IHS) service areas, the Alaska Area ranks second highest for alcohol-related deaths (IHS, 2008). The Alaska Area age-adjusted alcohol death rate is 10 times higher than the US death rate: 72.8 versus 6.9 per 100,000 (IHS, 2008). Among rural Alaska Natives, 48% of the men and 24% of women had alcohol problems (Seale, Shellenberger, &

Spencer, 2006). High rates of suicide, violence, and health problems are associated with alcohol use among Alaska Native people (Allen, Levintova, & Mohatt, 2011; Hesselbrock, Segal, & Hesselbrock, 2000; Segal, 1998). Although alcohol use disorders and related problems among Alaska Native people have been studied, (Hesselbrock, Hesselbrock, & Segal, 2003; Hesselbrock et al., 2000; Parks, Hesselbrock, Hesselbrock, & Segal, 2001; Segal, 1998) little is known about factors associated with alcohol detoxification treatment completion and transition to substance abuse treatment.

A careful review of the literature revealed these 3 critical points on the care continuum are typically examined independently, rather than a series of steps. Consequently, we present the literature in 3 distinct sections: detoxification completion, acceptance of referral to substance abuse treatment, and substance abuse treatment entry.

Detoxification treatment completion

Nationwide among the general population, detoxification treatment completion rates range from 66%–88% (Araujo et al., 1996; Armenian, Chutuape, & Stitzer, 1999; Blondell, Amadasu, Servoss, & Smith, 2006; Gordon et al., 2001; Martinez-Raga, Marshall, Keaney, Ball, & Strang, 2002; San, Cami, Peri, Mata, & Porta, 1989; Wiseman, Henderson, & Briggs, 1997). Incomplete detoxification, rather than complete, is often studied and defined as withdrawal from treatment by discharge against medical advice or transfer to other facility for medical reasons. Demographic factors, use-related behaviors, withdrawal symptoms, and psychiatric disorders are associated with an incomplete detoxification (Armenian et al., 1999; de los Cobos, Trujols, Ribalta, & Casas, 1997; Martinez-Raga et al., 2002). Those admitted at a younger age are less likely to complete detoxification (Armenian et al., 1999; Martinez-Raga et al., 2002). Drug use 30 days prior to admission for alcohol detoxification, fewer months of abstinence, withdrawal symptoms (nausea/vomiting), and psychiatric disorders are associated with an incomplete detoxification (de los Cobos et al., 1997; Gordon et al., 2001; Martinez-Raga et al., 2002). On the other hand, a longer length of stay (LOS) and being married are associated with successfully completing detoxification (de los Cobos et al., 1997; San et al., 1989). Among Canadian Aboriginal people, females were less likely to complete detoxification than males (X. Li, Sun, Marsh, & Anis, 2013).

Two studies among the general population reported referral to treatment rates, each provided a distinct definition of referred to treatment. One found 96% were referred to treatment, defined as appointments given for outpatient services and admissions to inpatient facilities (Wiseman et al., 1997). The second study identified 60% accepted a referral and also arrived at their treatment facility (Smart, Finley, & Funston, 1977). Factors associated with acceptance of referral to substance abuse treatment following detoxification were not reported in these studies.

Substance Abuse Treatment Entry

Among the general population studies report substance abuse treatment entry, defined as treatment initiation, engagement, or transfer to treatment following detoxification (Blondell, Smith, Canfield, & Servoss, 2006; Campbell et al., 2010; Castaneda, Lifshutz, Galanter, Medalia, & Franco, 1992; Franken & Hendriks, 1999; Gordon et al., 2001; Hien & Scheier,

1996; Kleinman, Millery, Scimeca, & Polissar, 2002; Mark, Dilonardo, Chalk, & Coffey, 2003; McCusker, Bigelow, Luippold, Zorn, & Lewis, 1995; Millery, Kleinman, Polissar, Millman, & Scimeca, 2002; B. Stein, Orlando, & Sturm, 2000; B. D. Stein, Kogan, & Sorbero, 2009). Substance abuse treatment entry rates following detoxification range from 26%–79%, the latter for those with managed care (McCusker et al., 1995; B. Stein et al., 2000). A range of factors were associated with substance abuse treatment entry following detoxification. A high school education, 6 months or more of employment, longer LOS, and a history of detoxification hospitalizations were associated with entering treatment after detoxification (Campbell et al., 2010; Castaneda et al., 1992; Hien & Scheier, 1996; McCusker et al., 1995). Homelessness, severe drug use problems, severe medical issues, and mental health conditions were associated with not entering substance abuse treatment following detoxification (Blondell, Smith, et al., 2006; Franken & Hendriks, 1999).

In the current study, data from an adult Alaska Native inpatient detoxification unit provided a unique opportunity to study the 3 phases as a series of steps on the continuum of care. Independent variables fell into 4 categories: demographic/psychosocial characteristics, clinical factors, use-related behaviors, and health care utilization. Based upon the detoxification literature, we hypothesized detoxification treatment completion would be associated with being married, male, older at admission, longer LOS, and 30 days of abstinence prior to last use, while a secondary drug diagnosis and psychiatric disorders would be associated with not completing detoxification. Absent a relevant literature, our analyses explored factors associated with the acceptance of referral to substance abuse treatment following detoxification. We hypothesized that a high school education or greater, employment, longer LOS, and previous admissions to detoxification would be related to substance abuse treatment entry following detoxification, while homelessness, secondary drug diagnosis, medical conditions and diagnosed psychiatric disorders would be associated with not entering substance abuse treatment following detoxification. We explored the relationship of all other variables to each outcome.

2. Material and Methods

2.1 Study Sample

The sample derived from an inpatient, tribally owned, medically managed 6-bed detoxification unit in Southcentral Alaska. The unit was funded through the Indian Health Service (IHS) and served almost exclusively Alaska Native/American Indian (AN/AI) people. Non-AI/ANs were admitted on a case-by-case basis; admitted based upon available bed space. The detoxification unit was part of comprehensive substance abuse treatment services/programs that have a long history of incorporating cultural components. A therapeutic village of care approach was used for substance abuse treatment (excluding detoxification) that was based upon structural and functional aspects of Alaska Native culture (Naquin, Trojan, O'Neil, & Manson, 2006). Recovery services included outreach, screening, assessment, brief intervention, inpatient detoxification, outpatient treatment, intermediate residential treatment, and continuing care. Patients had a primary diagnosis of alcohol withdrawal. The recommended LOS was between 4–7 days with adjustments as needed. Admission criteria were withdrawal requiring medical management, adult, and

AN/AI. The unit prioritized treatment for pregnant women and intravenous drug users. Most referrals for detoxification treatment came from the Alaska Native Medical Center; located a short distance from the unit. The Salvation Army operated a detoxification unit in the area; it was open intermittently during the study time period. The only other detoxification facility specifically serving AN/AI people was several hundred miles away in a more rural location.

We used a retrospective cohort design that included 383 adult patients admitted to the detoxification unit over a two-year time period, 1/1/2006–12/31/2007. A total of 419 patients were admitted. Thirty-six were excluded from the analysis; 18 were not AN/AI and 19 had a primary diagnosis of drug withdrawal (one met both exclusion criteria). We excluded patients with drug withdrawal as they follow different treatment protocols, pharmacological approaches, and have different indicators of withdrawal severity (Kosten & O'Connor, 2003). The measures of withdrawal severity used in this study, DTs/seizures, are not generally seen in withdrawal from other substances.

2.2 Data Source

Detoxification treatment staff collected and recorded these treatment data during standard admission and discharge procedures. Data were recorded in the unit's electronic medical record (EMR) system, were extracted, and provided de-identified in Microsoft Excel™. The data were determined “not human subjects” by the Colorado Multiple Institutional Review Board and “exempt” by the Alaska Area Institutional Review Board. This manuscript was submitted to the tribal review processes of the health care organization from which the data originate, Southcentral Foundation, and the Alaska Native Tribal Health Consortium.

2.3 Measures

2.3.1 Outcome Variables—The 3 outcome variables used in these analyses were recorded in the EMR by nursing staff.

Detoxification treatment was considered complete if the patient finished the recommended treatment and LOS (n=383).

Acceptance of a referral to substance abuse treatment indicated the patient's verbal agreement to accept a referral during their stay which was then recorded in the EMR. All patients were encouraged to enter substance abuse treatment but not everyone considered a referral (n=383).

Substance abuse treatment entry (inpatient or outpatient) was confirmed by staff at the time of discharge. Only those who accepted a referral to substance abuse treatment were included in the analysis (n=138).

2.3.2 Explanatory Variables—Demographic/psychosocial, clinical characteristics and use related behaviors were collected within the first day of admission. Health care utilization information was extracted from the EMR.

Demographic/psychosocial characteristics included age at admission, gender, education, marital status, stable housing (i.e., living in own home/apartment), employment status

(“other” includes 3 individuals identified as day laborers/1 non-specified), children in the home at admission, and household composition. Primary support, social environment, history of physical abuse, and current legal problems were from the DSM-IV Axis IV recorded in the EMR (American Psychiatric Association, 1994).

Clinical characteristics included the global assessment of functioning (GAF) from the DSM-IV Axis V, which measured severity of symptoms and social/occupational/psychological functioning (American Psychiatric Association, 1994). The GAF, assigned by a trained clinician, ranged from 0–100 and was collected at admission. Higher scores indicated better functioning. A secondary drug diagnosis, history of delirium tremens/seizures, medical conditions, and diagnosed psychiatric conditions were also part of the clinical characteristics.

Use-related behaviors included number of days of alcohol use within the 30 days prior to admission (self-reported), age at first use, and days abstinent prior to last drinking episode.

Health care utilization variables included LOS, previous admissions to the unit, and readmission occurring within one-year to this unit.

Number of days of

2.4 Statistical Analysis

Descriptive statistics characterized the sample; means and standard deviations for continuous and number and percent for categorical variables were used. Unadjusted odds ratios for each outcome and independent variable(s) were calculated. Three separate multiple logistic regression models estimated the adjusted associations of each outcome separately (detoxification completion, acceptance of referral to substance abuse treatment, entry into substance abuse treatment). Final models were built through purposeful selection, an approach advantageous for parsimony and risk factor identification (Bursac, Gauss, Williams, & Hosmer, 2008). Purposeful selection first examines bivariate associations of the outcome under study with each independent variable separately. Bivariate associations with p-values of less than or equal to .25 were identified as potential candidates for the multivariate model(s). Each variable was added sequentially into the model(s) in the order noted in Table 1, beginning with demographic/psychosocial characteristics and ending with health care utilization variables. Variables were retained if they had a p-value of .10; otherwise they were omitted. At the end of the iterative process, variables not selected for inclusion in the final model(s) were added back in one at a time to determine impact. Variables identified as significant (p-value <.05) were kept in the final model. This iterative process was completed for all 3 outcomes. The pseudo r-squared is reported for each model (McKelvey & Zavoina, 1975).

The entire dataset had 5% missing data but 27% of the cases had one or more missing values. List-wise deletion eliminates these cases; in order to address missing data full information maximum likelihood was used (Allison, 2012). Mplus was used for statistical analyses and SAS for data management (Muthén & Muthén, 1998–2011; SAS Institute Inc.,

2014). A sensitivity analysis found patients that completed treatment, had social environment problems, and a longer LOS has less missing data (p-values .01).

3. Results

Sample characteristics are displayed in Table 1. The average age was 43 (SD=10.4). More than half were male (57%); 47% had a high school diploma or equivalent; 45% were never married; 56% had stable housing; 72% had children living in the home upon admission; 17% reported legal problems. The average GAF score was 44 (SD=8.9); 28% had a secondary drug diagnosis; on average patients first used alcohol at 14.6 (SD=10.4) years old; the average LOS was 5 days (SD=2.4).

Table 1 also includes the unadjusted odds ratio, confidence intervals, and p-values for each outcome (detoxification completion, acceptance of referral to substance abuse treatment, substance abuse treatment entry) and independent variables used in these analyses. Results are similar to the adjusted results reported in Table 2 and detailed below.

Detoxification treatment completion

Approximately 75% (n=289) of those that entered detoxification completed treatment. After controlling for other variables, higher GAF scores were associated with completing detoxification. A person with a GAF score of 54 had 2.37 times greater odds of completing treatment than a person with a GAF score of 44 (10 point difference).ⁱ Patients with a secondary drug diagnosis were 50% less likely to complete detoxification than those without one. Older ages of first alcohol use were associated with completing detoxification; a 27 year old had 2.81 times greater odds of completing detoxification compared to a 15 year old. Longer LOS were associated with increased odds of completing detoxification. A patient with a LOS of 4 days had 11.08 times greater odds of completing treatment compare to a patient with a LOS of 2 days. Those accepting a referral to substance abuse treatment had 3.79 times greater odds of completing detoxification than those who did not.

Acceptance of referral to substance abuse treatment

Thirty-six percent accepted a referral to substance abuse treatment following detoxification. Adjusting for other variables, women were 38% less likely to accept a referral to treatment compared to men. Patients with legal problems had more than 2 times the odds of accepting a referral than those without legal problems. A longer LOS was associated with accepting a referral to substance abuse treatment; a patient with a LOS of 5 days had 2.25 times greater odds of accepting a referral to treatment compared to one with a LOS of 2 days.

Substance Abuse Treatment Entry

Substance abuse treatment entry analyses were based upon the number of patients who accepted a referral to substance abuse treatment (n=138). Of those accepting a referral, 58% had confirmed entry into an inpatient or outpatient treatment program at discharge from

ⁱA 10 point increase in the GAF score is calculated by $(e^b)^c$ where e^b is equal to the odds ratio (1.09) and c is equal to the 10 point increase. $(e^b)^c = (1.09)^{10} = 2.37$. (Hosmer & Lemeshow, 1989)

detoxification. Results indicate LOS was the only variable associated with entering substance abuse treatment. A patient with a LOS of 3 days had a 42% increase in the odds of entering substance abuse treatment following detoxification compared to a patient with a 1 day LOS.

4. Discussion

4.1 Key Findings

Detoxification Treatment Completion—The detoxification treatment completion rate of this study (78%) fell within the reported range (53–88%) of other studies (Araujo et al., 1996; Armenian et al., 1999; Blondell, Amadasu, et al., 2006; de los Cobos et al., 1997; Gordon et al., 2001; X. Li et al., 2013; Martinez-Raga et al., 2002; San et al., 1989). Consistent with prior research, we found a longer LOS and a secondary drug diagnosis were associated with detoxification treatment completion. Our analysis revealed that higher GAF scores were associated with detoxification treatment completion. This is similar to previous alcohol detoxification research that found higher levels of functioning were associated with a decrease in detoxification readmissions (Running Bear et al., 2014). This suggests patient functioning is an important indicator of successful alcohol detoxification completion. An older age of first use was associated with completing detoxification. This is consistent with other detoxification research that found a younger age was associated with an incomplete detoxification (Armenian et al., 1999; Gordon et al., 2001).

Acceptance of a referral to substance abuse treatment—The acceptance of referral to substance abuse treatment rate in this study is lower (36%) compared to other studies, 60% (Smart et al., 1977) and 96% (Wiseman et al., 1997). Referral to treatment rates are not directly comparable to each other due to the operationalization of referral. Additionally, the two prior studies were based upon male samples only. In our sample men were more likely to accept a referral to treatment and also more likely to be homeless compared to women (Running Bear, Beals, Novins, & Manson, 2016). Accepting a referral to treatment for men may provide housing and needed treatment, particularly if inpatient treatment is sought. Preliminary analysis of this sample also found women had higher rates of children in the home compared to men. To increase acceptance of referral to substance abuse treatment among women programs that provide child care or allow children to attend are needed (Brady & Ashley, 2005). Given the close-knit communities some patients come from, research on family and community social support and their impact on sobriety is needed. Further investigation is needed to determine factors driving the low acceptance of referral rates among Alaska Native people.

Those with legal issues were more likely to accept a referral to substance abuse treatment, suggesting issues connected to the legal system motivate acceptance of referral. Although all patients were encouraged to enter substance abuse treatment following detoxification in this sample, many unfortunately refused to consider one.

Substance Abuse Treatment Entry—The substance abuse treatment entry rate for this study (58%) was mid-range other studies (26%–79%) (Blondell, Smith, et al., 2006; Campbell et al., 2010; Castaneda et al., 1992; Chutuape, Katz, & Stitzer, 2001; Franken &

Hendriks, 1999; Gordon et al., 2001; Hien & Scheier, 1996; Kleinman et al., 2002; Mark et al., 2003; McCusker et al., 1995; B. Stein et al., 2000; B. D. Stein et al., 2009). In this analyses, substance abuse treatment entry was confirmed by detoxification treatment staff and recorded upon discharge from the unit, whereas other studies relied upon patient self-reports (Blondell, Smith, et al., 2006; Campbell et al., 2010; Kleinman et al., 2002) or confirmed treatment entry from 7 days (Hien & Scheier, 1996) up to 6 months post-detoxification discharge (Campbell et al., 2010). Prior research led us to expect that a high school education or greater, employment, a longer LOS, and previous admissions to detoxification would be related to entering substance abuse treatment following detoxification. Conversely, we anticipated homelessness, a secondary drug diagnoses, medical conditions, and diagnosed psychiatric disorders would be associated with not entering substance abuse treatment following detoxification. The only variable associated with substance abuse treatment entry following acceptance of a referral to substance abuse treatment was LOS. This supports research that found LOS was associated with higher rates of transfer to treatment programs (Campbell et al., 2010; McCusker et al., 1995) but also affirms that we need a better understanding of factors associated with substance abuse treatment entry among Alaska Natives, as some variables associated in other samples were not associated in this sample.

In the present analysis, LOS was associated with all 3 outcomes (detoxification completion, acceptance of referral to substance abuse treatment, substance abuse treatment entry). Patients with a longer LOS may stay longer in detoxification if they are motivated to enter substance abuse treatment, particularly if waiting for an opening in a treatment facility. Additionally, we need a better understanding of the factors contributing to LOS for all 3 outcomes.

4.2. Treatment Implications

At each point on the continuum of care (detoxification completion, acceptance of referral to substance abuse, entry to substance abuse treatment), different associations were found suggesting patients need different types of services or linkages at each point to ensure successful engagement or completion of a particularly segment of the continuum of care.

Detoxification Treatment Completion—Efforts to increase GAF scores during detoxification and post-detoxification may prove effective but will require comparative studies to test methods for improving patient functioning. Patients in need of motivation to continue with further substance abuse treatment following detoxification may benefit from motivation interviewing (Vederhus, Timko, Kristensen, Hjemdahl, & Clausen, 2014), counseling (Rawson, Mann, Tennant, & Clabough, 1983) or development of a therapeutic alliance (Campbell et al., 2009). Such efforts may prove useful in assisting Alaska Native patients to reach the next phase on the continuum.

Accepting Referral to Substance Abuse Treatment—Encouraging detoxification patients to accept referral to further substance abuse treatment is an important phase in the continuum of care often overlooked. The state of Alaska is faced with a shortage of trained health care professionals who can deliver treatment, as well as a shortage of available

treatment programs. These factors impact availability of providers and treatment options leading to long waitlists which may impede progress of enthusiastic patients who are knowledgeable of these treatment gaps. Contingency management may assist with alcohol abstinence and prevent relapse while patients wait for treatment program openings (Chutuape, Silverman, & Stitzer, 1999; McCaul, Stitzer, Bigelow, & Liebson, 1984). Another option is case-management during detoxification which increases the use of rehabilitation services (McLellan, Weinstein, Shen, Kendig, & Levine, 2005).

Substance Abuse Treatment Entry—While those that stayed longer in detoxification may be motivated to continue with treatment, patients with shorter LOS may experience issues that influence shorter stays like adverse effects to medication, severe withdrawal symptoms, (San et al., 1989) vomiting, and nausea (Gordon et al., 2001). Health care professionals should seek to understand and resolve these types of concerns that prohibit success. Brief treatment (O’Farrell, Murphy, Alter, & Fals-Stewart, 2007) and modest monetary incentives (Chutuape et al., 2001) have proven effective in linking patient to services after detoxification. These services and incentives may aid Alaska Native patients in attaining treatment post-detoxification and should be explored. Incorporation of cultural aspects into substance abuse treatment are shown to aid in abstinence, cessation, acceptability; these are important to consider when treating Alaska Native people (Gone & Calf Looking, 2015; Kulis, Hodge, Ayers, Brown, & Marsiglia, 2012; Legha & Novins, 2012; Stone, Whitbeck, Chen, Johnson, & Olson, 2006). Suggested treatment services may be used for more than one point on the continuum of care but effectiveness would need to be demonstrated.

4.3 Methodological issues and limitations

Our definition of treatment entry included patients with a confirmed entry into an inpatient or outpatient substance abuse treatment program upon discharge from detoxification. The definition did not include those who may have entered mental health or psychiatric services, individualized counselling, or other therapeutic services used to treat substance use. Post-discharge confirmation of substance abuse treatment entry did not occur after discharge from the unit. Patients could have entered substance abuse treatment post-discharge; these admissions would have been unrecorded. To the extent these limitations were at work in the present analyses, the observed relationships may be underestimated. Motivation to change is crucial to substance abuse treatment; (DiClemente, Bellino, & Neavins, 1999) the absence of such data limit these analyses. Additionally, these analyses relied upon treatment data and therefore did not include cultural variables which could impact outcomes.

These limitations are offset by the uniqueness and rich array of variables. The data had little missing information, offered important insight into a high risk population (Alaska Natives) whom we know little about regarding detoxification, and allowed us to examine 3 distinct but related points on the continuum of care for substance abuse treatment. These findings add to our knowledge and suggest points of intervention that facilitate successful transition from detoxification to substance abuse treatment.

5. Conclusion

Although substance abuse treatment entry following detoxification has declined, (Mark et al., 2002) detoxification services can serve as a critical gateway for forging connections to substance abuse treatment (Kleinman et al., 2002; Mark et al., 2003). This study found distinct predictors of detoxification completion, acceptance of referral to substance abuse treatment, and substance abuse treatment entry. Services like motivational interviewing, counseling, development of therapeutic alliance, monetary incentives, and contingency management are effective in linking patient to services after detoxification. Considering these services and the factors associated with each point on the continuum of care when linking patients to follow-up treatment is crucial.

Acknowledgments

The National Institute for Minority Health and Health Disparities (P60 MD000507, SM Manson, PI) provided the infrastructural support that facilitated the management and analyses of the data.

We wish to thank the detoxification unit that provided the data for this analysis, as well as the National Institute for Minority Health and Health Disparities (P60 MD000507, SM Manson, PI) for the infrastructural support that facilitated the management and analyses of the data.

References

- Allen J, Levintova M, Mohatt G. Suicide and alcohol related disorders in the U.S. Arctic: boosting research to address a primary determinant of health disparities. *International Journal of Circumpolar Health*. 2011; 70(5):473–487. [PubMed: 22067096]
- Allison, PD. Handling Missing Data by Maximum Likelihood. Paper presented at the SAS Global Forum 2012, Statistics and Data Analysis; Haverford, PA. 2012.
- American Psychiatric Association. *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition (DSM-IV)*. Washington, DC: American Psychiatric Association; 1994.
- Araujo L, Goldberg P, Eyma J, Madhusoodanan S, Buff DD, Shamim K, Brenner R. The effect of anxiety and depression on completion/withdrawal status in patients admitted to substance abuse detoxification program. *Journal of Substance Abuse Treatment*. 1996; 13(1):61–66. [PubMed: 8699544]
- Armenian SH, Chutuape MA, Stitzer ML. Predictors of discharges against medical advice from a short-term hospital detoxification unit. *Drug and Alcohol Dependence*. 1999; 56(1):1–8. [PubMed: 10462086]
- Blondell RD, Amadasu A, Servoss TJ, Smith SJ. Differences among those who complete and fail to complete inpatient detoxification. *Journal of Addictive Diseases*. 2006; 25(1):95–104. [PubMed: 16597577]
- Blondell RD, Smith SJ, Canfield MC, Servoss TJ. Abstinence and initiation of treatment following inpatient detoxification. *The American Journal of Addictions*. 2006; 15(6):462–467.
- Brady, KT.; Ashley, OS., editors. *Women in substance abuse treatment: results form the alcohol and drug services study (ADSS)*. Rockville, MD: Substance Abuse and Mental Health Services Administration, Office of Applied Studies; 2005. (SMA 04-3968 ed.)
- Bursac Z, Gauss CH, Williams DK, Hosmer DH. Purposeful selection of variables in logistic regression. *Source Code for Biology and Medicine*. 2008; 3:17–24. [PubMed: 19087314]
- Callaghan RC. Risk factors associated with dropout and readmission among First Nation individuals admitted to an inpatient alcohol and drug detoxification program. *Canadian Medical Association Journal*. 2003; 169(1):23–27. [PubMed: 12847035]
- Campbell BK, Fuller BE, Lee ES, Tillotson C, Woelfel T, Jenkins L, ... McCarty D. Facilitating outpatient treatment entry following detoxification for injection drug use: a multisite test of three interventions. *Psychology of Addictive Behaviors*. 2009; 23(2):260–270. [PubMed: 19586142]

- Campbell BK, Tillotson CJ, Choi D, Bryant K, DiCenzo J, Provost SE, ... McCarty D. Predicting outpatient treatment entry following detoxification for injection drug use: the impact of patient and program factors. *Journal of Substance Abuse Treatment*. 2010; 38(Suppl 1):S87–96. [PubMed: 20307800]
- Carrier E, McNeely J, Lobach I, Tay S, Gourevitch MN, Raven MC. Factors associated with frequent utilization of crisis substance use detoxification services. *Journal of Addictive Diseases*. 2011; 30(2):116–122. [PubMed: 21491293]
- Castaneda R, Lifshutz H, Galanter M, Medalia A, Franco H. Treatment compliance after detoxification among highly disadvantaged alcoholics. *American Journal of Drug and Alcohol Abuse*. 1992; 18(2):223–234. [PubMed: 1314019]
- Chutuape MA, Katz EC, Stitzer ML. Methods for enhancing transition of substance dependent patients from inpatient to outpatient treatment. *Drug and Alcohol Dependence*. 2001; 61(2):137–143. [PubMed: 11137278]
- Chutuape MA, Silverman K, Stitzer M. Contingent reinforcement sustains post-detoxification abstinence from multiple drugs: a preliminary study with methadone patients. *Drug and Alcohol Dependence*. 1999; 54(1):69–81. [PubMed: 10101619]
- de los Cobos JP, Trujols J, Ribalta E, Casas M. Cocaine use immediately prior to entry in an inpatient heroin detoxification unit as a predictor of discharges against medical advice. *American Journal of Drug and Alcohol Abuse*. 1997; 23(2):267–279. [PubMed: 9143638]
- DiClemente CC, Bellino LE, Neavins TM. Motivation for change and alcoholism treatment. *Alcohol Research & Health*. 1999; 23(2):86–92. [PubMed: 10890801]
- Franken IHA, Hendriks VM. Predicting outcome of inpatient detoxification of substance abusers. *Psychiatric Services*. 1999; 50(6):813–817. [PubMed: 10375152]
- Gone JP, Calf Looking PE. The Blackfeet Indian culture camp: Auditioning an alternative indigenous treatment for substance use disorders. *Psychological Services*. 2015; 12(2):83–91. [PubMed: 25961644]
- Gordon AJ, Wentz CM, Gibbon JL, Mason AD, Freyder PJ, O'Toole TP. Relationships between patient characteristics and unsuccessful substance abuse detoxification. *Journal of Addictive Diseases*. 2001; 20(2):41–53.
- Hesselbrock VM, Hesselbrock MN, Segal B. Alcohol dependence among Alaskan Natives and their health care utilization. *Alcoholism: Clinical and Experimental Research*. 2003; 27(8):1353–1355.
- Hesselbrock VM, Segal B, Hesselbrock MN. Alcohol dependence among Alaska Natives entering alcoholism treatment: A gender comparison. *Journal of Studies on Alcohol*. 2000; 61(1):150–156. [PubMed: 10627109]
- Hien D, Scheier J. Trauma and short-term outcome for women in detoxification. *Journal of Substance Abuse Treatment*. 1996; 13(3):227–231. [PubMed: 9017565]
- Hosmer, DWJ.; Lemeshow, S. *Applied Logistic Regression*. New York: John Wiley & Sons; 1989.
- Indian Health Service, Office of Public Health Support, & Division of Program Statistics. *Indian Health Service Regional Differences in Indian Health*. Washington: Government Printing Office; 2008.
- Kleinman BP, Millery M, Scimeca M, Polissar NL. Predicting long-term treatment utilization among addicts entering detoxification: The contribution of help-seeking models. *Journal of Drug Issues*. 2002; 32(1):209–230.
- Kosten TR, O'Connor PG. Management of drug and alcohol withdrawal. *New England Journal of Medicine*. 2003; 348(18):1786–1795. [PubMed: 12724485]
- Kulis S, Hodge DR, Ayers SL, Brown EF, Marsiglia FF. Spirituality and religion: intertwined protective factors for substance use among urban American Indian youth. *American Journal of Drug and Alcohol Abuse*. 2012; 38(5):444–449. [PubMed: 22554065]
- Legha RK, Novins D. The role of culture in substance abuse treatment programs for American Indian and Alaska Native communities. *Psychiatric Services*. 2012; 63(7):686–692. DOI: 10.1176/appi.ps.201100399 [PubMed: 22588198]
- Li X, Sun H, Marsh DC, Anis AH. Factors associated with seeking readmission among clients admitted to medical withdrawal management. *Substance Abuse*. 2008; 29(4):65–72.

- Li X, Sun H, Marsh DC, Anis AH. Factors associated with pretreatment and treatment dropouts: comparisons between Aboriginal and non-Aboriginal clients admitted to medical withdrawal management. *Harm Reduction Journal*. 2013; 10:38. [PubMed: 24325629]
- Mark TL, Dilonardo JD, Chalk M, Coffey R. Factors associated with the receipt of treatment following detoxification. *Journal of Substance Abuse Treatment*. 2003; 24(4):299–304. [PubMed: 12867203]
- Mark, TL.; Dilonardo, JD.; Clalk, M.; Coffey, CM. Substance Abuse Detoxification: Improvements Need in Linkage to Treatment. Rockville, MD: Center for Substance Abuse Treatment, Substance Abuse and Mental Health Services Administration; 2002. (SAMHSA Publication No. SMA-02--3728)
- Mark TL, Vandivort-Warren R, Montejano LB. Factors affecting detoxification readmission: analysis of public sector data from three states. *Journal of Substance Abuse Treatment*. 2006; 31(4):439–455. [PubMed: 17084799]
- Martinez-Raga J, Marshall EJ, Keaney F, Ball D, Strang J. Unplanned versus planned discharges from in-patient alcohol detoxification: retrospective analysis of 470 first-episode admissions. *Alcohol and Alcoholism*. 2002; 37(3):277–281. [PubMed: 12003918]
- McCaul ME, Stitzer ML, Bigelow GE, Liebson IA. Contingency management interventions: effects on treatment outcome during methadone detoxification. *Journal of Applied Behavior Analysis*. 1984; 17(1):35–43. [PubMed: 6725168]
- McCusker J, Bigelow C, Luippold R, Zorn M, Lewis BF. Outcomes of a 21-day drug detoxification program: retention, transfer to further treatment, and HIV risk reduction. *American Journal of Drug and Alcohol Abuse*. 1995; 21(1):1–16. [PubMed: 7762537]
- McKelvey RD, Zavoina W. A statistical model for the analysis of ordinal level dependent variables. *Journal of Mathematical Sociology*. 1975; 4(1):103–120.
- McLellan AT, Weinstein RL, Shen Q, Kendig C, Levine M. Improving continuity of care in a public addiction treatment system with clinical case management. *American Journal on Addictions*. 2005; 14(5):426–440. [PubMed: 16257880]
- Miller, NS.; Kipnis, SS. Improvement Protocol (TIP) Series 45. Rockville, MD: Substance Abuse and Mental Health Services Administration; 2006. Detoxification and Substance Abuse Treatment. Treatment. ((SMA) 06-4131)
- Millery M, Kleinman BP, Polissar NL, Millman RB, Scimeca M. Detoxification as a gateway to long-term treatment: assessing two interventions. *Journal of Substance Abuse Treatment*. 2002; 23(3):183–190. [PubMed: 12392804]
- Muthén, LK.; Muthén, BO. Mplus User's Guide. 6. Los Angeles, CA: Muthén & Muthén; 1998–2011.
- Naquin V, Trojan J, O'Neil G, Manson SM. The Therapeutic Village of Care: An Alaska Native alcohol treatment model. *Therapeutic communities*. 2006; 27(1):105–121.
- O'Farrell TJ, Murphy M, Alter J, Fals-Stewart W. Brief family treatment intervention to promote aftercare among male substance abusing patients in inpatient detoxification: A quasi-experimental pilot study. *Addictive Behaviors*. 2007; 32(8):1681–1691. [PubMed: 17223279]
- Parks CA, Hesselbrock MN, Hesselbrock VM, Segal B. Gender and reported health problems in treated alcohol dependent Alaska Natives. *Journal of Studies on Alcohol*. 2001; 62(3):286–293. [PubMed: 11414337]
- Rawson RA, Mann AJ, Tennant FS Jr, Clabough D. Efficacy of psychotherapeutic counselling during 21-day ambulatory heroin detoxification. *Drug and Alcohol Dependence*. 1983; 12(2):197–200. [PubMed: 6653391]
- Running Bear U, Anderson H, Manson SM, Shore JH, Prochazka AV, Novins DK. Impact of adaptive functioning on readmission to alcohol detoxification among Alaska Native People. *Drug and Alcohol Dependence*. 2014; 140(7):168–174. [PubMed: 24837583]
- Running Bear U, Beals J, Novins DK, Manson SM. Gender differences among Alaska Native people seeking alcohol withdrawal treatment. *Substance Abuse*. 2016; 37(2):372–378. [PubMed: 26731436]
- San L, Cami J, Peri JM, Mata R, Porta M. Success and failure at inpatient heroin detoxification. *British Journal of Addiction*. 1989; 84(1):81–87. [PubMed: 2644999]
- SAS Institute Inc. SAS/STAT® 9.4 User's Guide. Cary, NC: SAS Institute Inc; 2014.

- Seale JP, Shellenberger S, Spencer J. Alcohol problems in Alaska Natives: lessons from the Inuit. *American Indian and Alaska Native Mental Health Research*. 2006; 13(1):1–31.
- Segal B. Drinking and drinking-related problems among Alaska Natives. *Alcohol Health and Research World*. 1998; 22(4):276–280. [PubMed: 15706755]
- Smart RG, Finley J, Funston R. The effectiveness of post-detoxification referrals: effects on later detoxification admissions, drunkenness and criminality. *Drug and Alcohol Dependence*. 1977; 2(3): 149–155. [PubMed: 69522]
- Stein B, Orlando M, Sturm R. The effect of copayments on drug and alcohol treatment following inpatient detoxification under managed care. *Psychiatric Services*. 2000; 51(2):195–198. [PubMed: 10655002]
- Stein BD, Kogan JN, Sorbero M. Substance abuse detoxification and residential treatment among Medicaid-enrolled adults: rates and duration of subsequent treatment. *Drug and Alcohol Dependence*. 2009; 104(1–2):100–106. [PubMed: 19481884]
- Stone RA, Whitbeck LB, Chen X, Johnson K, Olson DM. Traditional practices, traditional spirituality, and alcohol cessation among American Indians. *Journal of Studies on Alcohol*. 2006; 67(2):236–244. [PubMed: 16562405]
- Substance Abuse and Mental Health Services Administration. Treatment Episode Data Set (TEDS): 2010. Discharges from Substance Abuse Treatment Services. Rockville, MD: Substance Abuse and Mental Health Services Administration; 2010. (HHS Publication No. (SMA) 12-14-4817)2013
- Vederhus JK, Timko C, Kristensen O, Hjemdahl B, Clausen T. Motivational intervention to enhance post-detoxification 12-Step group affiliation: a randomized controlled trial. *Addiction*. 2014; 109(5):766–773. [PubMed: 24400937]
- Wiseman EJ, Henderson KL, Briggs MJ. Outcomes of patients in a VA ambulatory detoxification program. *Psychiatric Services*. 1997; 48(2):200–203. [PubMed: 9021850]

Highlights

- These analyses focused on 3 outcomes (detoxification completion, referral to substance abuse treatment, entry into substance abuse treatment) in a sample of Alaska Native adult patients admitted to inpatient alcohol detoxification.
- Higher global assessment functioning scores, longer lengths of stay and older ages of first alcohol use were associated with the likelihood of completing detoxification while a secondary drug diagnosis was associated with the likelihood of not completing detoxification.
- Those with legal problems and longer lengths of stay were more likely to accept a referral to substance abuse treatment while women were less likely than men to accept a referral.
- Length of stay was the only variable associated with substance abuse treatment entry.

Table 1
Sample Characteristics and Bivariate Relationships of Independent Variables with Each Outcome

Variables	Descriptive Statistics Entire Sample			Detoxification Completion			Acceptance of a Referral to Substance Abuse Treatment			Substance Abuse Treatment Entry (for those that accepted a referral)		
	n	mean	%/SD	Odds	CI	P-value	Odds	CI	P-value	Odds	CI	P-value
Demographic/Psychosocial Characteristics												
Age	42.8		10.4	1.02	1.00, 1.05	0.04	1.02	.99, 1.04	0.11	1.01	.98, 1.04	0.38
Gender												
Male	218		57%	1.00			1.00			1.00		
Female	165		43%	0.72	.45, 1.15	0.17	0.57	.37, .87	0.01	0.97	.47, 1.97	0.93
Education												
Less than high school	97		25%	1.00			1.00			1.00		
High school education	179		47%	1.03	.59, 1.82	0.91	1.51	.89, 2.57	0.13	0.77	.32, 1.89	0.57
More than high school	107		28%	1.20	.63, 2.28	0.58	1.59	.89, 2.86	0.12	1.05	.39, 2.81	0.92
Marital status												
Living as married	65		17%	1.00			1.00			1.00		
Single never married	173		45%	0.87	.46, 1.64	0.67	0.94	.51, 1.72	0.83	0.79	.30, 2.12	0.64
Divorced, separated, widowed	145		38%	1.88	.93, 3.76	0.08	1.26	.80, 1.98	0.33	0.95	.35, 2.56	0.92
Housing status												
Stable	214		56%	1.00			1.00			1.00		
Unstable	169		44%	1.07	.65, 1.66	0.86	1.64	1.07, 2.49	0.02	1.67	.84, 3.29	0.14
Employment status												
Employed	61		16%	1.00			1.00			1.00		
Seasonal work/other	19		5%	0.57	.17, 1.92	0.36	1.14	.41, 3.15	0.80	0.91	.18, 4.64	0.91
Seeking employment	163		42%	0.50	.22, 1.09	0.08	1.18	.64, 2.18	0.53	1.42	.52, 3.88	0.49
Not in labor force	140		36%	0.41	.19, .91	0.03	1.12	.60, 2.11	0.72	1.26	.45, 3.50	0.66
Children in the home												
Yes	276		72%	1.31	.79, 2.18	0.29	1.35	.84, 2.18	0.22	1.02	.46, 2.25	0.96
No	107		28%	1.00			1.00			1.00		
Patient lives with												

Variables	Descriptive Statistics Entire Sample		n=383			n=383			n=383			n=138		
	n/mean	%/SD	Odds	CI	P-value	Odds	CI	P-value	Odds	CI	P-value	Odds	CI	P-value
Alone	168	44%	0.93	.58, 1.48	0.76	1.36	.89, 2.07	0.15	1.73	.87, 3.43	0.12	1.00		
Family/Non-Family	215	56%	1.00			1.00			1.00			1.00		
Problems related to primary support														
Yes	298	78%	1.56	.85, 2.84	0.15	1.56	.89, 2.74	0.12	1.80	.71, 4.52	0.21	1.00		
No	85	22%	1.00			1.00			1.00			1.00		
Social environment problems														
Yes	341	89%	1.67	.78, 3.61	0.19	0.99	.49, 2.01	0.99	0.74	.23, 2.36	0.61	1.00		
No	42	11%	1.00			1.00			1.00			1.00		
History of physical abuse														
Yes	26	7%	0.71	.26, 1.91	0.50	2.01	.86, 4.69	0.11	1.04	.31, 3.47	0.95	1.00		
No	357	93%	1.00			1.00			1.00			1.00		
Legal problems														
Yes	65	17%	1.35	.64, 2.84	0.43	2.12	1.20, 3.72	0.01	0.55	.74, 4.10	0.21	1.00		
No	318	83%	1.00			1.00			1.00			1.00		
Clinical Characteristics														
Global Assessment Functioning at admission	43.6	8.9	1.04	1.00, 1.09	0.05	0.98	.96, 1.01	0.18	1.00	.95, 1.05	0.99	1.00		
Drug related secondary diagnosis														
Yes	107	28%	0.67	.40, 1.10	0.11	1.17	.74, 1.89	0.51	1.86	.86, 4.02	0.11	1.00		
No	276	72%	1.00			1.00			1.00			1.00		
Delirium tremens or seizures														
Yes	119	31%	0.77	.47, 1.26	0.30	0.90	.57, 1.42	0.65	1.03	.49, 2.17	0.93	1.00		
No	264	69%	1.00			1.00			1.00			1.00		
Medical conditions														
One or more	161	42%	0.93	.58, 1.49	0.77	1.79	1.17, 2.74	0.01	1.25	.63, 2.45	0.53	1.00		
None	222	58%	1.00			1.00			1.00			1.00		
Diagnosed psychiatric disorders														
One or more	46	12%	1.34	.62, 2.90	0.45	1.49	.80, 2.80	0.21	0.69	.27, 1.77	0.44	1.00		
None	337	88%	1.00			1.00			1.00			1.00		

Variables	Descriptive Statistics Entire Sample		Detoxification Completion			Acceptance of a Referral to Substance Abuse Treatment			Substance Abuse Treatment Entry (for those that accepted a referral)		
	n/mean	%/SD	Odds	CI	P-value	Odds	CI	P-value	Odds	CI	P-value
Use Related Behaviors											
Alcohol use in the last 30 days											
=30	188	49%	1.32	.95, 2.11	0.25	1.29	.84, 1.96	0.23	1.55	.79, 3.07	0.20
<=29	195	51%	1.00			1.00			1.00		
Age first use											
	14.6	4.8	1.06	.99, 1.14	0.10	0.99	.95, 1.04	0.85	0.96	.87, 1.06	0.42
Days abstinent prior to last use											
31+	138	36%	0.64	.40, 1.03	0.07	0.86	.56, 1.34	0.51	0.58	.28, 1.19	0.13
0-30	245	64%	1.00			1.00			1.00		
Health Care Utilization											
Length of stay											
	5.1	2.4	2.92	2.17, 3.92	<.001	1.32	1.19, 1.45	<.001	1.19	1.04, 1.35	0.01
Number of admission to detoxification unit											
Two or more	194	51%	0.98	.61, 1.56	0.93	0.96	.63, 1.46	0.85	0.89	.45, 1.78	0.73
One	189	49%	1.00			1.00			1.00		
Readmitted with one year											
Yes	162	42%	1.11	.69, 1.78	0.67	0.98	.64, 1.50	0.94	1.05	.53, 2.08	0.90
No	221	58%	1.00			1.00			1.00		
Accepted a referred to substance abuse treatment											
Yes	138	36%	4.75	2.53, 8.91	<.001						
No	245	64%	1.00								
Entered substance abuse treatment (n=138)											
Yes	80	58%	1.69	.54, 5.33	0.37						
No	58	42%	1.00								

Notes: n/mean=number for categorical variables and mean for continuous variables; %/sd=percentage for categorical variables and standard deviation for continuous variables

Table 2

Adjusted Logistic Regressions for Each Outcome

Alcohol Detoxification Treatment Completion Adjusted Logistic Regression			
n=383	Odds Ratio	95% CI	P-value
Global assessment functioning on admission	1.09	1.05, 1.12	<.001
Drug Related Secondary Diagnosis			
Yes	0.50	.26, .97	0.040
No			
Age first use	1.09	1.02, 1.15	0.006
Length of stay	3.32	2.34, 4.71	<.001
Accepted a referral to treatment			
Yes	3.80	1.64, 8.85	0.002
No			
<i>Pseudo R-squared</i>		0.76	

Accepted a Referred to Substance Abuse Treatment Adjusted Logistic Regression			
n=383	Odds Ratio	95% CI	P-value
Gender			
Male			
Female	0.62	.39, .98	0.039
Legal problems			
Yes	2.11	1.16, 3.83	0.014
No			
Length of stay	1.31	1.19, 1.44	<.001
<i>Pseudo R-squared</i>		0.16	

Entered Substance Abuse Treatment (n=138)			
n=138	Odds Ratio	95% CI	P-value
Length of stay	1.19	1.04, 1.35	0.010
<i>Pseudo R-squared</i>		0.06	

Notes: OR=odds ratio, CI=confidence interval