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Post-treatment Low-risk Drinking as a Predictor of Future Drinking and Problem Outcomes among Individuals with Alcohol Use Disorders: A 9-year Follow-up

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Abstract

Background—Treatment for alcohol use disorders has traditionally been abstinence-oriented, but new research and regulatory guidelines suggest that low-risk drinking may also be an acceptable treatment outcome. However, little is known about long-term outcomes for patients who become low-risk drinkers post-treatment. This study explores a post-treatment low-risk drinking outcome as a predictor of future drinking and psychosocial outcomes over 9 years.

Methods—Study participants were adults with alcohol use disorders at treatment entry who received follow-up interviews 6 months post-treatment intake (N=1061) in two large randomized studies conducted at Kaiser Permanente Northern California, a large private, nonprofit, integrated health system. Six-month drinking status was defined as abstinent, low-risk (non-abstinent, no 5+ drinking days), or heavy drinking (1 or more days of 5+ drinks). Using logistic regression models we explored the relationship between past 30-day drinking status at 6 months and odds of being abstinent or a low-risk drinker (compared to heavy drinking), and positive Addiction Severity Index psychosocial outcomes over 9 years (9-year follow-up rate of 73%).

Results—Abstainers and low-risk drinkers at 6 months had higher odds of recent abstinence/low-risk drinking over 9 years than heavy drinkers; abstainers had better drinking outcomes than low-risk drinkers. Additionally, among those with interview data, 95% of abstainers and 94% of low-risk drinkers at 6 months were abstinent/low-risk drinkers at 9 years; surprisingly 89% of heavy drinkers at 6 months were also abstinent/low-risk drinkers though still significantly fewer than the other groups. Abstainers and low-risk drinkers at 6 months had better psychiatric outcomes and abstainers had better family/social outcomes than heavy drinkers; medical outcomes did not differ. Low-risk drinkers and abstainers showed no reliable differences across psychosocial measures.

Conclusions—The findings suggest that a low-risk drinking outcome may be reasonable over the long-term for some alcohol-dependent individuals receiving addiction treatment.

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Keywords

low-risk drinking; long-term outcomes; long-term psychosocial functioning; alcohol

INTRODUCTION

Treatment for alcohol use disorder (AUD) has traditionally been abstinence-oriented, but new research and regulatory guidelines suggest that low-risk drinking may be an acceptable outcome in addiction treatment. Numerous studies have found that low-risk drinkers have positive outcomes post-treatment and that low-risk drinkers and abstainers have similar drinking and social functioning outcomes (Dawson et al., 2007; Dawson and Grant, 2011; Kline-Simon et al., 2013; Delucchi and Weisner, 2010; Grant et al., 2015). Furthermore, the Food and Drug Administration (FDA) has moved to focusing on no heavy drinking as well as abstinence as primary treatment outcomes in Phase III alcohol medication studies (Falk et al., 2010; Johnson et al., 2007; Join Together Staff, 2015; U.S. Department of Health and Human Services et al., 2015)

In our prior work (Kline-Simon et al., 2013), which examined patients entering treatment for AUDs in a private integrated healthcare system, we found that individuals who were abstinent or low-risk drinkers at 6 months post-treatment intake had fewer heavy drinking days at 1-year post-treatment compared with those who were heavy drinkers at 6 months; abstainers also had fewer heavy drinking days when compared with the low-risk drinkers. More notably, we also found that, low-risk drinkers and abstainers did not differ across any of the psychosocial severity measures examined (psychiatric, family/social or employment) with the exception of medical severity, with low-risk drinkers having better self-reported medical outcomes. When compared with heavy drinkers, both abstainers and low-risk drinkers had lower psychiatric and family/social problem severity. Abstainers also had lower 12-month employment problem severity compared with heavy drinkers, though low-risk and heavy drinkers did not differ. These findings further support the notion that low-risk drinking may be an acceptable treatment outcome with respect to future short term prognostic indicators. Moreover, we examined this cohort across a 5-year follow-up and found that those who were low-risk drinkers or abstainers at 6 months post-treatment had similar rates and costs associated with utilization of primary care, emergency department and inpatient services; whereas, heavy drinkers had higher ED and inpatient utilization and costs (Kline-Simon et al., 2014). However, it is still unknown if the relative benefits of low-risk drinking post-treatment on drinking and psychosocial outcomes are sustained over a longer period of time.

In this study, we extend our previous work (Kline-Simon et al., 2013) to determine whether patients who are low-risk drinkers after addiction treatment are able to maintain favorable drinking and psychosocial outcomes over a longer follow-up period. Specifically, we compare drinking groups at 6 months post-treatment intake (i.e., abstainers, low-risk drinkers and heavy drinkers) on drinking and psychosocial outcomes over a 9 year period. Based on our prior short-term findings, we hypothesized that the abstinent group will continue to have better drinking outcomes over time compared with both low-risk and heavy

drinkers, and that the low-risk drinking and abstinent groups will continue to have similar medical and psychosocial outcomes over time and will be comparatively better than those for the heavy drinking group.

METHODS

Setting

Kaiser Permanente of Northern California (KPNC) is a private, nonprofit, integrated healthcare delivery system providing comprehensive health services to more than 4 million members, 44% of the commercially insured population in the region (Gazdik, August 8, 2013). The membership is largely employed, working and middle class, and is racially and socio-economically diverse: more than 30% are non-white, 20% have a high school or lower level of education and almost 50% earn less than $50,000 annually. KPNC's population is highly representative of the demographic characteristics of the entire population from its geographic area (Van Den Eeden et al., 2003). Addiction treatment programs at KPNC provide group-based outpatient and day treatment modalities that include supportive group therapy, education, relapse prevention, family therapy and individual counseling in a model similar to other abstinence-based, private and public programs. Both modalities last 8 weeks and aftercare is available for 10 months.

Study participants

Study participants were drawn from two large randomized studies conducted at the KPNC Chemical Dependency Recovery Program in Sacramento, California. The Day Hospital Study compared day hospital to traditional outpatient treatment and recruited patients between 1994 and 1996 (N = 1204) (Weisner et al., 2000b). The Integrated Care Study examined integrated delivery of medical and addiction services and recruited patients between 1997 and 1998 (N = 749) (Weisner et al., 2001). Program components were consistent in both studies, and patients completed an interview conducted by research staff at treatment intake, month 6, and 1, 5, 7 and 9 years with high follow-up rates (86%, 87%, 78%, 77% and 73% at 6 months, 1, 5, 7 and 9 years respectively). Institutional review board approval was obtained from the Kaiser Foundation Research Institute and University of California, San Francisco.

Consistent with our previous work (Kline-Simon et al., 2013; Kline-Simon et al., 2014), we examined a sub-sample of patients who met criteria for alcohol abuse or dependence at treatment intake and had a follow-up interview 6 months post-treatment intake (N=1061) to compare three drinking groups at 6 months (abstainers, low-risk drinkers, and heavy drinkers) on a variety of drinking and psychosocial outcomes over 9 years post-treatment.

Measures

Patient Characteristics—Treatment intake demographic variables included age, gender, race/ethnicity (white, African American, Hispanic, other), annual income (>=$40k vs. < $40k) and marital status (married vs other). The number of heavy drinking days (5+ drinks per drinking day) in the prior month was collected at treatment intake and all follow-ups; length of stay in treatment was measured in weeks from intake.

Substance use—AUD (alcohol dependence or abuse) in the month prior to the treatment intake interview was determined based on questions from the Diagnostic Interview Schedule for Psychoactive Substance Dependence (DSM-IV). Patients were also assessed for DSM-IV dependence on cannabis, hallucinogens, opioids, sedatives, stimulants, and other drugs in the prior month. A count of AUD symptoms and a dichotomous indicator of drug dependence (excluding alcohol) in the prior month based on the DSM-IV criteria were created. Substance use severity and related problems were measured by the alcohol, drug, medical, psychiatric, and family/social composite scores of the Addiction Severity Index (ASI) instrument (McLellan et al., 1992) at treatment intake and at each follow-up. Each composite score ranges from zero (indicating no problems in the relevant domain) to 1.0 (indicating high severity).

Six-month Drinking Status—Drinking status at 6 months post-treatment intake was classified as three categories: 1) ***abstinence*** from alcohol during the prior 30 days; 2) ***low-risk drinking*** defined as non-abstinence and no heavy drinking days (5+ drinks per drinking day) during the prior 30 days; and 3) ***heavy drinking*** defined as one or more heavy drinking days during the prior 30 days.

Outcomes from One to Nine Years—The drinking outcome was dichotomous, defined as a combined measure of abstinence and/or low-risk drinking (abstinence/low-risk drinking) versus at least one heavy drinking day in the prior 30 days at each follow-up. Consistent with prior work (Kline-Simon et al., 2013) that related outcomes to general population norms, dichotomous indicators of the medical, psychiatric, and family/social ASI severity measures were created using a normed value based on scores in a general population membership sample of the health plan (Weisner et al., 2000a); employment ASI severity was not available at the follow-ups and was therefore not examined. The normed score was not available for family/social ASI; thus, the median value for the study sample was used (Kline-Simon et al., 2013; Weisner et al., 2000a). Values less than or equal to the norm (or median) were considered positive outcomes. Each outcome was assessed separately as a dichotomous measure.

Analysis

ANOVA and chi-square tests were used to examine bivariate differences between continuous and categorical patient characteristics, respectively, across the 6 month drinking groups. To address missing data, we implemented multiple imputation methods using PROC MI and PROC MIANALYZE in SAS (Smolkowski et al., 2010; Young and Johnson, May 13–16, 2010; Yuan, 2011). This technique created 30 complete datasets, all with plausible values for each missing value, which were analyzed using methods described below. PROC MIANALYZE was then used to combine the results from the 30 datasets to generate valid estimates and adjust standard errors for inference (Smolkowski et al., 2010; Yuan, 2011; Young and Johnson, May 13–16, 2010). A generalized estimating equations (GEE) model using a logit link and assuming an exchangeable correlation structure was used to estimate the probability of each outcome over the 9 year period (at 1, 5, 7 and 9 years) while accounting for correlations among the repeated measures. All models included indicators for drinking status at 6 months post-treatment (abstinence [reference group], low-risk drinking,

and heavy drinking), a continuous measure of time in years, and the following covariates measured at treatment intake: age, gender, ethnicity, marital status, annual income, drug dependence, weeks of treatment, number of alcohol dependence/abuse symptoms, and continuous measures of psychiatric and medical ASI to adjust for prior problem severity. For models of psychosocial outcomes, additional covariates included corresponding continuous treatment intake ASI problem severity measures. A sensitivity analysis was conducted to examine the association between the number of readmissions to substance use treatment over the 9 year period and the outcomes. A measure of the number of readmissions to substance use treatment during the 9 year period was created based on electronic health record data. The results did not differ with the inclusion of readmissions and therefore this measure was not included in the final analyses. All analyses were performed using SAS© software, version 9.3 (SAS Institute Inc., Cary, NC); statistical significance was defined as $p < 0.05$ two-tailed.

RESULTS

Patient Characteristics

Among those in the analytical sample, participants who completed all 5 interviews (N=681) were more likely to be female (70% vs. 60%, p=0.001), younger (mean[SD]=39.1[10.6] vs. 40.7[11.6], p=0.022) and had longer lengths of stay in treatment (mean[SD]=11.4 weeks [15.1 weeks] vs. 9.1[13.7]; p=0.018) as compared to those that were missing at least one interview. There were no differences in the percent of missing observations across drinking groups at any time point.

At 6 months post-treatment intake, 66% of the sample was abstinent, 14% were low-risk drinkers and 20% were heavy drinkers (p<.001). The low-risk drinking group had a relatively higher proportion of women than the abstinent and heavy-drinking groups (47% low-risk drinkers, 38% abstainers, 27% heavy drinkers; p<0.001) (Table 1). Compared with the abstinent and low-risk drinking groups, the heavy drinker group was significantly younger (p=0.001), had a smaller proportion of married individuals (p<.001) and had the highest average number of recent heavy drinking days at treatment intake (16.8 heavy drinkers vs.13.6 low-risk drinkers vs.13.2 abstainers; p=0.001). Patients in the abstinent group were in treatment approximately 10 weeks longer than those in the other groups (p<.001) and more had an annual household income over $40,000 (45% abstainers, 37% low-risk drinkers, 34% heavy drinkers; p=0.008).

Abstinent/Low-risk Drinking Outcomes from One to Nine Years

Table 2 displays the results of the repeated measures, mixed-effects models examining the relationship between drinker status at 6 months and odds of recent abstinent/low-risk drinking from 1 to 9 years. Overall the odds of recent abstinent/low-risk drinking increased over time. Averaging across time and after controlling for covariates, both low-risk and heavy drinkers at 6 months had lower odds of recent abstinent/low-risk drinking compared with abstainers. In a post-hoc analysis, switching the referent group to low-risk drinkers, heavy drinkers had lower odds of recent abstinent/low-risk drinking compared with low-risk drinkers (adjusted odds ratio[AOR]=0.20, 95% CI=0.15–0.26, p<.001).

Among those with 9-year follow-up data, 89% of subjects in the heavy drinking group achieved recent abstinent/low-risk drinking, though this was still significantly fewer than the other groups (95% of the abstainers at 6 months, 94% of the low-risk drinkers at 6 months; p=0.024).

Medical, Psychiatric and Family/Social Outcomes from One to Nine Years

Table 3 displays results from the repeated measures, mixed-effects generalized estimating equation models examining self-reported medical and psychosocial outcomes from 1 to 9 years. Overall the odds of positive psychiatric outcomes decreased over time while the odds of positive family/social outcomes increased. Medical outcomes did not change over time. Heavy drinkers at 6 months had worse psychiatric and family/social outcomes compared with abstainers; low-risk drinkers and abstainers did not differ. Medical outcomes did not differ across the groups. In post-hoc analyses, switching the referent group to low-risk drinkers, heavy drinkers at 6 months had worse psychiatric (AOR=0.78, 95% CI=0.63–0.98, p=0.029) outcomes than low-risk drinkers. Heavy drinkers at 6 months also tended to have worse family/social outcomes (AOR=0.81, 95% CI=0.65–1.00, p=0.058) compared with low-risk drinkers though these differences were not statistically different; medical outcomes did not differ.

DISCUSSION

Abstainers and low-risk drinkers had better drinking outcomes compared with heavy drinkers over the 9-year post-treatment period; abstainers also had better long-term drinking outcomes than low-risk drinkers. Additionally, among those with follow-up interview data, 95% of abstainers at 6 months and 94% of low-risk drinkers were either abstinent or low-risk drinkers at 9 years while 89% of those who were heavy drinkers at 6 months were abstinent or low-risk drinkers at 9 years, though significantly fewer than the other two groups. Thus, while individuals who abstained or were low-risk drinkers 6 months after treatment had better drinking outcomes over time based on the models, even those who were heavy drinkers after treatment had a high likelihood of becoming a non-problem drinker by 9 years. However, it is important to note that these high percentages were found only among those with interview data at the 9 year follow-up which had a 73% response rate. We did not find significant differences across the groups in terms of missing data over the study period but it is important to keep in mind that many patients who dropped out of the study may have continued, or even started to have recent heavy drinking. As the measures were limited to drinking frequency for the prior 30 days at each follow-up we do not know if these patients were consistently abstinent/low-risk drinkers. However, Dawson et. al found that after a 3 year period only 25.9% experienced the recurrence of AUD symptoms and 5.1% experienced recurrence of dependence, which supports the pattern found here (Dawson et al., 2007). Long term drinking outcomes should be examined in other samples across different initial drinker status levels.

Abstainers and low-risk drinkers did not differ in long-term psychiatric or family/social outcomes over the 9-year post-treatment period, supporting our short-term results which found similar psychosocial outcomes at 1-year post-treatment between these two groups

(Kline-Simon et al., 2013). Heavy drinkers at 6 months had worse psychiatric outcomes compared with both abstainers and low-risk drinkers and worse family/social outcomes compared with abstainers. This suggests that those who are able to attain abstinence or low-risk drinking 6 months after treatment are more likely to maintain favorable psychosocial outcomes over time. We did not find differences between the drinking groups in terms of self-reported medical outcomes, which contrasts with the differences we found in emergency department, inpatient and primary care cost and utilization over 5 years between heavy drinkers and abstainers which are often proxies for medical problems (Kline-Simon et al., 2014).

Overall psychiatric outcomes worsened over the 9-year period for all groups. This worsening occurred after the 1-year follow-up time point, suggesting that although any benefit received from treatment could be sustained for the short term, longer-term care may have been needed for these effects to continue. We did find that overall family/social outcomes improved over time for all groups which is not surprising as addressing these issues is a strong focus in the treatment program.

Although heavy drinkers at 6 months had substantial and consistent improvement in drinking over 9 years, they were still less likely to have a positive drinking outcome in the following years, and had worse psychiatric outcomes over time compared with both abstainers and low-risk drinkers, as well as worse family/social outcomes compared with abstainers. Abstainers at 6 months had better drinking outcomes compared with low-risk drinkers but they did not differ across any of the psychosocial measures examined which suggests that the inclusion of low-risk drinking may be a reasonable outcome for treatment in addition to abstinence. Though low-risk drinking is likely not appropriate for everyone, it is possible that those who learn how and are able to manage their drinking after treatment may find it to be a more attainable outcome than complete abstinence over time. In a drinking society where individuals are surrounded by alcohol, it can be difficult to completely abstain, especially with the potential label as an addict and loss of social support systems; many would prefer treatment that incorporates their drinking goals, which may not necessarily include complete abstinence (Mertens et al., 2012; Collins et al., 2015). Furthermore, viewing low-risk drinking after treatment as a positive outcome may encourage more individuals to get help -- particularly the 80% of individuals who never treat their lifetime AUD (Grant et al., 2015).

Study limitations include the use of a private integrated health care delivery system which may not be representative of public or other private health care populations. However, generalizability has greatly increased with the implementation of the Affordable Care Act (Blumenthal and Tavenner, 2010; Beronio, July 8, 2010). As with any longitudinal study, some sample attrition occurred. To address this multiple imputation was used to account for missing data. We also note that the analytical sample of 1061, which required participants to have an AUD diagnosis and a 6 month interview, was only 54% of the intent-to –treat sample of 1953. A variable centered approach was used which may not track with individual differences in the outcomes over time. The current study had only a measure of 5+ drinks per drinking day for both men and women, which was used to indicate heavy drinking days; weekly limits were not available. However, we expect that this limitation caused our

estimate of low-risk drinkers to be more conservative. Treatment for both studies was abstinence-based and did not encourage low-risk drinking as a treatment outcome, which again most likely resulted in a more conservative estimate of low-risk drinkers. Future work should examine differences between drinker status post-treatment intake and psychosocial outcomes and drinking levels using a treatment program that focuses on low risk drinking and should examine for whom low-risk drinking is an appropriate outcome. Finally, unlike in our previous work (Kline-Simon et al., 2013), we were unable to examine employment severity outcomes as these measures were not available in the 7 and 9 year interviews.

Conclusions

Individuals who became low-risk drinkers after treatment were able to maintain positive psychosocial outcomes over 9 years post-treatment intake comparable to individuals who remained abstinent after treatment, suggesting that the inclusion of low-risk drinking may be a reasonable outcome for treatment in addition to abstinence. Low-risk drinkers were also able to maintain non-heavy drinking outcomes, however not as well as those who abstained. Furthermore, all groups were found to have similar and highly favorable drinking outcomes by the 9-year follow-up. This suggests that long-term drinking outcomes, as compared to psychosocial outcomes, may not be the only, nor the most ideal, way to operationalize long-term recovery. Future research should explore for whom low-risk drinking is likely to be associated with longer-term benefits, taking into account different conceptions of recovery.

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Individuals who became low-risk drinkers after treatment were able to maintain positive psychosocial outcomes over 9 years comparable to individuals who remained abstinent, suggesting that the inclusion of low-risk drinking may be a reasonable treatment outcome in addition to abstinence. Furthermore, all groups (including heavy drinkers) had similar and highly favorable drinking outcomes by the 9-year follow-up. This suggests that long-term drinking outcomes, as compared to psychosocial outcomes, may not be the most ideal, way to operationalize long-term recovery.

Table 1

Treatment intake patient characteristics by 6-month drinker status

	Abstainers (n=706)	Low-risk drinkers (n=146)	Heavy drinkers (n=209)	p-Value
Women (%)	38.4	47.3	26.8	<0.001
Age, mean (SD)	40.5(10.8)	39.6 (11.5)	37.3 (10.6)	0.001
Ethnicity (%)				
White	77.7	75.9	76.3	
African-American	8.8	10.3	10.1	0.981
Hispanic	8.4	9.7	9.2	
Other	5	4.1	4.4	
Married (%)	50.5	50.7	36.1	<0.001
Annual income (40K+) (%)	44.9	37.0	33.8	0.008
Weeks in treatment, mean (SD)	13.9 (16.5)	3.9 (6.4)	3.8 (5.3)	<0.001
Number of alcohol abuse/dependence symptoms, mean (SD)	6.8 (2.0)	6.9 (2.0)	7.1 (1.9)	0.120
Heavy drinking days (30-day), mean (SD)	13.2 (10.6)	13.6 (10.0)	16.8 (10.0)	0.001
Drug dependence (%)	27.8	37.7	30.6	0.055
Psychiatric ASI problem severity, mean (SD)	0.42 (0.26)	0.42 (0.26)	0.39 (0.26)	0.320
Medical ASI problem severity mean (SD)	0.32 (0.39)	0.34 (0.37)	0.31 (0.38)	0.748

Note: ASI= addiction severity index

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Table 2

Recent abstinence and/or low-risk drinking at 1, 5, 7, and 9 years by 6-month drinker status[^]

	Recent abstinence/low-risk drinking			
	AOR	**95% CI**		**p-value**
Time	1.19	1.16	1.22	<.001
Low-risk drinkers at 6 mos. (vs abstainers)	0.51	0.38	0.67	<.001
Heavy drinkers at 6 mos. (vs abstainers)	0.10	0.08	0.13	<.001
Age	1.01	1.00	1.02	0.006
Female (vs male)	1.36	1.13	1.68	0.002
Ethnicity				
African American (vs white)	0.98	0.72	1.32	0.887
Hispanic (vs white)	0.84	0.62	1.13	0.241
Other (vs white)	1.25	0.79	1.99	0.343
Married at baseline (vs other)	1.10	0.91	1.34	0.330
Annual income >= $40k (vs. < $40k)	1.13	0.93	1.34	0.224
Drug dependence (vs no dependence)	1.01	0.87	1.38	0.518
Psychiatric ASI problem severity at intake	0.80	0.54	1.19	0.274
Medical ASI problem severity at intake	1.29	1.01	1.68	0.045
Weeks in Treatment	1.01	1.00	1.02	0.003
Number of alcohol dependence/abuse symptoms	1.05	1.00	1.10	0.036
Post-hoc analyses				
Heavy drinkers at 6 mos. (vs low-risk drinkers)	0.78	0.63	0.98	<.001

Note:

[^]model adjusts for patient characteristics measured at treatment intake; Logistic regression generalized estimating equation models; AOR = adjusted odds ratio; CI = confidence interval; ASI= addiction severity index

Table 3

Medical and psychosocial outcomes at 1, 5, 7, and 9 years by 6-month drinker status[^]

	Positive Medical Outcomes[*]				Positive Psychiatric Outcomes[*]				Positive Family/Social Outcomes[*]			
	AOR	95% CI		p-value	AOR	95% CI		p-value	AOR	95% CI		p-value
Time	1.00	0.98	1.02	0.904	0.93	0.91	0.94	<0.001	1.04	1.02	1.06	<0.001
Low-risk drinkers at 6 mos. (vs abstainers)	0.95	0.79	1.15	0.609	1.01	0.83	1.23	0.898	0.84	0.70	1.02	0.076
Heavy drinkers at 6 mos. (vs abstainers)	0.86	0.72	1.02	0.078	0.79	0.67	0.94	0.007	0.68	0.57	0.80	<0.001
Age	0.99	0.98	0.99	<0.001	1.01	1.00	1.01	0.034	1.01	1.00	1.02	0.001
Female (vs male)	0.86	0.75	1.98	0.029	0.57	0.49	0.65	<.001	1.08	0.94	1.23	0.279
Ethnicity												
African American (vs white)	0.96	0.77	1.19	0.706	1.51	1.22	1.87	<.001	1.00	0.80	1.26	0.986
Hispanic (vs white)	1.12	0.88	1.42	0.364	1.16	0.92	1.45	0.207	1.19	0.95	1.49	0.138
Other (vs white)	1.25	0.92	1.70	0.156	1.53	1.14	2.05	0.005	1.66	1.20	2.30	0.002
Married at baseline (vs other)	1.10	0.96	1.27	0.156	1.05	0.91	1.20	0.499	1.59	1.39	1.82	<.001
Annual income >= $40k (vs. < $40k)	1.06	0.92	1.22	0.421	1.01	0.88	1.16	0.875	1.13	0.98	1.30	0.080
Drug dependence (vs no dependence)	0.95	0.82	1.10	0.504	1.02	0.88	1.18	0.810	0.91	0.78	1.06	0.216
Psychiatric ASI problem severity at intake	0.46	0.35	0.61	<0.001	0.09	0.07	0.12	<.0001	0.42	0.32	0.56	<.001
Medical ASI problem severity at intake	0.47	0.39	0.56	<0.001	0.85	0.71	1.02	0.078	1.07	0.90	1.28	0.433
Weeks in Treatment	1.01	1.00	1.01	0.012	1.00	1.00	1.01	0.717	1.01	1.00	1.01	0.013
Number of alcohol dependence/abuse symptoms	1.06	1.03	1.10	<0.001	1.06	1.03	1.10	<.0001	1.01	0.97	1.04	0.624
Family/social ASI problem severity at intake	-	-	-	-	-	-	-	-	0.39	0.30	0.50	<0.001
Post-hoc analyses												
Heavy drinkers at 6 mos. (vs low-risk drinkers)	0.88	0.71	1.10	0.253	0.78	0.63	0.98	0.029	0.81	0.65	1.00	0.058

Note:

[^] Models adjust for patient characteristics measured at treatment intake; Logistic regression generalized estimating equation models;

[*] Positive outcomes determined by ASI scores less than or equal to the population norm or sample median.

Addiction Severity Score values: Alcohol Norm = 0.11; Medical Norm = 0.24; Psychiatric Norm = 0.03; Social/Family Median = 0; Employment Median = 0.19; (Normed to the general population on ASI scores [Weisner et al., 2000a]; Median based on full sample scores); AOR = adjusted odds ratio; CI = confidence interval; ASI= addiction severity index