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The relationship between services delivered and substance use outcomes in New Mexico's Screening, Brief Intervention, Referral and Treatment (SBIRT) Initiative

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Abstract

Background—Recent years have seen increased diffusion of the Screening, Brief Intervention, Referral and Treatment Initiative (SBIRT) in healthcare environments. This study examined the relationship between substance use outcomes and service variables within the SBIRT model.

Methods—Over 55,000 adult patients were screened for substance misuse at rural health clinics throughout New Mexico during the SBIRT Initiative. This naturalistic pre-post services study used administrative baseline, 6 month follow-up, and services data for adult participants in the New Mexico SBIRT evaluation ($n=1,208$). Changes in self-reported frequency of illicit drug use, alcohol use, and alcohol intoxication were examined as a function of service level (brief intervention– BI versus brief treatment/referral– BT/RT) and number of service sessions.

Results—Participants reported decreased frequency of illicit drug use, alcohol use, and alcohol intoxication 6 months after receipt of SBIRT services ($p<.001$ for each). Compared to those who received BI, participants who received BT/RT had sharper reductions in frequency of drinking ($IRR=.78$; $p<.05$) and alcohol intoxication ($IRR=.75$; $p<.05$). Number of service sessions was associated with reduced frequency of alcohol use ($IRR=.84$; $p<.01$) and intoxication ($IRR=.82$; $p<.05$), but only among those who received BI.

Conclusions—Substance-using patients with disparate levels of use may benefit from SBIRT. In a real-world, multi-site rural SBIRT program, services of higher intensity and (within the BI modality) frequency were associated with greater magnitude of change in drinking behaviors. Reductions in illicit drug use, while substantial, did not differ significantly based on service

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Conflict of Interest

All authors declare that they have no conflicts of interest.

Contributors

J. Gryczynski, S. Mitchell, and R. Schwartz jointly conceptualized the study, reviewed the literature, and drafted the manuscript. J. Gryczynski undertook the statistical analysis and led the writing. A. Gonzales, T. Peterson, and A. Moseley were responsible for the data collection in the SAMHSA-funded New Mexico SBIRT project and contributed to the revision of the manuscript. All authors have approved the final manuscript.

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variables. Future studies should identify the preferred service mix in the SBIRT model as it continues to expand.

Keywords

Screening; Brief Intervention; Brief Treatment; SBIRT; Services; Rural Healthcare

1. Introduction

Recent years have seen increased interest in integrating interventions for risky alcohol and drug misuse within the broader healthcare system. An extensive body of evidence supports the efficacy of opportunistic brief interventions in reducing alcohol misuse and its related consequences when delivered in medical venues such as primary care clinics and hospital emergency departments (Academic Emergency Department SBIRT Research Collaborative, 2007; Bertholet et al., 2005; Cuijpers et al., 2004; Moyer et al., 2002; U.S. Preventive Services Task Force, 2007; Whitlock et al., 2004; Wilk et al., 1997). Health economic studies also support the cost-effectiveness of brief interventions (Fleming et al., 2000; 2002; Gentilello et al., 2005; Maciosek et al., 2006; Solberg et al., 2008; Wutzke et al., 2001; Zarkin et al., 2003). Studies are also beginning to show that brief interventions delivered in medical environments can be effective in reducing problematic illicit drug use (Bernstein et al., 2005; Ondersma et al., 2005, 2007) and linking drug dependent patients to specialty treatment (Krupski et al., 2010), although a much more mature evidence base exists for brief alcohol interventions.

In 2003, the Substance Abuse and Mental Health Services Administration (SAMHSA) launched the Screening, Brief Intervention, Referral, and Treatment (SBIRT) Initiative. Initially implemented in seven states, the SAMHSA SBIRT Initiative was meant to demonstrate the feasibility of integrating substance use screening and intervention services into the mainstream medical system. Nationally, over half a million patients have been screened for risky substance use, with 16% receiving brief intervention, 3.7% receiving brief treatment, and 3.7% receiving referral to specialty treatment (Office of National Drug Control Policy, 2008).

Evaluations of the SBIRT Initiative are beginning to appear in the literature. In a quasi-experimental multi-site study of SBIRT in Emergency Departments, researchers found that brief intervention was effective in reducing alcohol consumption at 3 month follow-up (Academic ED SBIRT Research Collaborative, 2007). In the Emergency Department SBIRT program in Washington State, researchers found that those who received SBIRT services were more likely to access substance abuse treatment (Krupski et al., 2010) and incurred fewer Medicaid costs (Estee et al., 2010) than matched comparison groups. Another study found substantial decreases in drug use and heavy drinking among individuals receiving SBIRT in a public healthcare system where SBIRT was implemented as standard care (InSight Project Research Group, 2009). Madras and colleagues (2009) reported outcome findings for the initial cohort of SBIRT grantees, finding significant decreases in a range of substance use behaviors among a random sample of service recipients selected for 6 month follow-up (Madras et al., 2009).

In the current naturalistic pre-post services study, we extend the existing literature by examining the relationship between substance use outcomes and key service variables (level of intervention and number of service sessions) in New Mexico's SBIRT program.

2. Methods

2.1. Study Site

This study draws from an administrative dataset from Sangre de Cristo Community Health Partnership, the non-profit organization that administered New Mexico's SBIRT program (NMSBIRT). As a first-cohort SAMHSA SBIRT grantee, they successfully established SBIRT in over 35 rural healthcare sites throughout New Mexico, operating in 17 of the State's 33 counties. Service sites included Federally Qualified Health Centers, Public Health Offices, and Indian Health Service Clinics. Screening was conducted using a one-page questionnaire that included the full Alcohol Use Disorders Identification Test (AUDIT; Reinart and Allen, 2007), followed by a yes/no question about past year use of any illegal drug (with examples given) and a yes/no question about past year non-medical use of prescription drugs. The format of the drug screening was similar to the single-question screener recommended by Smith and colleagues (2010). Over 55,000 adult screenings were administered by healthcare staff through NMSBIRT.

2.2. Service Model

The SBIRT model encompasses brief intervention (BI), brief treatment (BT), and/or referral and treatment (RT). NMSBIRT services were delivered by Behavioral Health Counselors (BHCs) integrated into the health centers. BHCs received an initial 80-hour training on intervention strategies and project procedures, with additional booster trainings delivered by supervisors. All BHCs were licensed practitioners in psychology, clinical social work, or chemical dependency counseling, or obtained such licensures while working on the project. BI was based on motivational interviewing (Miller and Rollnick, 2002), while BT was based on the Community Reinforcement Approach (Hunt and Azrin, 1973). Patients were introduced to the BHC via direct, in-person referral from healthcare staff if their AUDIT score was above 8 or they answered affirmatively to either drug question. Counselors then met with patients to discuss their responses to the screening. If the patient agreed, the counselor asked structured questions about past 30-day substance use frequency using the Government Performance and Results Act (GPRA) questionnaire (described below). While general service level placement guidelines were provided by SAMHSA based on patient responses to these questions, BHCs had ultimate discretion regarding service planning. Counselors based their clinical decisions on a combination of patient responses to screening as well as brief discussions with patients about substance use consequences and patient readiness.

2.3. Data

Data for this study were compiled from administrative service records and GPRA patient interview data. The level of detail for data collection increased with the types of services planned. Basic demographic information was collected for individuals who received screening only. Those who also received a BI completed a section of the GPRA inquiring about substance use in the past 30 days. Those who received BT or RT completed the full GPRA questionnaire. A subsample of individuals selected for follow-up (described below) completed another GPRA 6 months later. BHCs maintained records on service level and number of sessions delivered. The present study used a dataset consisting of merged baseline, follow-up, and service record data. Overall, a record of service delivery existed for 82% of cases with baseline GPRA data on substance use (indicating that services were planned). Data were not kept on how many of the remaining individuals actively refused, had a medical problem that precluded their receipt of BI, or received services but had missing data.

2.4. Sample

Participants were adult patients ages 18 and older who had a positive screen for risky alcohol or drug use, received a BI or a more intensive level of services (BT or RT), and were randomly selected to complete a 6 month follow-up assessment as part of the project evaluation. Participants were pursued for follow-up if they received a BI, BT, or RT, and the last two digits of their social security number fell within a randomly-generated numerical range provided by SAMHSA (targeting approximately 20–30% of the sample who received BI/BT/RT services). For NMSBIRT, this corresponded to 1,569 unique patients for whom information on baseline substance use behaviors was available.

The analysis sample was reduced with the importation of service records data, which was available for 1,290 unique adult patients. Fifty-five cases were excluded because they were coded as receiving no services except screening, reflecting either erroneous inclusion in the follow-up pool or data entry errors. The analysis sample was further reduced with cleaning the administrative dataset. In 8 instances, there were multiple legitimate baseline follow-up pairs present in the data (e.g., the same individual received services on multiple occasions). To avoid complications arising from potential cumulative intervention effects, only the first complete baseline-follow-up pair was used for the present analysis. In 10 other instances, the same individual had multiple baseline records but only one follow-up record. In these cases, the baseline record that corresponded to the follow-up record was retained. Finally, cases with missing data on the explanatory variables of interest were dropped. This process left a final baseline of 1,208 unique individuals. Follow-up data at 6 months was available for 834 of these cases (69.0%).

2.5. Measures

Measures were drawn from self-reported patient GPRA data and service records.

2.5.1. Substance Use—Three self-reported substance use behaviors were examined in the present study: number of days in the past 30 days that the patient (a) used illicit drugs (including non-medical use of prescription drugs); (b) consumed alcohol; and (c) consumed alcohol to intoxication. On the GPRA, only individuals who reported consuming alcohol in the past 30 days were asked about drinking to intoxication. For the present analysis, patients who reported not consuming alcohol were coded as having zero days of drinking to intoxication.

2.5.2. Control Variables—Patient gender, age, Hispanic ethnicity, and race (White; American Indian/Alaska Native; Other race/multiple races) were included as control variables.

2.5.3. Time—A dummy variable was created to designate assessment time point (0=baseline; 1=6 month follow-up).

2.5.4. Services Received—Data on services received were obtained from service records completed by BHCs after grant-supported services had been delivered to a patient. These forms tracked the number of service sessions actually delivered (as opposed to planned). A dummy variable was created to indicate level of intervention received (0=BI alone; 1=BT and/or RT). A variable was created representing number of service encounters with the BHC.

2.5.6. Services x Time Interaction—The appropriate interaction terms were included to capture differential change in substance use frequency based on services delivered.

2.6. Statistical Analysis

Two major analyses were conducted. The first examined the relationship between type of services received (BI vs. BT/RT) and magnitude of change in frequency of illicit drug use, alcohol use, and drinking to intoxication from baseline to 6 month follow-up. This analysis focused on whether, relative to baseline, reported change in substance use frequency was fundamentally different for those receiving BI than for those receiving BT/RT. Service $\times$ Time interactions were interpreted as multiplicative effects controlling for differences in the baseline incidence (Buis, 2010). Thus, relative rather than marginal changes are of interest. The second analysis investigated the relationship between number of service sessions and change in substance use, overall and within each service level. Separate models were estimated for self-reported days of illicit drug use, days of alcohol use, and days of drinking to intoxication. To account for the distributional nature of the dependent variables, repeated measurement, and overdispersion, random-effects negative binomial regression models were fit with person-specific intercepts. The analysis permits use of all available data, including those who could not be reached for follow-up. As an added check on the stability of the results, the findings were confirmed in analyses that imputed missing 6 month data with the baseline value (i.e., assuming no change for those who could not be reached for follow-up). Analysis was conducted using Stata SE/11.1.

3. Results

3.1. Sample Characteristics

The analysis sample was 39.2% female, with a mean age of 37.0 ($SD=14.5$; range=18–85). Whites made up 82.0% of the sample, while 16.0% were AI/AN, and 2.0% reported another race or multiple races. Hispanic ethnicity was reported by 56.2%. Considering BI, BT, and RT as a hierarchy, 70.8% received BI only, while 29.2% received BT, and 3.0% received RT. Among participants who reported past 30 day illicit drug use at baseline, 77.5% reported marijuana, 23.4% reported cocaine, 12.5% reported heroin, and 7.1% reported methamphetamines. Participants who could not be reached for follow-up were more likely to be male (33.4% vs. 27.2%; $p<.05$), white (32.9% vs. 22.1%; $p<.01$), and Hispanic (34.0% vs. 27.1%; $p<.05$), and reported higher baseline frequencies of drug use ($M=7.5$, $SD=11.4$ vs. $M=5.8$, $SD=10.3$; $p<.01$), alcohol use ($M=8.5$, $SD=10.1$ vs. $M=6.6$, $SD=8.8$; $p<.01$), and alcohol intoxication ($M=6.4$, $SD=9.3$ vs. $M=5.0$, $SD=7.9$; $p<.01$).

Table 1 shows participant characteristics stratified by BI versus BT/RT. Bivariate comparisons showed no significant demographic differences between these service categories. Naturally, because BT/RT represents a more intensive level of services, participants receiving BT/RT had higher self-reported frequency of substance use at baseline than those who received BI alone ($p<.001$ for all three dependent variables). On average, those who received BT/RT also had more service encounters with the BHC than those who received BI only ($M=1.3$ for BI vs. 3.2 for BT/RT; $p<.001$). A large majority of those who received BI alone received only a single service session (81.8%), while less than half of those receiving BT/RT had just a single service episode (48.2%). Participants reported considerable reductions in substance use frequency from baseline to 6 month follow-up. The unadjusted mean 30-day frequencies of substance use decreased from 6.35 days ($SD=10.67$) to 2.85 days ($SD=7.37$) for illicit drugs, from 7.21 days ($SD=9.23$) to 4.30 days ($SD=7.27$) for alcohol, and from 5.45 days ($SD=8.36$) to 3.07 days ($SD=6.26$) for alcohol intoxication.

3.2. Service Level

Table 2a shows descriptive model-adjusted counts for days of drug use, alcohol use, and drinking to intoxication at baseline and 6 months for patients in each service level. Table 2b depicts estimates from the models examining whether the magnitude of change in substance

use behaviors from baseline to follow-up differed by Service Level. The main effects of Time indicate that patients who received BI alone reported significant reductions in days of illicit drug use, alcohol use, and alcohol use to intoxication ($p < .001$ for all three models). The Service $\times$ Time interaction, which captures differential effects of Time for those who received BT/RT vs. BI alone, relative to the baseline incidence in each category, was significant for days of alcohol use ($p < .05$) and days of drinking to intoxication ($p < .05$), but not days of drug use ($p = .32$).

For days of alcohol use, the estimated incidence rate at 6 month follow-up for patients who received BI is 0.68 times their baseline incidence rate ($p < .001$). In turn, the 30-day incidence rate at 6 months for patients who received BT/RT is multiplied by 0.53 relative to baseline ($p < .001$). Thus, the adjusted 30-day incidence decreases by 32% for those who received BI only, compared to 47% for those who received BT/RT ($p < .05$). Similarly, the incidence rate of drinking to intoxication was reduced from baseline to 6 month follow-up for those who received BI (IRR=.70; $p < .001$), but more so for those who received BT/RT (IRR=.53; $p < .001$), representing a 30% vs. 48% decline for those receiving BI and BT/RT, respectively ($p < .05$). While the incidence rate for illicit drug use decreased markedly by 6 month follow-up for those who received BI only (IRR=.48; $p < .001$) as well as those who received BT/RT (IRR=.40; $p < .001$), the magnitude of change did not differ significantly by service type ($p = .32$).

3.3. Number of Service Sessions

Additional analyses were conducted to determine whether the observed differences between BI and BT/RT were attributable to the BT/RT group having had more service encounters with the BHC. Models were also fit that controlled for the number of service sessions received (models not shown). In these models, the Service $\times$ Time interaction remained significant at the .05 level for days of alcohol use as well as days of alcohol intoxication, with only negligible attenuation of effects. Thus, it appears that the number of service encounters does not explain the observed differences in BI vs. BT/RT.

Results of the models examining the impact of number of service sessions, stratified by service level received, are shown in Table 3. Among those who received BI, the interaction of Time and Number of Service Sessions was significant for days of alcohol use (IRR=.84; $p < .01$) and days of alcohol intoxication (IRR=.82; $p < .05$), with delivery of each additional session yielding decreased incidence from baseline to 6 month follow-up on the order of 16% for alcohol use and 18% for alcohol intoxication. Number of service sessions did not moderate the effect of Time on frequency of illicit drug use. Among those who received BT/RT, number of service sessions did not moderate change from baseline to follow-up for any of the three outcomes examined.

3.4. Confirmatory Analyses

The analyses were duplicated when missing outcome data were imputed under the assumption of no change from baseline. All of the main findings – differential change in frequency of alcohol use and drinking to intoxication by service level, as well as service session effects for alcohol use and days of intoxication isolated to the BI subgroup – were confirmed (i.e., Services $\times$ Time interactions significant at $p < .05$).

4. Discussion

The findings of this study support SBIRT services as a catalyst for decreasing substance use behavior. In all models examined, regardless of level of services received, there was a substantial and statistically significant effect for Time, always in the direction of decreased

frequency of substance use 6 months after receipt of SBIRT services. These findings confirm previous research showing decreases in substance use behaviors among participants in the SAMHSA SBIRT Initiative (InSight Project Research Group, 2009; Madras et al., 2009). The current study also contributes to the literature by focusing on the relationship between substance use outcomes and service delivery variables within the SBIRT model.

In summary, those who received BT/RT reported sharper decreases in frequency of alcohol use and drinking to intoxication from baseline to follow-up, compared to those who received BI alone. Decreases in illicit drug use were substantial, but did not differ significantly in magnitude between the BI and BT/RT service levels. Importantly, the differences between BI and BT/RT on the alcohol outcomes could not be accounted for by the number of service sessions, suggesting the possibility of a qualitative (and not merely quantitative) difference between the two. The number of service sessions did, however, portend improved outcomes for the BI group. For those who got BI, but not those who got BT/RT, number of service encounters was associated with decreased frequency of drinking and intoxication at 6 month follow-up. These findings indicate that service variables within the SBIRT model could potentially make a difference in substance use outcomes, particularly for alcohol use behaviors.

While this study provides the first look at differences between the SAMHSA-defined SBIRT service categories as implemented in real-world rural healthcare environments, the results resonate with previous findings that multiple service encounters may be better at reducing alcohol use than single-session interventions (Whitlock et al., 2004). Comparative service dose was identified as a moderator of substance use outcomes in a meta-analysis of motivational interviewing (Burke et al., 2003). This is consistent with our findings that number of sessions was associated with improved alcohol use outcomes for the subgroup that received BI. That this was not the case for BT/RT suggests the possibility of a different dose-response profile across the interventions, although caution is warranted due to the more compressed range of sessions delivered in the BI category. The advantage of BT/RT over BI for alcohol use is somewhat divergent from previous literature, as studies comparing brief motivational interviewing to extended treatments have generally found comparable effects (Burke et al., 2003; Lundahl et al., 2010; Moyer et al., 2002). Likewise, a systematic review and meta-analysis of brief alcohol interventions in primary care concluded that extended counseling does not have much effect beyond that of brief intervention (Kaner et al., 2009).

It is important to emphasize that BI itself appears to be a potent intervention, as patients receiving only BI reported considerable decreases in frequency of illicit drug use, alcohol use, and drinking to intoxication by 6 month follow-up. Even though service differences were found for the alcohol use outcomes, this study cannot determine the broader clinical significance of providing services of greater frequency or intensity within the SBIRT model. Previous research suggests that brief alcohol interventions in medical settings certainly have the potential to reduce adverse outcomes like hospitalizations (Fleming et al., 2002) and even deaths (Cuijpers et al., 2004), but controlled studies will be needed to identify the preferred service structure for SBIRT.

This study has a number of limitations. Information on substance use behaviors was based on self-report, and data on services received was based on counselors' administrative records. The baseline and follow-up interviews were conducted by the same BHC that delivered SBIRT services. Although these clinicians were well-versed in eliciting information on personal behaviors in a non-judgmental way, it is possible that patients with more BHC contact could be prone to underreport substance use at follow-up. NMSBIRT was a large initiative carried out in multiple healthcare sites across the state, and as such is not immune to the shortcomings of administrative data systems that are oriented towards

services rather than research (e.g., limited variables to use as controls; incomplete records). Data on broader non-SBIRT service utilization was unavailable, but could potentially impact outcomes. Patients who followed through with more intensive services may have simply been more motivated to address their substance use. Using clinical research standards, the rate of follow-up was relatively low and therefore of some concern. However, the NMSBIRT program had among the highest follow-up rates of the initial SBIRT cohort (Madras et al., 2009). Additionally, the main findings continued to hold in confirmatory analyses where missing 6 month outcomes were imputed with the participant's baseline value (i.e., under the assumption of no change).

It is plausible that the sharper decline for alcohol use and intoxication frequency among those who received BT/RT is attributable to regression to the mean, as this group had higher self-reported frequency of substance use at baseline compared to those who received BI alone. That greater improvement would be reported by those with higher baseline problem severity is not altogether unexpected, although effect sizes for alcohol BIs have been higher when those with more severe problems are excluded (Moyer et al., 2002). However, recent research indicates that BIs may work well for those with more severe problems. A study of BI in a trauma care setting found that alcohol-dependent participants experienced greater benefits from BI than those who were non-dependent (Field and Caetano, 2010). A multi-site study of SBIRT in Houston, Texas found that patients with higher severity tended to report greater decreases in days of drug use and heavy drinking at 6 month follow-up, although decreases relative to baseline were of generally similar magnitude across levels of severity (InSight Project Research Group, 2009). In the current study, change in drinking behaviors was more pronounced for BT/RT, relative to the baseline incidence in each respective service level. However, regression to the mean cannot be ruled out as an alternative explanation. As this study lacked a no-service control group, changes in substance use over time cannot be definitively attributed to SBIRT. However, this seems plausible given the extant literature supporting SBIRT effectiveness (Academic ED SBIRT Research Collaborative, 2007; Bertholet et al., 2005; Babor and Kadden, 2005; Cuijpers et al., 2004; Madras et al., 2009; Moyer et al., 2002; Whitlock et al., 2004; Wilk et al., 1997). Finally, this analysis was limited to the New Mexico SBIRT program, and it is unknown how well findings generalize to other settings.

Due to these limitations, the results should not be interpreted to mean that programs should not offer additional services beyond BI for illicit drug users. It is not known whether BI alone would have been sufficient to affect a similar degree of change among those receiving BT/RT (although it is possible; see Field and Caetano, 2010). These findings do, however, shed light on the relationship between substance use outcomes and services received within the SBIRT model. First, patients with disparate levels of substance use who received SBIRT services in real-world rural healthcare environments reported considerable decreases in substance use behaviors 6 months after receipt of services. Relative to BI, services of higher intensity were related to discernibly greater magnitude of downward change in drinking behaviors, but this was not the case for illicit drug use. Among recipients of BI (but not BT/RT), additional service sessions were associated with greater decreases in frequency of alcohol use and alcohol intoxication. It is not apparent, however, whether the differences found are sufficient to justify the additional costs of providing higher-intensity services. To answer these questions, randomized outcome and cost-effectiveness studies comparing different components of the SBIRT model will be necessary. Identification of the optimal service mix in the SBIRT model is an important area for future research to pursue as adoption of these services continues to expand throughout the healthcare system.

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Table 1

Baseline characteristics of those receiving brief intervention (BI) vs. brief treatment/referral (BT/RT) in NMSBIRT.

	BI (n=855)	BT/RT (n=353)	Sig.
Demographics			
Female Gender, <i>Percent</i>	39.88	37.68	NS
White, <i>Percent</i>	82.81	80.17	NS
American Indian/Alaska Native (AI/AN), <i>Percent</i>	14.85	18.70	NS
Other race/multiple races, <i>Percent</i>	2.34	1.13	NS
Hispanic ethnicity, <i>Percent</i>	54.97	59.49	NS
Age, <i>M(SD)</i>	37.02 (15.23)	36.85 (12.58)	NS
Substance Use			
Number of days of illicit drug use in last 30 days, <i>M(SD)</i>	5.64 (10.15)	8.09 (11.69)	<i>p</i> <.001
Number of days of alcohol use in last 30 days, <i>M(SD)</i>	6.30 (8.42)	9.41 (10.66)	<i>p</i> <.001
Number of days of alcohol intoxication in last 30 days, <i>M(SD)</i>	4.43 (7.36)	7.90 (9.99)	<i>p</i> <.001
Services Received			
Number of sessions with Behavioral Health Counselor, <i>M(SD)</i>	1.30 (.87)	3.18 (3.45)	<i>p</i> <.001
Received only one service session, <i>Percent</i>	81.75	48.16	<i>p</i> <.001

Notes: t-test used for continuous and count variables; test of proportions used for binary variables.

NS=not significant at *p*<.05.

Table 2a

Predicted days of illicit drug use, alcohol use, and drinking to intoxication at baseline and 6 months by service level.

	<u>Days of Illicit Drug Use</u>		<u>Days of Alcohol Use</u>		<u>Days of Alcohol Intoxication</u>	
	Baseline	6 months	Baseline	6 months	Baseline	6 months
BI	5.25 (.57)	2.50 (.32)	6.19 (.48)	4.19 (.36)	4.62 (.41)	3.22 (.32)
BT/RT	7.80 (.57)	3.12 (.50)	7.73 (.69)	4.08 (.45)	6.94 (.69)	3.65 (.45)

Note: Predicted counts adjusted for gender, age, race, and Hispanic ethnicity. Standard errors in parentheses.

Table 2b

Service level (BI vs. BT/RT) and change in frequency of drug use, alcohol use, and drinking to intoxication.

	Days of Illicit Drug Use	Days of Alcohol Use	Days of Alcohol Intoxication
Received BT/RT (ref=BI only)	1.486 (1.244 – 1.776) ***	1.248 (1.090 – 1.429) **	1.502 (1.292 – 1.746) ***
6 month follow-up (ref=baseline)	0.477 (0.390 – 0.582) ***	0.677 (0.595 – 0.769) ***	0.698 (0.601 – 0.810) ***
Time x BT/RT	0.840 (0.593 – 1.189)	0.781 (0.616 – 0.990) *	0.754 (0.580 – 0.981) *

* $p<.05$;
** $p<.01$;
*** $p<.001$.

Note: Adjusted Incidence Rate Ratios reported, 95% Confidence Intervals in parentheses. Models are adjusted for gender, age, race, and Hispanic ethnicity.

Table 3

Relationship between number of service encounters and change in frequency of substance use within each service level.

	Days of Illicit Drug Use	Days of Alcohol Use	Days of Alcohol Intoxication
Patients receiving BI only (n=855)			
Number of Service Sessions	0.953 (0.839 – 1.083)	1.106 (1.006 – 1.217)*	1.121 (1.035 – 1.214)**
6 month follow-up (ref=baseline)	0.533 (0.363 – 0.783)**	0.805 (0.652 – 0.995)*	0.902 (0.695 – 1.171)
Time x Service Sessions	0.916 (0.705 – 1.189)	0.840 (0.736 – 0.958)**	0.816 (0.694 – 0.961)*
Patients receiving BI/RT (n=353)			
Number of Service Sessions	0.909 (0.861 – 0.958)***	0.957 (0.919 – 0.996)*	0.939 (0.899 – 0.982)**
6 month follow-up (ref=baseline)	0.370 (0.249 – 0.549)***	0.581 (0.435 – 0.776)***	0.585 (0.428 – 0.800)***
Time x Service Sessions	1.030 (0.932 – 1.138)	0.980 (0.918 – 1.047)	0.978 (0.908 – 1.053)

* $p < .05$;
 ** $p < .01$;
 *** $p < .001$.

Note: Random-effects negative binomial regression used. Models are adjusted for gender, age, race, and Hispanic ethnicity. Adjusted Incidence Rate Ratios reported. 95% Confidence Intervals in parentheses.