



American Addiction Centers Outcomes Study

Intake to Discharge Outcomes among
Residential Addiction Treatment Clients

Centerstone Research Institute

2018

Purpose of this Paper

Addiction and addiction treatment is multi-faceted, and impacts many areas of a person's life, including performance at work, relationships with loved ones, and mental and emotional well-being.

Understanding people on the journey to recovery is similarly complex, and cannot be reduced to whether a person is abstinent or not abstinent. American Addiction Centers (AAC) approaches treatment and recovery from a holistic perspective, supporting clients to build the quality of life they want in all domains, including physical health, mental and emotional health, family and social systems, and vocational functioning.

In consideration of this broader view of recovery and a dedication to delivering client-centered, effective treatment, AAC partnered with Centerstone Research Institute (CRI), an independent non-profit research organization, to build a client outcome monitoring system that supported the systematic collection of client outcome data at intake, discharge, and post-discharge. This client outcome monitoring system was embedded within the electronic health record and integrated into the clinical workflows for staff who interface with AAC clients day-to-day. The function of this system was to standardize data collection across AAC's multiple facilities to permit comparison, process improvement, and collect longitudinal data about clients' experiences post discharge. AAC selected six facilities across the United States to participate in the outcomes monitoring project.

This paper includes a description of the client population that received care at participating AAC facilities and an examination of changes in key client outcomes from intake to discharge. Specifically, recovery capital, relapse risk, mental health symptomology and family functioning. Findings from the post-discharge follow ups are presented in a subsequent paper.

Treatment at AAC

Clients seek treatment at AAC from across the United States and are matched to AAC facilities based on their specific needs. AAC provides a variety of evidence-based, substance use and co-occurring mental health disorder treatments, with an emphasis on *treating the whole person, not just the addiction*. Treatment includes individual, group, and family therapy and relies on a variety of evidence-based therapeutic approaches such as motivational interviewing, cognitive behavioral therapy, and trauma-informed counseling. In addition to traditional therapy formats, AAC's comprehensive treatment includes alternative approaches such as yoga, meditation, nutrition, and physical fitness. All of the facilities use AAC's treatment curriculum *Embracing change: Recovery for Life*. Once a client completes treatment and discharges from services, they are connected with AAC's alumni program which provides aftercare support.

Methods

Procedures

AAC chose six facilities across the enterprise to participate in the outcome monitoring system. Facilities included were Recovery First, Greenhouse, Desert Hope, Forterus, and San Diego Addiction Treatment Center. These facilities are located across the continental United States and are considered to be representative of AAC's offered services and client base. To prepare AAC staff for the adoption of the evaluation system, CRI delivered intensive in-person outcomes monitoring training for staff at each facility to ensure fidelity in the administration and data entry of each of the evaluation tools. Upon arrival at an AAC facility, clients completed a battery of intake assessments with a trained staff member within three calendar days of admission. Clients completed the discharge battery of assessments with a trained AAC staff member within seven days prior to leaving the facility. All tools were embedded into the electronic health record and data collection was integrated into routine clinical workflows. Once a trained staff member completed an assessment, the EHR would automatically score it, which allowed scores to be viewed and integrated into treatment and case management planning by the appropriate staff.

Measures

All clients who entered treatment at the six participating facilities completed a battery of validated assessments that measure key treatment outcomes at intake and discharge. AAC's Clinical Oversight Team, in conjunction with the clinical leadership at each facility and CRI, selected assessment tools that met two criteria: 1) instruments must be validated, reliable tools for measuring change over time in target outcomes, and 2) instruments must provide information to pragmatically support clinical treatment and the development of post-discharge plans. Therefore, each assessment included in the outcome monitoring system is a valid measure of change over time for individual clients, as well as aggregated sample groups. A total of five assessments were selected, summarized in the table on the following page.

Assessment	Justification for Use
<i>Addiction Severity Index (ASI), 5th edition</i>	The ASI is a validated, reliable tool that assesses clients' needs in seven key domains critical to overall quality of life and functioning: Medical, Education/Employment, Alcohol, Drug, Legal, Family/Social, and Psychiatric. The ASI is well aligned with the primary treatment goals of improving client's overall functioning, and serves as the foundation for developing a targeted treatment plan. It is used as AAC's Biopsychosocial assessment tool and measures change over time. Composite scores are calculated for each of the 7 domains with a range of 0 to 1. The composite score is a reflection of severity of the client's problems in each domain; the higher the score, the more severe the problems.
<i>The Advance Warning Signs of Relapse (AWARE)</i>	The AWARE is a validated, reliable tool that is used to predict a client's risk of relapse to heavy drinking in the next two months. AAC chose to utilize the AWARE for all clients for an additional study to examine the predictive ability of the AWARE for substances beyond alcohol. It is a 28-item scale with a score range of 28 to 196; the higher the score, the higher the probability of heavy drug or alcohol use (not just a slip) by the client in the <i>next two months</i> .
<i>The Recovery Capital Scale (RCS)</i>	The RCS is a validated, reliable tool that identifies a client's internal and external assets that support recovery. It provides treatment and case management staff information on individualized and specific areas on which to focus in order to improve recovery supports for each client. It is a 35-item assessment with a score range of 35-175. The higher the score, the higher the clients' recovery capital; the lower the score, the lower the client's recovery capital.
<i>The Family Assessment Device (FAD)</i>	The FAD is a validated, reliable tool that assesses level of dysfunction within a client's family system. It contains a 12 item scale with a range of scores from 1, which is healthy functioning, to 4 which is unhealthy functioning. A score of 2 or above is clinically significant, indicating that family issues should be addressed in treatment.
<i>The Personal Health Questionnaire-9 (PHQ-9)</i>	The PHQ-9 is a validated, reliable tool that assesses a client's level of likelihood of a diagnosis of depression, and therefore a need for further depression diagnostics. It is designed for repeated administration, and provides a snapshot score that indicates if depressive symptomology improves or becomes more severe. It is a 9-item scale with a score range of 0 to 20+; higher scores reflect greater severity of depression symptoms.

Data Analysis

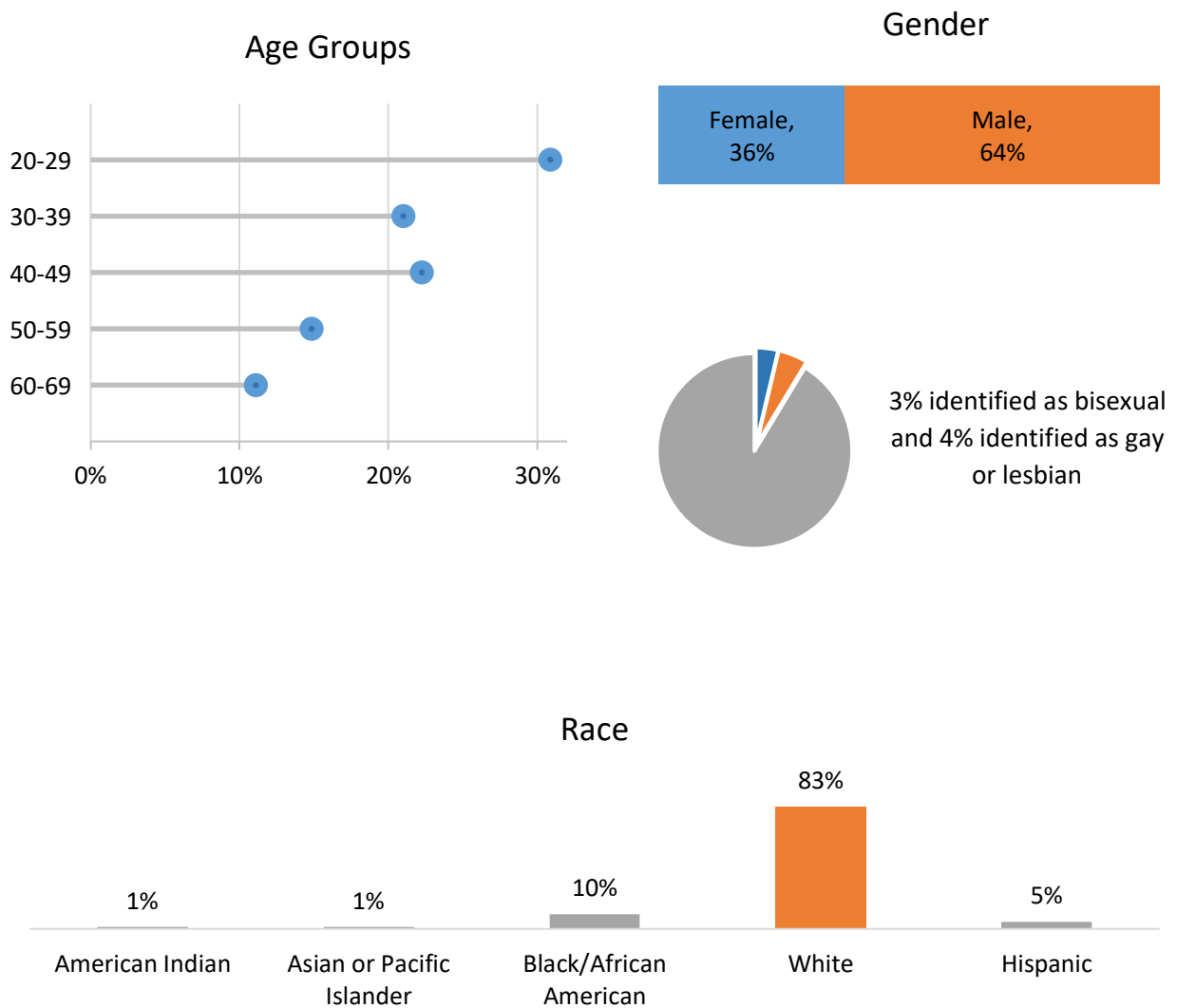
The primary goal of this study was to explore client progress in a variety of functional areas related to recovery from intake to discharge. Therefore, CRI conducted paired *t* tests to assess whether clients' average ASI, PHQ-9, RCS, FAD, and AWARE scores collected at both time points were different to a statistically significant degree. Power analysis for a dependent sample *t*-test was conducted in G*Power to determine a sufficient sample size using an alpha of 0.05, a power of 0.80, a small effect size ($d_z = 0.2$), and two tails (Faul et al., 2013). Based on the aforementioned assumptions, the desired sample size

is 199 for each analysis. Therefore, all analyses within this study were sufficiently powered. In order to account for any outliers, reported significance results were confirmed using nonparametric tests. Data analysts set significance levels for all statistical tests at $p < 0.05$ as a conservative means of detecting differences. In other words, the results from CRI's analyses are very unlikely to be due to chance, but rather due to the treatment provided by AAC.

Results

Characteristics of AAC Clients

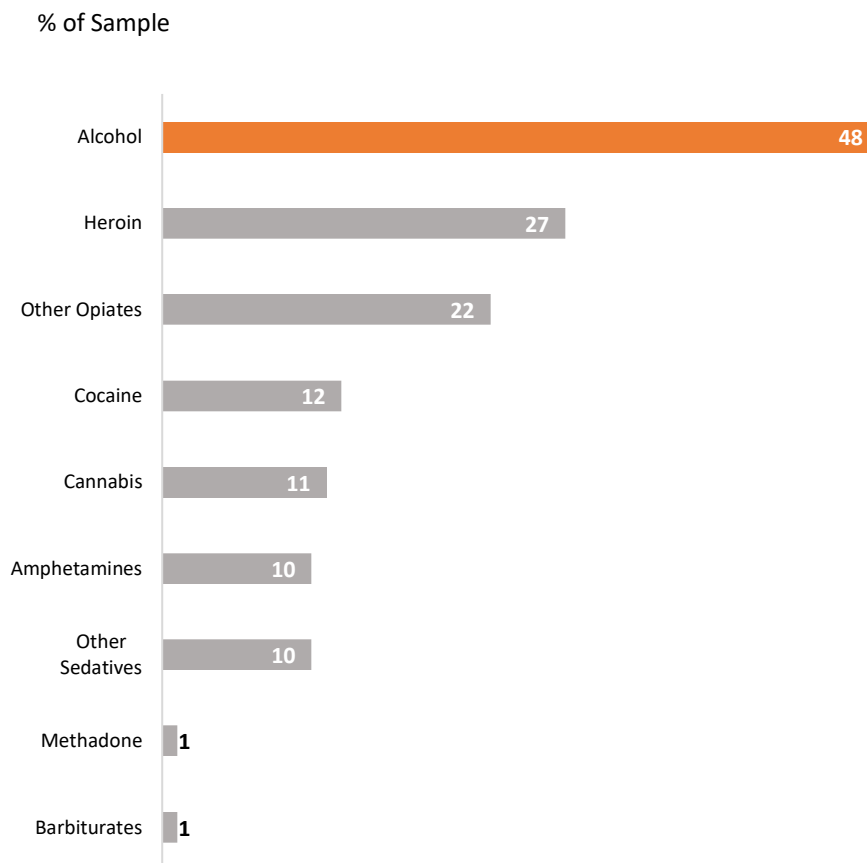
Data from a total of $n = 4,225$ clients were included in this analysis. The majority of clients included in this study identified as male (64%), white (83%) and heterosexual (93%). Most clients also reported ages of 20 to 29, with an average age of $M = 35.5$, $SD = 12.5$ for the total sample.



Clients were also asked to disclose their problem substance during the intake process, and could report more than one substance as their problem substance. Nearly half (48%, n = 2020) reported that alcohol was a problem substance. For comparison, according to the 2015 National Survey on Drug Use and Health, 15.1 million adults ages 18 and older (6.2 percent of this age group) were diagnosed with Alcohol Use Disorder. This includes 9.8 million men (8.4 percent of men in this age group) and 5.3 million women (4.2 percent of women in this age group). The second most common problem substances were heroin (27%, n = 1127) and other opiates or analgesics (22%, n = 924). Of the 20.5 million Americans 12 or older that had a substance use disorder in 2015, 2 million (9.75%) had a substance use disorder involving prescription pain relievers and 591,000 (2.8%) had a substance use disorder involving heroin (American Society of Addiction Medicine, 2016). Most clients (67%, n = 2,756) also reported using more than one substance in the month prior to admission at AAC. Further, a wide majority (78%, n = 3,122) of clients indicated heavy substance use within the month prior to intake, while only 6% (n = 226) were abstinent or reported light use in the month prior to intake.

Average length of stay in days in the sample was $M = 30.91$, $SD = 9.66$.

Problem Substance at Intake



Source: AAC Outcomes Monitoring Study

Intake to Discharge Outcomes

Substance Use

Substance use and recovery were not heavily investigated in this analysis because all clients included in this study were receiving services in an inpatient residential facility where access and resources to substances is forbidden and unavailable at the time of data collection. Theoretically, all participants would show marked levels of abstinence because of lack of access. For information regarding abstinence and substance use 12-months after discharge, please refer to [White Paper #3].

However, AAC did explore the extent to which clients reported having problems related directly to alcohol or drugs as a treatment outcome. To assess this, items from the ASI regarding the number of days clients reported having problems related to alcohol or drugs, as well as the extent to which they reported being bothered by these problems were compared at intake and discharge. For example, clients were asked:

- to report the number of days within the previous 30 in which they experienced problems including craving for alcohol or drugs, withdrawal symptoms, disturbing effects of drug or alcohol intoxication, or wanting to stop and not being able to do so; and
- to rate the extent to which they were bothered by alcohol and drug related problems on a scale of 1 (*not at all*) to 5 (*extremely*).

On average, clients experienced a statistically significant decrease in problem days related to alcohol from intake (M = 11.35, SD = 13.29) to discharge (M = 2.53, SD = 7.58), as well as for drugs from intake (M = 16.37, SD = 13.81) to discharge (M = 3.17, SD = 8.13).

ASI Reported Problem Days (past 30 days)

	Intake		Discharge		<i>t</i>	<i>P value</i>	<i>n</i>	<i>d</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>				
Alcohol Problem Days	11.35	13.29	2.53	7.58	38.763	.000***	3,600	0.82
Drug Problem Days	16.37	13.81	3.17	8.13	56.697	.000***	3,604	1.16

Note. Nonparametric tests were also conducted to account for skew and confirmed the *P value*; *M* = Mean *SD* = Standard Deviation *t* = Paired *t* test *d* = Cohen's *d*; **p* ≤ .05, ****p* ≤ .001



Alcohol problem days reduced from **11** to **3**, a **78%** decrease



Drug problem days reduced from **16** to **3**, an **81%** decrease

The extent to which clients were bothered by these problems also decreased significantly from intake to discharge for both drugs and alcohol. For problems related to alcohol, these data suggest that clients were “considerably” bothered at intake (M = 4.04, SD = 1.27), and “slightly” bothered at discharge (M = 2.25, SD = 1.36). A similar pattern was observed for drugs, with clients reporting being “considerably to

severely” bothered at intake (M = 4.32, SD = 1.04) and “slightly” bothered at discharge (M = 2.34, SD = 1.37).

Recovery Capital

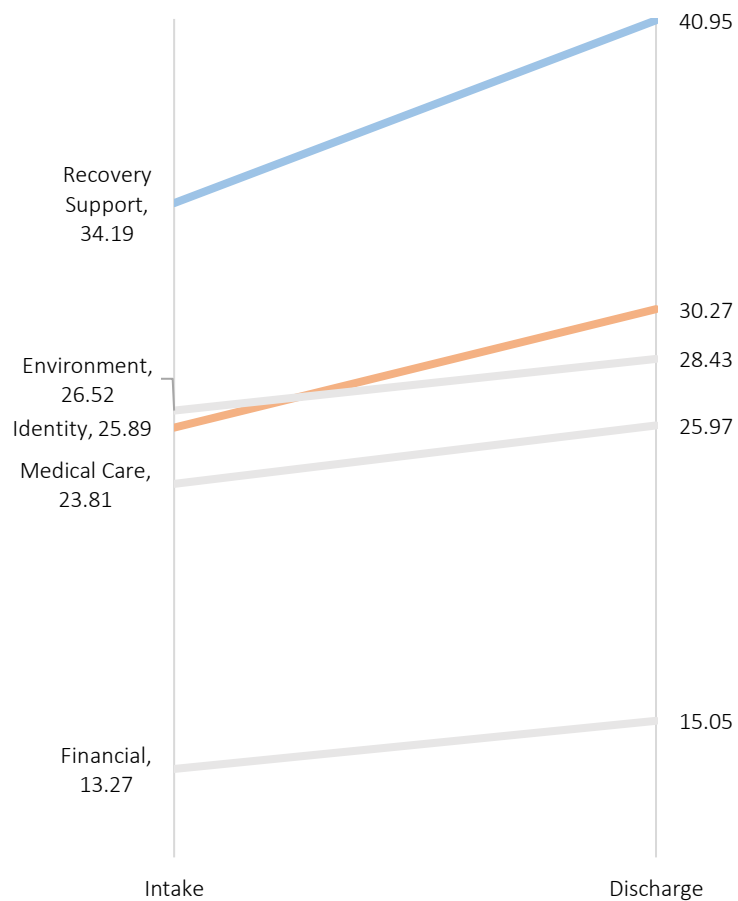
Recovery Capital is a concept defined as “the breadth and depth of internal and external resources that can be drawn upon to initiate and sustain recovery from severe alcohol or drug problems” (White & Cloud, 2008).

To measure this construct, AAC chose to use the Recovery Capital Scale (RCS). Data related to the multidimensional nature of recovery capital were also assessed with the employment and legal subscales within the Addiction Severity Index to supplement outcomes monitoring in this area.

Scores on the Recovery Capital Scale range from 35 to 175. The average intake score of the RCS was M = 121.24, SD = 19.17 (n = 1802), and the average discharge score of the RCS was M = 138.27, SD = 16.22 (n = 1802). This indicates a 17.03 point increase in overall recovery capital from intake to discharge. This change was statistically significant, (t = 37.85, p = .000, d = .96).

The RCS also assesses recovery capital in several unique dimensions (e.g., recovery support, identity, medical care, environment, financial). These subscales were established via a psychometric analysis of the RCS using data also collected in the AAC outcomes recovery system (Holder, Suiter, Berney, & Mathes, unpublished manuscript). All recovery capital areas showed statistically significant improvement from intake to discharge (see table below), with identity and recovery support scores indicating the greatest improvement.

All recovery capital dimensions on the RCS improved from intake to discharge.



Note: RCS Domain Score Ranges: Intake and Discharge, Respectively
 Recovery Support: 11-55
 Identity: 7-35
 Medical Care: 6-30
 Environment: 7-35
 Financial: 4-20

RCS Scores By Domain Intake to Discharge

	Intake		Discharge		<i>t</i>	<i>P value</i>	<i>n</i>	<i>d</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>				
Total Score	121.24	19.17	138.27	16.22	37.85	.000***	1,802	0.96
Recovery Support	34.19	7.72	40.95	6.25	24.77	.000***	954	0.96
Identity	25.89	5.73	30.27	3.93	31.58	.000***	1,731	0.89
Medical Care	23.81	3.90	25.97	3.19	22.70	.000***	1,695	0.61
Environment	26.52	4.97	28.43	4.25	16.07	.000***	1,558	0.41
Financial	13.27	3.91	15.05	3.58	20.19	.000***	1,510	0.48

Note. *M* = Mean *SD* = Standard Deviation *t* = Paired *t* test *d* = Cohen's *d*
 p* ≤ .05, **p* ≤ .001

AAC also utilized the Employment and Legal domains of the ASI to further assess client recovery capital. The average ASI-Employment intake score was *M* = .42, *SD* = .28, and average discharge score *M* = .58, *SD* = .23. The average ASI Legal intake score was *M* = .12, *SD* = .21, and average discharge score was *M* = .7, *SD* = .16. Client composite scores on the Employment domain indicated a statistically significant increase from intake to discharge (see Table 2), indicating a decrease in employment activity. This outcome is reasonable given clients do not work during their residential stay. However, the Legal dimension on the ASI indicated a statistically significant decrease in recovery capital, which indicates improvement on this measure. This outcome most likely is due to AAC's specific attention to addressing legal issues.

ASI Domain Scores Intake to Discharge

	Intake		Discharge		<i>t</i>	<i>P value</i>	<i>n</i>	<i>d</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>				
Employment	0.42	0.28	0.58	0.23	-40.53	.000***	3,573	0.62
Legal	0.12	0.21	0.07	0.16	18.60	.000***	3,301	0.27

Note. Nonparametric tests were also conducted to account for skew and confirmed the *P value*; *M* = Mean *SD* = Standard Deviation *t* = Paired *t* test *d* = Cohen's *d*
 p* ≤ .05, **p* ≤ .001

Risk of Relapse

Identifying risk of relapse for clients in drug and alcohol treatment is an integral step in effective treatment planning and delivery, as well as strategizing ways to meet clients' needs after discharge. Therefore, AAC also incorporated the Assessment of Warning Signs for Relapse (AWARE) into the outcomes monitoring system in order to systematically and intentionally build risk reduction into its treatment model.

At intake, clients' average score on the AWARE was $M = 103.59$, $SD = 27.46$. At discharge, clients' average score was $M = 78.21$, $SD = 12.82$, a 24% decrease in the risk of relapse. The AWARE currently is validated to predict relapse in alcohol use. This change was statistically significant.

AWARE SCORES INTAKE TO DISCHARGE

	Intake		Discharge		<i>t</i>	<i>P value</i>	<i>n</i>	<i>d</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>				
TOTAL SCORE	103.59	27.46	78.21	12.82	47.88	.000***	2,486	1.18

Note. Nonparametric tests were also conducted to account for skew and confirmed the *P value*; *M* = Mean *SD* = Standard Deviation *t* = Paired *t* test *d* = Cohen's *d*


* $p \leq .05$, *** $p \leq .001$

Mental and Emotional Health

AAC facilities are recognized as either Joint Commission or CARF accredited and provide evidence-based mental health services to clients diagnosed with co-occurring disorders. The ability to provide mental health services to this population is essential in effective drug and alcohol treatment programs. According to SAMHSA's 2014 National Survey on Drug Use and Health (NSDUH) approximately 7.9 million adults in the United States had co-occurring disorders. Because of this high prevalence of mental health issues among individuals with addiction disorders, AAC collected outcomes monitoring data on mental health symptomology with the PHQ-9 and the ASI Psychiatric Domain.

The average intake score of the PHQ-9 was $M = 11.53$, $SD = 6.72$ ($n = 1973$), and the average discharge score of the PHQ-9 was $M = 2.43$, $SD = 3.31$ ($n = 1973$). This change was statistically significant, ($t = 56.97$, $p = .000$, $d = 1.92$).

PHQ-9 Intake to Discharge



Clients showed a 9.16 point decrease in depression symptomology. This indicates that clients entered AAC with moderate to moderately high levels of depression symptoms, and left AAC with very low symptoms.

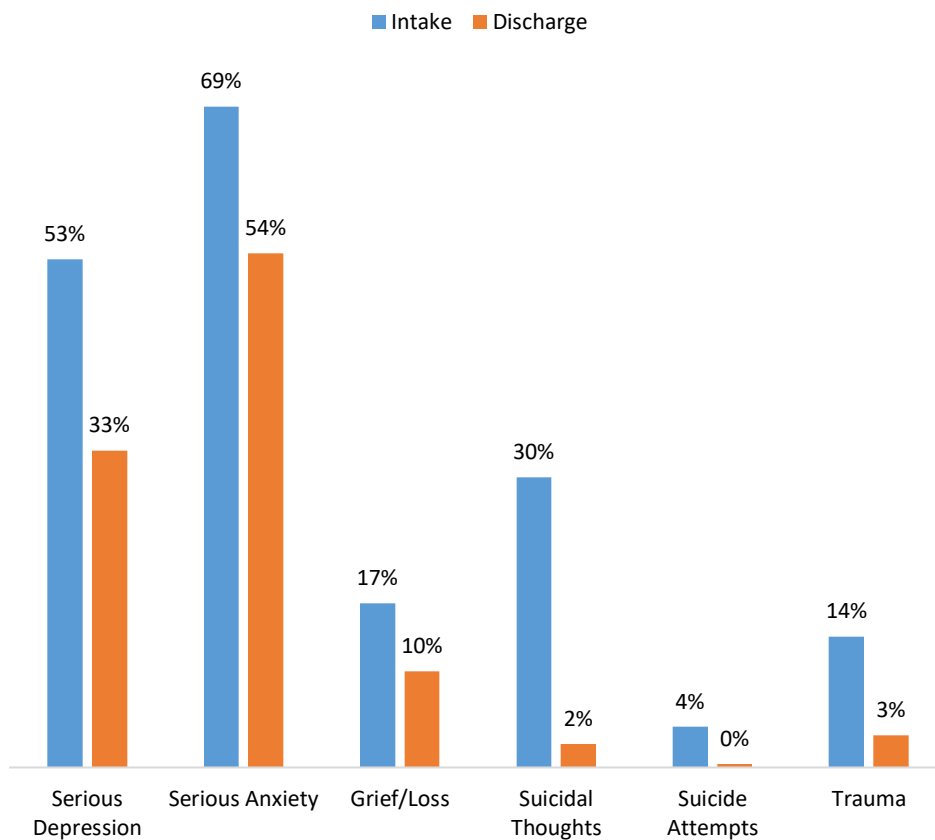
The ASI Psychiatric domain was also used as an indicator to evaluate treatment impact on client mental health. Client scores showed statistically significant improvement from intake to discharge, from $M = .38$, $SD = .22$ at intake to $M = .24$, $SD = .2$ at discharge ($n=3,273$). In addition, AAC collected data related to client anxiety, depression, grief and loss, suicidality (i.e., thoughts, attempts), and trauma. Clients experienced statistically significant improvement in all of these symptoms from intake to discharge. The percentage of clients reporting suicidal thoughts dropped by 93%, and zero clients reported suicide attempts during their treatment.

ASI DOMAIN SCORES INTAKE TO DISCHARGE

	Intake		Discharge		<i>t</i>	<i>P value</i>	<i>n</i>	<i>d</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>				
PSYCHIATRIC	0.38	0.22	0.24	0.20	37.67	.000***	3,273	0.67

NOTE. NONPARAMETRIC TESTS WERE ALSO CONDUCTED TO ACCOUNT FOR SKEW AND CONFIRMED THE *P* VALUE; *M* = MEAN *SD* = STANDARD DEVIATION *T* = PAIRED T TEST *D* = COHEN'S *D* **P* ≤ .05, ****P* ≤ .001

Percentage of Clients Reporting Mental Health Symptoms in Past 30 Days



*All changes significant at *p* ≤ .001

Clients were then asked how many days in the past 30 they experienced any of the mental health symptoms they reported. The average number of days significantly decreased from 17 days at intake to 8 days at discharge, a 53% reduction. The amount that clients were troubled or bothered by these problems reduced by 48% from intake to discharge. These data suggest that clients were “moderately” bothered at intake (*M* = 3.70, *SD* = 1.25), and “slightly” bothered at discharge (*M* = 2.50, *SD* = 1.25).



Psychiatric problem days reduced from 17 to 8, a 53% decrease

Family Functioning

Family members often play a critical role in clients' recovery. As part of AAC's programs, family members are invited to actively engage in treatment by participating in family therapy as well as clients' individual therapy, which often focuses heavily on family dynamics. Family functioning was included as a key construct in the outcomes monitoring system, and was assessed with the Family Assessment Device (FAD) and the ASI Family domain.

At intake, clients average scores on the FAD were $M = 2.24$, $SD = .56$ ($n = 2853$). At discharge, average scores decreased to $M = 2.02$, $SD = .54$. Family functioning showed a statistically significant improvement from intake to discharge. This outcomes suggests that the family focused treatment clients received at AAC improved family dynamics, and continued family counseling and support after completing AAC treatment would further support client recovery.

FAD SCORE INTAKE TO DISCHARGE

	Intake		Discharge		<i>t</i>	<i>P value</i>	<i>n</i>	<i>d</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>				
TOTAL SCORE	2.24	0.56	2.02	0.54	21.64	.000***	2,853	0.40

Note. Nonparametric tests were also conducted to account for skew and confirmed the *P value*; *M* = Mean *SD* = Standard Deviation *t* = Paired *t* test *d* = Cohen's *d*
* $p \leq .05$, *** $p \leq .001$

Clients' scores on the Family domain of the ASI were also compared as a supplemental measure of change in family functioning. These scores also indicated a statistically significant improvement from intake to discharge, with a decrease in the average score at intake of $M = .31$, $SD = .22$, to the average at discharge of $M = .16$, $SD = .17$.

ASI DOMAIN SCORES INTAKE TO DISCHARGE

	Intake		Discharge		<i>t</i>	<i>P value</i>	<i>n</i>	<i>d</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>				
FAMILY	0.31	0.22	0.16	0.17	38.74	.000***	3,107	0.76

Note. Nonparametric tests were also conducted to account for skew and confirmed the *P value*; *M* = Mean *SD* = Standard Deviation *t* = Paired *t* test *d* = Cohen's *d*
* $p \leq .05$, *** $p \leq .001$

Clients were asked about their relationships with family and incidents of conflict. Clients reported significant improvement in their relationships with family from intake to discharge. Specifically, the average number of days of serious conflict with family members decreased from 6 days at intake to 2 days at discharge. The amount that clients were troubled or bothered by these family related problems reduced by 33% by discharge. These data suggest that clients were "moderately" bothered at intake ($M = 3.57$, $SD = 1.29$), and then only "slightly" bothered at discharge ($M = 2.24$, $SD = 1.29$).



Family conflict days reduced from **6** to **2**, an **74%** decrease

Summary

American Addiction Centers facilities are accredited by either The Joint Commission (TJC) or the Commission on Accreditation of Rehabilitation Facilities (CARF), and their techniques and intervention strategies are rooted in scientific research. The company believes that recovery is possible for anyone, that hope is key, and that providing individuals with tools to help them remain clean and sober for life are primary aims of American Addiction Centers treatment.

This strong belief in the philosophy and approach to treatment lead AAC to hire a third-party independent evaluation team in 2015. Evaluators were asked to measure outcomes among clients entering AAC for residential treatment, at discharge from treatment, and at two, six, and twelve months post-discharge intervals. The evaluation was specifically designed to measure critical health and social functioning outcomes that are typically the major reasons for relapse to substance use following treatment (e.g., alcohol use, drug use, mental health symptomatology, lack of family/community recovery support, etc.)¹. Valid and reliable instruments were selected to measure each of these areas of functioning and were collected as a routine part of intake and discharge information gathering. The evaluation team established a call center solely dedicated to tracking and interviewing clients after discharge from treatment so that these same outcomes could be measured over time.

This White Paper represents a sub-study of a larger 3-year evaluation with a specific focus on the immediate impact of AAC treatment client outcomes from intake to discharge. Results from this study suggest AAC's treatment is beneficial for clients on multiple areas of functioning that have been evidenced to be significantly related to relapse prevention, risk reduction, and recovery. Clients' average scores on measures used in this study indicated statistically significant improvement in recovery capital, risk of relapse, mental health, and family functioning. Subsequent White Papers in this series will reflect the findings of the comprehensive 3-year evaluation, and will build upon the current findings by exploring the impact of these holistic health domains on long-term recovery.

¹ McLellan AT, Alterman AI, Metzger DS, et al. (1994). Similarity of outcome predictors across opiate, cocaine, and alcohol treatments: role of treatment services. *Journal of Consulting Clinical Psychology*, (62), 1141-1158.