

TECHNICAL REPORT

Summary Findings for Research Component R2:

*Substance Abuse, Co-existing Disability, and Vocational Rehabilitation:
Influences of Specialized Rehabilitation Programs on Employment
Outcomes*

Single-Site CAM Program Evaluation (Only)

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on
Drugs and Disability**

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RESEARCH COMPONENT R2: Substance Abuse, Co-existing Disability, and Vocational Rehabilitation: Influences of Specialized Rehabilitation Programs on Employment Outcomes

INTRODUCTION

Background

The high prevalence of substance use/abuse among persons with disabilities has been shown to be a particular problem for vocational rehabilitation services. For example, results from several studies suggest that as much as 20% of the population qualifying for state vocational rehabilitation services may be diagnosed as positive for substance abuse (Moore, Greer, and Li, 1994; Moore and Li, 1994a; Moore and Li, 1997; Schwab and DiNitto, 1993). Furthermore, results from an epidemiological survey involving three Midwest states suggest that 25% of individuals receiving VR services experienced substance abuse problems, most of which were unknown to the individuals' VR counselors (RRTC, 1996). In addition, a recent study based on consumers served by the Ohio Rehabilitation Services Commission found that 10.6% of respondents reporting binge drinking within the past year, 12.4% reported illicit drug use in the past 12 months, and 24% scored seven or higher on the Short MAST, strongly indicative of substance dependence or recurring abuse (RRTC, 1996).

Substance abuse problems that are not addressed may seriously jeopardize the VR process, especially with regard to achieving successful outcomes. Specifically, untreated substance abuse has been shown to be associated with:

- Decreased likelihood of successful completion of VR goals (Corrigan, Lamb-Hart, and Rust, 1995; Moore and Li, 1994a; Worrel and Vandergoot, 1982).
- Increased incidence of work-related problems, including lateness, absenteeism, and working while under the influence of substances (Siegal et al., 1996; Moore and Li, 1994b).
- Decreased likelihood of maintaining a job placement (Moore and Li, 1994a).
- Increased occurrence of legal difficulties and housing instability/homelessness (RRTC, 1996b).
- Liabilities to cognitive deficits that interfere with the VR process (Corrigan, et al, 1995; RRTC, 1996b).

While some VR service providers will refuse to assist consumers who have an alcohol or other drug (AOD) problem until they have demonstrated a protracted period of sobriety, there is a growing body of research suggesting that when substance abuse and VR services are provided in a simultaneous, coordinated, and seamless manner, each supports the other (Corrigan, Lamb-Hart, and Rust, 1995; Corrigan, Rust, and Lamb-Hart, 1995; Drake, Teague, and Warren, 1990; RRTC, 1996b; Siegal et al., 1996). Also, for consumers with substance abuse and TBI, VR outcomes may be improved by the inclusion of within program VR services rather than solely relying on state counselors and systems. Preliminary outcome studies suggest that consumers find work earlier and maintain higher levels of employment or income when VR services are delivered directly at the treatment program site (Mowbray et al., 1994; Dennis et al., 1993; Drake et al., 1993).

Despite the positive outcomes alluded to above, many state VR systems are hesitant to fund case management or other “costly” programs because they are not perceived as positively cost-beneficial (French et al., 1994). Administrative and legislative mandates to serve the most severely disabled, however, will require that case management services be increasingly available, at least for the most needy populations (Siegal et al., 1996). We suspect that, despite reticence to fund highly specialized programs, positive socioeconomic results will in fact be recoverable when such services are provided to the most severely disabled.

One approach to addressing co-existing chemical dependence and physical disabilities is the specialty program focused solely on a specific population. Examples of substance abuse and mental health programs include club house services, wrap-around services, and intensive case management models. Willenbring (1994) notes their applicability to groups that are less responsive to conventional treatment, including those with more severe dependence, co-existing health service needs, severe disability in multiple areas of life functioning, more chronic conditions, and limited socioeconomic resources. Treatment solutions for such persons are complicated by an evolving health care climate where declining service availability and changes in capitation further attenuate viable treatment options. These health care changes may make cooperative use of centralized case management clinically necessary.

A model of the type alluded to above, which is targeted toward the needs of persons with substance abuse and TBI, was developed at Ohio State University by Dr. John Corrigan. That model espouses intensive case management, extensive client participation in rehabilitation

planning, and integration with existing community services (Corrigan, Lamb-Hart, and Rust, 1995; Corrigan, Rust, and Lamb-Hart, 1995). The program utilizes intensive, specialized case management to coordinate treatment teams that ultimately provide individuals with an array of services that include substance abuse treatment, VR, family education, long-term rehabilitation planning, and other social services. The TBI Network incorporates a strong consumer empowerment orientation, along with the fundamental principles of community integration and involvement, which appears to be especially promising. Influenced by the work of Dr. Corrigan, the RRTC on Drugs and Disability established the Consumer Advocacy Model (CAM) Program at Miami Valley Hospital in Dayton, Ohio in 1994. The CAM program was initiated to serve persons with traumatic brain injuries as well as other, severe disabilities co-existing with substance dependence.

Problem and Related Purpose

The current research component, referred to as **R2**, was developed out of a recognized need for appropriate and accessible services for individuals with disabilities who also have a co-existing substance abuse problem. These individuals typically require multiple, concurrent services including vocational rehabilitation, substance abuse treatment, housing, medical care, mental health services, and so on. Few models exist for providing these services in a seamless manner. Furthermore, those that do exist must be better evaluated so that the nature, kind, amount, and duration of services they afford can be better tailored to consumer profiles. Operationally, this overall research effort was defined by two sub-components: a multi-site comparison study and single-site program evaluation study. Results from both the multi- and single-site components, were seen as shedding light on the nature and extent of the relationship between substance abuse treatment, VR services, and employment, as well as the cost-effectiveness of these services. (NOTE: Although the description of R2 provided below deals with both the multi- and single-site studies, the current document focuses on results from the single-site program evaluation study. Results of the multi-site component are reported in a number of other documents, e.g., Heinemann, Corrigan, & Moore (2000a & b).)

During the multi-site study, research subjects were recruited from three collaborating sites, the Rehabilitation Institute of Chicago (RIC, which employs an outpatient rehabilitation services model (and served as the “control” site)), the TBI Network at Ohio State University (which

employs an intensive, coordinated service delivery model), and the CAM program operated by SARDI at Wright State University (which employs a less intense, but coordinated service delivery model). Subjects involved in this multi-site sub-component were all consumers with TBI. They each completed a comprehensive baseline assessment prior to receiving any program services and then participated in follow-up assessments at 9 and 24 months post-baseline. The objectives of this “quasi-experimental non-equivalent control group” study were: (a) to evaluate the effects of vocational rehabilitation services, both alone and as a coordinated package (e.g., CAM), on substance abuse and employment outcomes, (b) to investigate how these outcomes are affected by both treatment-centered (type, number, location, and duration of VR services) and patient-centered variables (type of disability), and (c) to explore the cost-benefits of concurrently providing multiple substance abuse, VR, and other services.

The second, single-site component of the **R2** effort involved continuation of the development and refinement of the Consumer Advocacy Model (CAM), which is operated and staffed by the WSU SARDI Program. Although models of treatment for persons who are chemically dependent and experience traumatic brain injuries or mental illness have been elaborated in several settings, there are virtually no approaches with proven efficacy for vocational preparation of persons with other, severe cognitive or physical disabilities and accompanying substance dependence. The expansion of CAM services to serve persons with disabilities other than TBI makes it possible to study the differential impact of this program on persons with other disabilities. It is postulated that since TBI is considered to be one of the most clinically challenging disabilities, persons with other physical disabilities will experience even greater benefits from participation in CAM. This component served as a next step in refinement and assessment of the CAM Program for the expanded population of persons with disabilities and co-existing substance abuse problems.

Hypotheses

The multi-site component of **R2** involved comparing outcomes across RIC, the TBI Network, and CAM. The specific hypotheses addressed as part of this component were as follows:

- 1a. Consumers who receive VR services will achieve more successful substance use reduction and employment outcomes than those who receive no vocational services at all, when severity of disabilities is controlled.

- 2a. Consumers who receive vocational rehabilitation services from on-site VR counselors are more likely to be successful in attaining employment than those who receive traditional VR services provided only through state VR systems.
- 3a. Multiple and concurrent provision of VR and substance abuse services will improve employment and substance use outcomes, and this will be mediated by the degree to which services are integrated within a single service delivery site.
- 4a. The latency to competitive employment will be cost effective for within program VR services compared with state or community-based VR services.

The single-site component of the **R2** project, which is the focus of this report, takes advantage of the CAM program evaluation begun in 1994, by continuing to evaluate the efficacy of that model. The specific hypotheses raised relative to the CAM evaluation were as follows:

- 1b. CAM consumers who complete Aware I and II, when designated on their treatment plans, will show more favorable outcomes relative to substance use reduction, employment, human community integration, and perceived well-being than non-completers.
- 2b. Consumers with severe disabilities other than TBI will achieve greater outcomes in CAM than consumers with TBI.
- 3b. Multiple services delivered at the same physical site will have greater impact than services delivered at multiple sites.

METHODS

As indicated earlier, the basic design underlying the multi-site study was a quasi-experimental, non-equivalent control group design, where the participants served by the Rehabilitation Institute of Chicago were denoted as the control group. On the other hand, the single-site study, which focused on the in-depth evaluation of the CAM Program, was based on a single group, longitudinal design.

Participants in the Study

Subjects in the multi-site study had to meet these eligibility criteria: 1) aged 18 years or older, 2) current substance abuse, and 3) a documented traumatic brain injury. At the same time,

exclusion criteria across all three sites included refusal to participate or active, unmanaged psychosis. Given these various criteria and ongoing referral rates at each site at the time the study was initiated, it was estimated that during the study period roughly 380 referrals per year would meet the eligibility requirements for the study (80 at CAM [TBI only], 200 at TBI Network, and 100 at RIC). Of these, it was anticipated that 190 would be eligible and willing to participate (refusal rate of approximately 50%; 40 at CAM, 100 at TBI Network, 50 at RIC). In fact, a total of 319 individuals participated in the multi-site study. That total represented 73% of the census of TBI consumers across the cooperating sites during the time period covered by the study.

The criteria for inclusion in the CAM single site study were more expansive. Subjects in the CAM single-site study had to meet the following eligibility criteria: 1) aged 16 years or older, 2) current substance abuse, and 3) disability that constitutes or results in a substantial impediment to employment and/or independent living. CAM receives referrals from both hospital and community sources (e.g., VR- BVR, BSVI, Crisis Care, Goodwill, and the court system). Of these it was estimated that approximately 95 percent would meet study eligibility criteria and agree to participate. In fact, to date a total of more than 600 consumers were identified and included in the single-site study.

Assurance of Human Subjects Protection. The SARDI Program, along with the cooperating TBI Network and RIC units, have a great deal of experience in addressing human subjects concerns. Our procedures are standardized across populations and are reviewed by the WSU Human Subjects Committee and comparable Institutional Review Boards (IRBs) at all cooperating research sites. The data collection protocol for this study, including all instruments and informed consents, was approved by the WSU Human Subjects Committee and the IRBs from each of the other participating agencies before any data collection activities began. Participants in the study were protected in several ways. For example, potential participants were informed that the study was being conducted independently and that refusal to participate would not affect services provided to them in any way. All subjects signed a written informed consent form and were provided with a copy. Questionnaires and other instruments contained no personal identifiers, with the exception of a numeric ID code that referred back to the informed consents. The informed consents at each site were maintained in a separate, locked file away from completed study instruments. All results have been analyzed and reported only in aggregate

form and participating agencies were not able to access individual data. Consumer requests for results of the study were provided via an abstract describing group results. All respondents were provided with the names, addresses, and telephone numbers of the Principle Investigators. Finally, all personal interviews were conducted in private locations.

Instrumentation

During intake interviews conducted for both the multi-site and single-site components a number of instruments were utilized. Those included the following:

- *Addiction Severity Index* (ASI; McLellan et al., 1980), a comprehensive clinical/research instrument used to assess problems across seven life areas: medical, employment/education, alcohol use, drug use, legal, family/social, and psychiatric. Composite scores in these areas are used as repeated measures to indicate change in problem severity over time (e.g., pre- to post-treatment). Previous research has shown the ASI to be reliable and valid (Kosten, et al., 1983; McDermott, et al., 1996; McLellan, et al., 1980; McLellan, et al., 1985).
- *Michigan Alcoholism Screening Test* (MAST; Selzer 1971) is a 25-item self-report instrument designed as a screen for alcoholism. Several investigations have demonstrated acceptable reliability and validity for the MAST (e.g., Gibbs, 1983; Magruder-Habib, Stevens, and Alling, 1993; Storgaard, Nielsen, and Gluud, 1994).
- *Biographical Questionnaire* (Heinemann, et al., 1991) was developed to assess various demographic and disability factors. Included is a section on brain injury that probes for information on injury severity and substance use at the time of injury. Data on medical problems, vocational status, and disability-related employment barriers are also gathered.
- *Social Position Index* (SPI; Hollingshead and Redlich, 1958) was used to characterize socioeconomic status across eight categories that range from higher executives and major professionals to students, homemakers, and unemployed persons who comprise the eighth category.
- *The Employability Rating Scale* (ERS; Ben-Yishay et al., 1987) is a 10 point scale used to rate level of productivity from "not active in VR services or being evaluated" to "full or part-time competitive," which considers the nature and skill level involved with employment.
- *Community Integration Questionnaire* (CIQ; Willer et al., 1993) is a 15-item self-report questionnaire that measures current level of integration within the community. Three

subscales have been derived: Home Integration, Social Integration, and Productivity. Test-retest reliability and concurrent validity are both acceptable (Willer et al., 1993).

- *Satisfaction with Life Scale* (SWLS; Diener et al., 1985) is a five-item self-report scale that has respondents indicate degree of agreement with five statements regarding satisfaction with their lives. It has been shown to be both reliable and valid (Pavot and Diener, 1993).
- *Family Satisfaction Scale* (FSS; Carver and Jones, 1992) is a 14-item self-report instrument that appraises a person's degree of satisfaction with family functioning, relationships, and support. Carver and Jones (1992) found evidence for construct validity of the FSS.
- *Neurobehavioral Cognitive Status Exam* (Cognistat; Northern California Neurobehavioral Group 1988) is a screening device that provides standardized scores on ten dimensions of cognitive functioning. Kiernan et al. (1987) found evidence for concurrent validity when compared to the Mini-Mental Status Exam (MMSE; Folstein, Folstein, and McHugh, 1975); and predictive validity has been reported to exceed that for the MMSE (Starrat, Fields, and Fishman, 1992). Englehart, Eisenstein, and Meininger (1994) found that the Cognistat was a valid screening device for both geriatric and non-geriatric adults with brain injury.
- *VR Case Management Tracking Form* (developed by study staff) This instrument details all contacts that the on-site VR counselor has with or on behalf of clients. These contacts include not only individual and group counseling, but also VR-specific case management, job support, and other individualized services.

During the follow-up interviews, only a relatively small subset of the items included in this initial comprehensive assessment were asked. In keeping with the orientation of the project with regard to assessing the effects of treatment on employment outcomes, the following areas were covered during these 9 and 24 month follow-up sessions: satisfaction with life, satisfaction with family, community integration, general health issues including admittances to the hospital, current substance use, legal status, jobs held and employment history over the past 9 months, and living arrangements.

Copies of the different instruments used during the studies conducted under the **R2** component are provided in Appendices A through D.

Procedures

Data collection as part of both the multi- and single-site studies began in 1998. The data collection for the multi-site study continued for 4 years, with the final follow-up interviews being completed in the summer of 2001. The single-site data collection activities are still underway - they represent an ongoing part of the overall evaluative and quality assurance aspects of the CAM model.

Data Collection Strategy. All consumers, both those in the multi-site and single-site components, participated in an assessment interview at intake. That interview was used to gather baseline data on demographics, disability characteristics, cognitive functioning, substance use, employment history, health status, quality of life, and services utilization. Follow-up assessment interviews were conducted at 9 and 24 months post-intake. Data gathered via the assessment interviews was supplemented with Activity Logs (i.e., “service tickets” describing the specific nature and timing of the services provided the different consumers - see Appendix E) and information from existing records and client databases (principally, referral forms, intake forms, and closure forms). Due to CDC funding being awarded to RIC prior to initiation of **R2**, extensive protocols and compatible databases already existed at the three sites, thereby greatly facilitating data collection, staff understanding of research protocols, and data analyses.

Data collection at CAM and the TBI Network was completed by Master’s level program clinicians. At RIC, research assistants were used to collect the required data. These assistants were selected based on three characteristics: (1) psychology, social science, medical or nursing student with at least one year of post-baccalaureate experience and either (2) experience working with brain injury or cognitively impaired populations, or (3) experience working with clients in alcohol abuse settings. All personnel, whether clinical or research staff, had a minimum of one month of training for interviews, practice interviews, and individual supervision of interviewing techniques. The interviewer training at all sites consisted of formal protocol training, instrument training, mock interviews, and routine monitoring. In addition, a mid-study reliability check was conducted for all interviewers.

Analysis Plan. For the multi-site component, error plots were generated to evaluate skews and other limitations in the data. Descriptive analyses were used to examine fundamental differences between and among individual site variables. Analysis of variance (ANOVA) techniques (e.g., mixed-model ANOVA’s) were employed to compare group means on selected

variables such as the ASI, ERS, CIQ, SWLS, and FSS (see descriptions of the project Instrumentation provided earlier. The associated F-tests were used to examine differences across repeated measures among groups of consumers, by type and extent of disability, gender, race, and nature of services provided. These comparisons were conducted within each sample as well as between sites. Longitudinal follow-up data were addressed through multivariate analysis of variance (MANOVA) to allow for the evaluation of differences across multiple dependent variables. Multiple regression analyses (OLS and Logistic) for both within site and cross site data, and related regression coefficients were estimated for each independent variable in order to control for mediating factors such as demographics, substance use severity, disability severity, and initial employability rating.

The assessment of the single-site data involved both simple descriptive statistics and the use of ANOVA techniques that allowed for the analysis of the criterion data (e.g., employment outcomes) over time as well as across different subgroups of Program consumers (e.g., TBI vs. Mentally Ill vs. Other Consumers). Chi-Square statistics and selected rank tests (e.g., the Wilcoxon and Kruskal-Wallis Tests) were used to assess changes across time for criteria that were non-metric in nature or failed to meet the normality assumption underlying traditional ANOVA techniques..

Overview of Progress, Problems Encountered, Changes Made. As of this time the initial sub-component, the multi-site study, has basically been completed. A final technical report has been developed based on the initial and 9-month follow-up data. Completion of the final analyses incorporating the 24-month follow-up data has occurred and another report developed. In addition, a journal article has been submitted and at least one other is currently under production. During the course of this component of the **R2** effort several technical issues arose, primarily issues related to data definitions and comparability across sites and having the database software “communicate” properly. These concerns were typically resolved rather quickly and the study was completed on schedule.

The more in-depth, single-site (CAM) study is an ongoing effort and related data collection is continuing. At different intervals “snapshots” of the data have been taken and related analyses completed. The last such comprehensive analysis was completed during the spring of year 4 and the results were summarized in a formal presentation at the American Psychological Association Convention. During the RRTC’s fifth fiscal year, additional snapshots were taken and related

analyses completed. The associated results have been and will be further disseminated via presentations at professional gatherings, development of the current technical report, and preparation of related journal articles. Generally speaking, this component of **R2** proceeded in accordance with the schedule anticipated in the original proposed “Research Plan Timelines”. Several basic problems encountered have been the time required to administer the initial intake assessments, managing the large mass of data resulting from that effort, and the response rates obtained during the two follow-ups. We are currently finalizing a computer-based administration process, which has considerable potential for helping to alleviate the first two of these problems. In addition, we are exploring the possibility of (a) changing our follow-up process to include an immediate post-closure follow-up and (b) initiating periodic post closure contacts, which should help improve the linkages we maintain with consumers once they exit the CAM Program. Such improved linkages are crucial if we are to reduce the “loss to follow-up” experienced to date..

Basic Limitations. The procedures followed in implementing both studies under the **R2** Component have led to a number of limitations in the resulting data. For one thing, the quasi-experimental, multi-site study represents at best a first step in evaluating within program VR efficacy for the population of persons with a disability and co-existing AOD problem. This type of design was deemed appropriate given the status of the literature and our limited ability to randomly assign consumers to treatments. Consequently the internal validity of the study is a concern, which is a limitation common to most substance abuse treatment research. In contrast, the external validity of this design is quite good - any observed effects may well be found in real-world settings and should, therefore, be amenable to being generalized to other programs serving the same population, except for any limitations associated with nonrandom site selection. At the same time, the single-site study design is very limiting and “suffers” from a number of potential threats regarding both its internal and external validity. In addition, both the multi- and single-site studies are confronted by potential problems associated with collecting and aggregating data from multiple, external sources, the lack of client candor in reporting requested information, cognitive deficits that mitigate against reliable reporting by respondents, and the significant “loss to follow-up” that was experienced.

RESULTS

As pointed out earlier (and in the project title), the findings reported in this section are based on analyses of the data generated over the last five years as part of the single-site evaluation of the CAM Program. (**NOTE:** The results for the multi-site study were completed earlier and are reported elsewhere - see related citations listed at the end of the first paragraph of the section entitled, **Problem and Related Purpose**.) The total number of consumers who provided the requisite data for this portion of the study was 648. Related findings are grouped into the following four areas:

- **Sample Description**
- **Hypothesis 1:** CAM consumers who complete Aware I and II, when designated on their treatment plans, will show more favorable outcomes relative to substance use reduction, employment, human community integration, and perceived well-being than non-completers.
- **Hypothesis 2:** Consumers with severe disabilities other than TBI will achieve greater outcomes in CAM than consumers with TBI.
- **Hypothesis 3:** Multiple services delivered at the same physical site will have greater impact than services delivered at multiple sites.

Sample Description

As noted above, the data used to address the hypotheses posited for the single-site study completed via **R2** were based upon data secured from 648 CAM consumers who received at least one service from CAM personnel. Summaries of (a) several demographic characteristics and (b) several disability attributes of those consumers are provided in Tables 1 and 2, respectively.

The results presented in Table 1 indicate the following:

- the vast majority of CAM's consumers, 76%, are males, while only 24% are females
- most CAM consumers are either Caucasian (58%) or African-American (41%)
- the consumers average about 39 years of age, with over 1/5 of them being under 30 and 1/10 being 51 or older
- only 16% of the consumers are married or cohabitating, while almost half are single and just over a third are divorced/separated/widowed

Table 1
Selected Demographic/Background Characteristics of Consumers* Served by CAM
Since 10/1997

CHARACTERISTIC	RELATED CATEGORIES	PERCENTAGES
- Gender	Females	24.4%
	Males	75.6%
- Ethnicity	Caucasian	57.9%
	African-American	40.8%
	Other Minority	1.3%
- Age (by Category)	30 or Younger	21.3%
	31 to 35 Years Old	12.3%
	36 to 40 Years Old	18.7%
	40 to 45 Years Old	19.4%
	46 to 50 Years Old	17.2%
	51 or Older	11.1%
	(Average Age)	(39.1 Years)
- Marital Status	Single/Never Married	47.5%
	Divorced/Separated/Widowed	36.4%
	Married/Remarried/Cohabiting	16.1%
- Have Children?	Yes	35%
	No	65%
- Education Level	Less than 12 th Grade	47%
	12 th Grade or GED	34%
	More than 12 th Grade	19%
- Living Arrangements (at time of admission)	Own Place (Home, apartment, etc.)	42.1%
	Friend's Home	9.5%
	Relative's Home	30.8%
	Supervised Setting (including Crisis Res.)	5.8%
	Homeless	5.6%
	Other Arrangements (e.g., Jail, MH Inst.)	6.1%
- Employment Status	Employed	19.7
	Unemployed (Seeking)	44.1
	Not in the Labor Force	36.2
- Monthly Income	\$0 (No Income)	41.9%
	\$1 to \$250	4.7%
	\$251 to \$500	14.5%
	\$501 to \$750	25.2%
	\$751 to \$1,000	7.4%
	Over \$1,000	6.3%
	(Average Monthly Income)	(\$351.06)
- Veterans Status	Yes	1.0%
	No	99.0%

* Maximum n (i.e., assuming no missing data on a variable of interest) would be 648 for the period covered.

Table 2
Summary Description of Disabilities at Admission for CAM Consumers Since 10/97

VARIABLE	DESCRIPTION	RELATED PERCENTAGES
Substance-Related Prevalence Estimates	Alcohol - Past Month	47.4% (57.7%)*
	- Lifetime	75.8% (85.7%)*
	Other Drugs - Past Month	38.5% (9.2%)*
	- Lifetime	69.2% (42.1%)*
Self-Reported Substance-Related Problems	No Substance Problems	27.3%
	Alcohol-Related Problems	19.7%
	Drug-Related Problems	11.4%
	Alcohol & Drug Related Problems	41.6%
Interviewers' Assessments of Substance-Related Problems	No Substance Problems	5.4%
	Alcohol-Related Problems	21.2%
	Drug-Related Problems	13.3%
	Alcohol & Drug Related Problems	60.2%
Substance of Preference?	No Drug Preferred	3.5%
	Alcohol	46.9%
	Cannabis	15.6%
	Cocaine	17.8%
	Heroin	3.1%
	Another drug	2.6%
	Multi-Substance (May Be Alcohol)	10.4%
Membership in Special Populations**	Alcohol/Other Drug Abuse	93.0% (15.8%)*
	Severely Mentally Disabled	12.2%
	Developmentally Disabled	9.1%
	Mentally Ill/Mentally Retarded	10.2%
	Deaf or Hearing Impaired	2.7%
	Blind or Visually Impaired	8.4%
	Physically Disabled	24.3%
	Speech Impaired	1.6%
	HIV or AIDS	1.1%
	Disabled (general category used till 7/1/00)	54.9%
Suicidal	9.7%	
Experience with Victimization and/or Domestic Violence**	Sexual Abuse Victim	16.3%
	Physical Abuse Victim	20.0%
	Involved in Domestic Violence	20.6%
Experienced a TBI?	Yes	38.3% (8.7%)*
	No	61.7%

* The percentages shown for comparison purposes in parentheses were taken from the National Household Survey on Drug Abuse (SAHMSA, 1999) - those percentages are for a nationally representative sample from the population of persons age 18 and older, which would be comparable in age to the sample of 648 CAM consumers.

** Consumers could self designate themselves as falling into more than one category.

*** Numbers in parentheses indicate primary + secondary disability estimates from 1998 RSA911 Data.

- about 2/3 of the consumers have no dependent children under the age of 18
- almost ¾ of all the consumers either live in their own place or with relatives, while about 6% report being homeless
- roughly 1/5 of the consumers report being employed (full-time, part-time, or in a sheltered setting), while just over 2/5 report being unemployed and the remainder are not in the labor force (e.g., homemakers, students, or inmates)
- approximately 42% of the consumers report having no monthly income and another 40% report having an income between \$251 and \$750 per month, i.e., \$3,012 to \$9,000 per year, both of which are well below the poverty level
- very few consumers (only 1%) indicated that they were veterans.

Thus, based upon these data one could characterize the modal CAM client as being a single, Caucasian or African-American male, who is about 40 years old, lives either by himself or with relatives, is unemployed, and has no income at the time of admission into the Program.

The results presented in Table 2 are even much more “telling” in regard to the unique nature of those served by the CAM Program. That information clearly documents that Program clients typically have a substance problem (90% or more), especially a problem involving illegal drugs, along with an associated disability (e.g., 38% have experienced a TBI, which represents a prevalence rate almost 4.4 time greater than the rate for the population of VR consumers nationwide; and over a fifth have been sexually or physically abused). Based on these data it is quite obvious the CAM Program is focused exclusively upon serving clients with a disability and co-existing substance abuse problem.

Given the fact that the consumers described in Tables 1 and 2 have been involved in the CAM Program over a period of almost 5 years, it seemed worthwhile to raise the question, “Have the consumers served by CAM changed over the last 5 years?” In order to address that question, a series of Chi-Square analyses involving a subset of the variables included in Tables 1 and 2 was undertaken. (NOTE: In order to help control the overall α -level across the indicated set of analyses so it was less than .10, the per variable α -level was set at .01.) The results of those analyses are summarized in Table 3.

Overall, the limited set of results provided in Table 3 indicates that while the CAM consumers served over the past five years are basically quite similar year-to-year, they did differ somewhat. Those differences primarily dealt with education level and TBI status. That is, (a)

Table 3
Selected Background/Demographic Characteristics of CAM Consumers in the Last 5 Years

CHARACTERISTIC	CATEGORIES	%AGE OF ADMITS PER YEAR*					OVERALL STATISTIC	TEST STATISTIC
		1997	1998	1999	2000	2001		
Gender	Male	84	82	77	77	77	78.1%	$X^2 = 1.79$ ($p = .775$)
	Female	16	18	23	23	23	21.9%	
Race	Caucasian	66	55	58	56	60	58.2%	$X^2 = 8.62$ ($p = .375$)
	African-American	31	44	38	42	40	40.2%	
	Other Minority	3	1	4	2	0	1.6%	
Education Level	Less than 12 th Grade	25	38	42	53	49	45.5%	$X^2 = 21.68$ ($p = .006$)
	12 th Grade or GED	59	38	32	32	39	36.5%	
	More than HS or GED	16	24	26	15	12	18.0%	
Marital Status	Single/Never Married	41	48	41	47	53	47.4%	$X^2 = 7.73$ ($p = .460$)
	Divorced/Separated/Widowed	47	32	45	35	33	36.5%	
	Married/Cohabiting	12	20	14	18	14	16.1%	
Employment Status	Employed Full-Time	12	11	8	12	8	9.9%	$X^2 = 16.23$ ($p = .44$)
	Employed Part-Time	3	13	14	8	9	10.1%	
	Not Working - Looking	34	33	26	38	38	34.5%	
	Not Working - Not Looking	38	35	38	28	27	31.3%	
	Other Status	13	8	14	14	18	14.2%	
TBI Status	No TBI	19	62	64	64	66	61.3%	$X^2 = 26.27$ ($p = .000$)
	Yes, Had a TBI	81	38	36	36	34	38.7%	
Used Alcohol in Past 30 Days	No	58	48	59	47	57	52.8%	$X^2 = 5.49$ ($p = .240$)
	Yes	42	52	41	53	43	47.2%	
Used Alcohol During Lifetime	No	7	21	28	30	22	24.2%	$X^2 = 8.71$ ($p = .069$)
	Yes	93	79	72	70	78	75.8%	
Used Illegal Drugs in Past 30 Days	No	71	64	66	64	54	61.7%	$X^2 = 5.95$ ($p = .203$)
	Yes	29	36	34	36	46	38.3%	
Used Illegal Drugs During Lifetime	No	26	29	34	32	29	30.7%	$X^2 = 1.25$ ($p = .870$)
	Yes	74	71	66	68	71	69.3%	

* The usable n's for the analyses in this table are 32, 92, 96, 136, and 142, respectively.

over the five years covered the education level of those being served has decreased and (b) while consumers with a TBI were the majority of those being served near the initiation of the Program in 1997 (81%), in each of the subsequent years they accounted for roughly about 35% to 36% of the CAM clientele. At the same time there were no major shifts observed in Consumers' gender, race, marital status, substance usage, etc. While this set of analyses was not exhaustive in regard to all the background/demographic variables that could have been considered, it suggests that while the general conclusions reached earlier based on Tables 1 and 2 appear to be quite valid, some variations in the consumer population, over time, have occurred. These changes may

reflect variations in the clients coming from the Program's different referral sources, changes in Program emphases (e.g., the current movement within CAM toward improving services for females), or changes in the general population of consumers with a disability and co-existing substance abuse problem in the greater Dayton service area.

Another basic issue not raised directly via the project's three hypotheses (which are exclusively focused upon dealing with observed "outcomes" for clients who have been "closed out" of the Program) that it would seem prudent to describe at this juncture, at least in part, is the nature of the treatment and rehabilitative experiences engaged in by clients during their tenure at CAM. At some point in time, it may be logical and desirable to view these "process-related" data as "causative factors" that may be related to observed, Program-related client "outcomes". For example, "Is length of time enrolled in the Program positively correlated with being abstinent at the time of closure?" With that perspective in mind, several questions were addressed ---

- "Overall, what types of experiences do CAM consumers (who have been "closed out") have while enrolled in the Program?"
- "Do those experiences differ significantly for women and men?"
- "Do those experiences differ appreciably between Caucasians and Minorities (predominantly African-Americans)?"

The data used to address these questions were based upon over 25,000 "service tickets" written by Program staff over the 5-year period beginning near the end of 1997. Those "service tickets" were aggregated by individual consumer and used to summarily describe the duration and some of the types of experiences each consumer had in the Program. (NOTE: For the comparative analyses involving Gender and Minority Status the α -level for each individual statistical test - one per type of service identified - was set at the .005 level so the overall, question-level α value would be no greater than .10.) The results of the associated analyses, which are based **only** upon those consumers who "entered" and were "closed" from the Program, are summarized in Table 4.

The information presented in Table 4 indicates the following:

- Overall, CAM's consumers spend about 216 days (or roughly 7.1 months) enrolled in the Program

Table 4
A Description of the Duration and Types of Services Experienced by CAM Consumers

VARIABLE	STATISTIC	OVERALL GROUP	GENDER*		RACE*	
			Male	Female	Non-Minority	Minority
Length of Time Program Services Received	Mean (Median)	216.03 days (128.75 days)	222.8	196.9	178.60	217.67
Number of Sessions Participated In	Mean (Median)	43.19 sessions (24 sessions)	45.3	36.6	30.43	37.49
Average Session Length	Mean (Median)	0.85 hours (0.74 hours)	0.88	0.76	0.92	0.77
Services Received by Consumers						
- Individual Counseling	% All Service	12.2%	12.3%	12.2%	12.6%	11.3%
- Group Counseling	% All Service	9.8%	10.4%	7.7%	9.1%	10.2%
- Toxicology Screening	% All Service	8.0%	8.1%	7.0%	7.8%	7.4%
- Case Management	% All Service	51.1%	50.6%	52.9%	49.6%	55.0%
- Assessment	% All Service	8.8%	8.2%	10.5%	10.3%	7.1%
- Reporting	% All Service	10.0%	10.3%	9.5%	10.4%	8.9%
- Other Services	% All Service	0.1%	0.1%	0.2%	0.2%	0.1%
No Show and Cancelled Sessions	% All Session	15.5%	14.7%	19.0%	15.8%	16.0%
%age of Sessions Handled by Phone	% All Session	28.3%	27.2%	31.8%	26.8%	31.5%
Content of Case Management Sessions						
- Housing	%CM Session	0.9%	1.0%	0.7%	0.7%	1.1%
- Job/Vocational	%CM Session	5.9%	5.7%	5.3%	5.5%	6.2%
- Other Income Support	%CM Session	0.2%	0.1%	0.4%	0.1%	0.3%
- Money Management	%CM Session	0.4%	0.3%	0.4%	0.2%	0.5%
- Interpersonal	%CM Session	82.2%	81.4%	87.1%	83.4%	80.8%
- Educational Information	%CM Session	7.2%	8.0%	4.7%	7.2%	7.9%
- Med Education/Monitoring	%CM Session	3.2%	3.5%	1.5%	2.9%	3.2%
Activities Engaged in During Case Management Sessions						
- Tx Plan Development	%CM Session	21.4%	21.6%	20.3%	24.8%	21.8%
- Crisis Support	%CM Session	0.8%	1.0%	0.5%	0.9%	0.9%
- Family Intervention	%CM Session	0.3%	0.3%	0.3%	0.3%	0.1%
-Develop Interpersonal and Communication Skills	%CM Session	16.7%	16.7%	17.1%	14.1%	15.3%
- Tx Plan Service Coordination	%CM Session	50.1%	49.2%	53.5%	47.3%	52.1%
- Service Outcome Monitor/Meas.	%CM Session	10.7%	11.2%	8.3%	12.6%	9.8%

* The bolded pairs of entries in this column significantly differ from each other at the α -level specified in the accompanying text. The associated n's are 386 for the composite sample, 300 and 84 (Males,Females) respectively, and 191 and 140 (Non-Minority,Minority) respectively.

- During her/his time with CAM, a typical consumer participated in roughly 43 sessions of about .85 hours (or 51 minutes) each (or in other words, she/he averaged about 1.4 sessions each week for a total time of about one hour, twenty minutes per week)

- Of the time engaged in actual Program services, about 51% was devoted to case management services, 12% to individual counseling activities, 10% to group counseling, about 8% to toxicological screening, 9% to assessment activities, and 10% percent to reporting
- About 6.7 (or 15.5%) of the all sessions “scheduled” with consumers ended up being “No Shows” or cancellations
- Overall, about 28% of the sessions (i.e., roughly 12 of the average of 43 sessions) were reported as being handled over the telephone
- During the Case Management sessions (which made up over half of all the sessions), the most prevalent type of content discussed, by far, was interpersonal relations (82% of those sessions)
- During the Case Management sessions, two activities (i.e., Tx Plan Development and Tx Plan Service Coordination) accounted for over 70% of the activities engaged in by the consumers.
- Generally speaking, the services engaged in by male and female consumers were quite similar, with two exceptions - the average session length for males was greater than the average session length for females (about 7 minutes or 16% longer) and more of the case management sessions in which males were engaged dealt with medication-related education and management than occurred for the case management sessions involving females.
- The services experienced by minority consumers appeared to be quite similar to those experienced by non-minorities, with one exception - the average session length for non-minorities was greater than the average session length for minorities (about 9 minutes or 19% longer)

Hypothesis 1b: CAM consumers who complete Aware I and II, when designated on their treatment plans, will show more favorable outcomes relative to substance use reduction, employment, human community integration, and perceived well-being than non-completers.

This initial hypothesis, which was posited roughly 6 years ago, involves several anomalies that needed to be resolved before the attendant analyses could be undertaken. First,

the available database for **R2** does not contain a specific flag or flags indicating which CAM consumers completed the Aware I and Aware II (see Exhibit 1) experiences. (Furthermore, procedurally some consumers could opt out of taking Aware I and proceed to Aware II, if it was called for as part of their treatment plans. This has been especially true in situations where it was surmised that consumers had already covered the Aware I content while participating in another treatment program.) As a result, the available data only indicates how much time a consumer spends participating in Aware I and/or Aware II, not whether she/he completes either or both experiences. Given this state-of-affairs, for the purposes of the analyses presented here-in two flags were created, one for whether a consumer participated in Aware I and another designating whether she/he participated in Aware II. In those instance where a person participated in Aware II, but not Aware I, it was assumed that individual had participated in the equivalent of Aware I at some previous point in time.

The second anomaly in Hypothesis 1b deals with the phrase, “*when designated on their treatment plans*”. Since the database does not contain such information, it was assumed that if a person participated in either Aware I or Aware II, the need for her/him to do so was specified in her/his related treatment plan. Given this assumption and the two flags noted above, each individual consumer who was “closed out” of the Program could be deemed to fall into one of the following three (mutually exclusive) categories or levels of “Involvement in Aware”:

1. did not participate in either Aware I or Aware II;
2. participated in Aware I, but not Aware II; and
3. participated in both Aware I and Aware II.

In addition to the preceding concerns, the “naturalistic nature” of the evaluative design underlying **R2** dictated that it would not be logical or appropriate to evaluate the main effect for “Involvement in Aware,” since the three groups noted above were not randomly constituted. Thus, the two sub-hypotheses out of the three possible (i.e., the main effect for “Entry vs. Exit” and the interaction of “Involvement in Aware” by “Entry vs. Exit”) were the only ones that could be meaningfully evaluated given the available data. As a result of the preceding issues and concerns, Hypothesis 1b could be restated as follows - “*CAM consumers who complete Aware I and Aware II (or equivalents) will show more improved outcomes (e.g., substance use reduction, increased employment, improved human community integration, and higher perceived well-*

Exhibit 1

Description of Aware I and Aware II Programming for The CAM Program

AWARE I - AWARE I is a psycho-educational based group that occurs one time per week for two hours. This program is completed over ten weeks. The group has been constructed into 9 modules of educative material for the clients and during the 7th module is addressed over two sessions equaling 10 sessions.

Brief Summarization of AWARE I Modules

Module 1	Review and completion of contract for Group Rules Introduction to the differentiation of use, abuse, and dependency
Module 2	Understanding disability and substance abuse
Module 3	Medication, substance abuse, and disabilities
Module 4	Introduction to the 12 steps (history of AA, steps, traditions, construction of open and closed groups)
Module 5	Grief and Loss
Module 6	Self Esteem and Self-Awareness
Module 7A	Triggers and Cravings
Module 7B	Relapse and Negative Thought Stopping
Module 8	Family (Roles, feelings n family, family disease, effect of use and disability on family)
Module 9	Family Continued (Al-Anon, Alateen, Questions raised from newly recovering families)

AWARE II – Aware II is a group-based session that occurs one time per week for twelve weeks. Each week consists of an in-depth understanding of the 12 Step Program and implementation of those steps throughout all areas of a person’s life. This program discusses the supportive measure of the 12 steps and how utilization is life long.

being) than consumers who complete just Aware I, who in turn will show more improved outcomes than those consumers who have completed neither set of experiences.”

Operationally the dependent variables or “outcomes” employed as part of the evaluation of this hypothesis were drawn from two separate data sources collected at two points in time. The first source involved an interview (ideally, if the consumer could be located) completed by the CAM clinical staff at the point in time when the consumer was “closed out” of the Program, while the second source was a 9-month follow-up interview completed by RRTC staff. As may be surmised, these two sources (a) addressed related, but somewhat different sets of outcome data and (b) yielded substantially different response rates (and thus, most likely involved somewhat different subsets of Program completers as well). The results of the analyses involving these two sets of data are summarized in Tables 5 and 6. When reviewing those results it should be noted that due to the exploratory nature of the hypothesis posed, the numbers of tests being conducted, the variant nature of the data (e.g., dichotomous as well as metric), and the drastic reduction in sample sizes associated with the 9-month follow-up data reported in Table 6 (which has most likely negatively impacted the power of the associated statistical tests), the α -level per outcome listed in Tables 5 and 6 was .05. So the overall α -level for each outcome-related analysis would be no greater than .05, the associated α -levels per sub-hypothesis (i.e., the main effect for “Entry vs. Exit” and the interaction effect for “Involvement in Aware” by “Entry vs. Exit,” **which is Hypothesis 1b**) were set at the .025 level. Finally, the interaction sub-hypotheses addressed for the dichotomous or non-metric outcomes involved the analyses of the differences observed between Exit and Entry, since a nonparametric alternative to the F-test for interaction in “Mixed Model ANOVA” does not currently exist. The related tests of those differences should yield results that are essentially equivalent to what would be observed if a nonparametric test for interaction existed. (In the case of the metric criteria these tests of differences would be basically equivalent to the tests one would observe if he/she ran a priori F-tests for interaction in a “Mixed Model ANOVA.”)

The set of results presented in Table 5 indicates the following relative to Hypothesis 1b:

- for some unknown reason, it appears the numbers of reported arrests decreased significantly for the “No Aware” Group, slightly for the “Aware I Only” Group and remained relatively constant for the “Aware I & II” Group

Table 5
Summary Description of Selected Outcomes at Time of Closure Experienced by CAM Consumers Who Participated in Aware I and II

OUTCOME VARIABLE	STATISTICS		GROUP MEANS:			TEST STATISTICS
			No Aware	Aware I Only	Aware I & II	
Frequency of Primary Drug Use (in last 30 days)	Average Days	Entry	2.22	1.78	1.80	$X^2_{Int} = 0.76$
		Exit	2.09	1.74	1.67	$Z_{Entry/Exit} = -2.50^*$
Number of Arrests (in last 24 months)	Average N of Arrests	Entry	1.46	1.67	1.82	$X^2_{Int} = 13.70^*$
		Exit	0.66	1.44	1.96	$Z_{Entry/Exit} = -6.89^*$
Number of Hospital Admits (in last 12 months)	Average N of Admits	Entry	.37	.30	.22	$X^2_{Int} = 3.88$
		Exit	.24	.27	.32	$Z_{Entry/Exit} = -2.50^*$
Number of Emergency Room Admits (in last 12 months)	Average N of Admits	Entry	.43	.30	.42	$X^2_{Int} = 2.07$
		Exit	.40	.35	.78	$Z_{Entry/Exit} = -1.05$
Number of Outpatient Admits or Visits (in last 12 months)	Average N Admits/Visits	Entry	1.28	1.63	.53	$X^2_{Int} = 4.85$
		Exit	.55	1.33	.68	$Z_{Entry/Exit} = -2.95^*$
Number of Routine Visits to Dr/Dentist (last 12 months)	Average N of Visits	Entry	2.97	2.41	3.35	$X^2_{Int} = 6.71^*$
		Exit	1.56	2.08	3.39	$Z_{Entry/Exit} = -1.92$
Living Arrangements	% Own Place/Home	Entry	43.8	35.2	45.5	$X^2_{Int} = 6.15$
		Exit	49.8	42.1	58.7	$Z_{Entry/Exit} = 3.89^*$
Employment Status	% Employed	Entry	21.6	14.3	18.5	$X^2_{Int} = 7.30^*$
		Exit	23.3	20.0	31.4	$Z_{Entry/Exit} = 2.48^*$
Individual's Monthly Income	Average Monthly Income	Entry	337.33	283.98	257.13	$X^2_{Int} = 7.32^*$
		Exit	357.22	287.89	224.36	$Z_{Entry/Exit} = 0.00$
Primary Source of Income	% Salary/Wages	Entry	9.2	1.0	9.1	$X^2_{Int} = 0.66$
		Exit	9.9	3.0	9.8	$Z_{Entry/Exit} = 1.67$
CAM Goals Met	% Closed as Goals Met	Exit	7.6	27.9	23.1	$X^2_{Int} = 28.68^*$
CAM Goals Met or Referred Elsewhere	% Closed Goals Met or Referred	Exit	20.7	41.4	50.0	$X^2_{Int} = 27.77^*$

* The designated test statistics are significant at the level specified in the text. It should also be noted that the test statistics used due to the non-metric and/or very skewed nature of most of the data were as follows: Interaction hypotheses - Kruskal Wallis Test; and main effect hypotheses - Wilcoxon Test for related samples. Furthermore, the maximum n's per Aware Group were 272, 105, and 54, respectively.

- the number of visits to a Dr. and/or dentist followed the same pattern as that noted for arrests - a significant decrease occurred for the “No Aware” Group, a slight decrease occurred for the “Aware I Only “ Group, and basically no change appeared to occur for the “Aware I & II” Group

- being employed significantly increased for those who participated in “Aware I & II,” increased a little less for those who participated in “Aware I Only,” and remained relatively constant for those consumers who were in the “No Aware” Group
- the monthly income reported for consumers who were in the “No Aware” Group increased, that for consumers in the “Aware I Only” Group remained relative constant, while the monthly salaries of those in the “Aware I & II” Group decreased between the times of Program admission and closure
- at closure the consumers who participated in “Aware I Only” and “Aware I & II” were significantly more likely to have been reported as having met their Program goals than were consumers in the “No Aware” Group
- similarly, at closure the consumers who participated in “Aware I Only” and “Aware I & II” were significantly more likely to have been reported as having met their Program goals or having been referred to another service provider (i.e., a mental health and/or Alcohol or Other Drug (AOD) Treatment or aftercare provider) than were consumers in the “No Aware” Group
- no significant interaction effects between “Involvement in Aware” and “Entry vs. Exit” were observed for “Frequency of Primary Drug Use”, “Numbers of Hospital, Emergency Room, or Outpatient Visits”, “Living Arrangements” (defined in this situation as living in one’s own place/home) , or “Primary Source of Income”.

Overall, these limited results suggest that Hypothesis 1b would be partially rejected. That is, it is suggested that participation in the Aware experience(s) is related to several of the designated set of major CAM Program outcomes (e.g., employment status and meeting one’s Program goals). At the same time, however, the observed relationships are not positive for all of the outcomes listed and the relationships for a number of the listed criteria were not significant (i.e., the effects of participation in Aware I and/or II were not “universal” in regard to the entire array of criteria studied).

Although not a direct part of Hypothesis 1b, some of the more interesting results found in Table 5 deal with the tests involving the main effect - “Entry vs. Exit.” Those results show that between Program admission and closure ---

- CAM consumers’ frequency of primary drug use decreased significantly
- the numbers of arrests they were involved in decreased significantly

- the numbers of times they were admitted to the hospital or treated as outpatients both decreased significantly
- significantly more of them were living in their own place/home at the time of closure
- significantly more of them were employed at closure than at entry.

These main effect findings suggest several of the ways in which the CAM Program is impacting the consumers it serves, at least at the time of closure from the Program.

As indicated earlier, the second set of analyses addressing Hypothesis 1b was based on data secured as part of a 9-month follow-up of CAM consumers. The results of those analyses (which of necessity are based upon data from all the consumers who completed the 9-month follow-up in order to maximize the available sample size) are summarized in Table 6.

With regard to Hypothesis 1b, the information provided in Table 6 indicates that between Program admission and the point of the 9-month follow-up only one of the hypothesis-related statistical (i.e., “Interaction”) tests was significant. That test dealt with the “Productivity” sub-score for the Community Integration Questionnaire - scores for consumers in the “No Aware” Group decreased slightly, while the “Productivity” scores for the “Aware I Only” Group increased somewhat, and those for the “Aware I and II” Group increased substantially. None of the other tests related to Hypothesis 1b were significant.

However, analogous to what occurred in relation to the analyses reported in Table 5, the analyses shown in Table 6 did indicate that for a number of the criteria considered there were significant differences observed between Program entry and the 9-month follow-up. Those differences were as follows:

- four of the subjective variables indicating reductions in substance use decreased significantly between intake and the 9-month interview, but reported alcohol and/or drug use within the past 30 days and ASI Alcohol and Drug Usage Scores did not decrease significantly
- consumers’ self-reported satisfaction with their lives improved significantly over the 9-month period addressed
- interviewers’ ratings of consumers’ legal problems decreased significantly, but none of the other indicators of “Improved Legal Status” showed similar positive, significant changes

Table 6
**Description of Selected Outcome-Related Findings for CAM Consumers After the Lapse of 9-
Months Who Had Participated in Aware I and II**

OUTCOME SOUGHT	VARIABLES	TIMES	RESULTS:			STATISTICAL TESTS*	
			GROUP MEANS:				
			No Aware	Only Aware I	Aware I & II		
Reduction in Substance Use	Self-reported AOD Problem	Entry 9-Mon	85% 54%	100% 64%	78% 90%	$X^2_{Int} = 4.32$ $Q_{Entry/9-mo} = 12.6^*$	
	Interviewer-reported AOD Problem	Entry 9-Mon	94% 71%	100% 64%	89% 90%	$X^2_{Int} = 2.33$ $Q_{Entry/9-mo} = 10.9^*$	
	Interviewer - Rating of Need for Alcohol Tx	Entry 9-Mon	3.32 1.44	3.20 1.18	3.33 3.00	$X^2_{Int} = 5.41$ $Z_{Entry/9-mo} = -4.4^*$	
	- Rating of Need for Drug Tx	Entry 9-Mon	2.65 0.80	3.30 1.64	3.00 2.30	$X^2_{Int} = 4.08$ $Z_{Entry/9-mo} = -4.9^*$	
	Reported Alcohol Use in Last 30 Days	Entry 9-Mon	50% 44%	73% 36%	38% 30%	$X^2_{Int} = 4.42$ $Q_{Entry/9-mo} = -1.7$	
	Reported Drug Use in Last 30 Days	Entry 9-Mon	20% 17%	55% 45%	33% 30%	$X^2_{Int} = 0.29$ $Q_{Entry/9-mo} = 0.1$	
	Alcohol Use Score (ASI)**	Entry 9-Mon	0.15 0.13	0.14 0.08	0.26 0.22	$X^2_{Int} = 0.63$ $Z_{Entry/9-mo} = -1.9$	
	Drug Use Score (ASI)**	Entry 9-Mon	0.03 0.02	0.06 0.03	0.10 0.06	$X^2_{Int} = 0.54$ $Z_{Entry/9-mo} = -1.7$	
	Improved Perception of Health and Well Being	Satisfaction with Life Score	Entry 9-Mon	16.71 18.93	15.91 18.36	12.40 15.60	$X^2_{Int} = 0.05$ $Z_{Entry/9-mo} = 2.8^*$
		Family Satisfaction Score - Couples	Entry 9-Mon	39.55 39.95	37.27 38.64	37.71 37.75	$X^2_{Int} = 2.14$ $Z_{Entry/9-mo} = 0.6$
Family Satisfaction Score - Singles		Entry 9-Mon	40.72 41.83	37.55 35.85	39.86 42.80	$X^2_{Int} = 2.54$ $Z_{Entry/9-mo} = 0.2$	
Physical Functioning (SF-36)		Entry 9-Mon	68.51 63.29	72.73 73.18	56.00 62.50	$X^2_{Int} = 2.20$ $Z_{Entry/9-mo} = 0.1$	
Role Functioning - Physical (SF-36)		Entry 9-Mon	43.24 45.12	54.55 59.09	51.85 45.00	$X^2_{Int} = 0.26$ $Z_{Entry/9-mo} = -0.3$	
Bodily Pain (SF-36)		Entry 9-Mon	55.08 48.68	56.00 44.09	51.40 61.40	$X^2_{Int} = 5.53$ $Z_{Entry/9-mo} = 1.8$	
General Health (SF-36)		Entry 9-Mon	54.51 53.85	61.18 57.45	59.50 50.00	$X^2_{Int} = 1.43$ $Z_{Entry/9-mo} = -1.8$	
Vitality (SF-36)		Entry 9-Mon	47.84 49.39	58.64 51.36	46.50 50.00	$X^2_{Int} = 0.41$ $Z_{Entry/9-mo} = -0.3$	
Social Functioning (SF-36)		Entry 9-Mon	63.89 59.76	67.05 68.18	60.00 55.00	$X^2_{Int} = 0.45$ $Z_{Entry/9-mo} = -0.7$	

Table 6 - Continued

OUTCOME SOUGHT	VARIABLES	TIMES	RESULTS:			STATISTICAL TESTS*
			GROUP MEANS:			
			No Aware	Only Aware I	Aware I & II	
	Role Functioning - Emotional (SF-36)	Entry	54.96	72.73	55.56	$X^2_{Int} = 0.24$
		9-Mon	43.90	54.55	43.33	$Z_{Entry/9-mo} = -1.8$
	Mental Health (SF-36)	Entry	57.41	70.91	56.60	$X^2_{Int} = 1.29$
		9-Mon	61.46	64.36	57.60	$Z_{Entry/9-mo} = -0.0$
	Reported Health Transition (SF-36)	Entry	3.03	3.55	3.20	$X^2_{Int} = 0.32$
		9-Mon	3.39	3.91	3.50	$Z_{Entry/9-mo} = 1.2$
	Greater Employability and Employment	Entry	39%	46%	30%	$X^2_{Int} = 0.73$
	Employed at time of Interview	9-Mon	27%	36%	40%	$Z_{Entry/9-mo} = -0.3$
Enhanced Sense of Community Integration	Total Community Integration Score	Entry	17.03	14.68	16.46	$X^2_{Int} = 2.05$
		9-Mon	17.00	17.16	18.50	$Z_{Entry/9-mo} = 1.7$
	Home Integration Score (CIQ)	Entry	5.54	4.48	6.95	$X^2_{Int} = 0.17$
		9-Mon	6.06	5.34	6.50	$Z_{Entry/9-mo} = 1.5$
	Social Integration Score (CIQ)	Entry	7.65	6.63	6.79	$X^2_{Int} = 2.34$
		9-Mon	7.38	7.55	7.30	$Z_{Entry/9-mo} = 0.1$
	Productivity Subscore (CIQ)	Entry	3.70	3.80	2.50	$X^2_{Int} = 7.25^*$
		9-Mon	3.59	4.18	4.70	$Z_{Entry/9-mo} = 1.4$
Improved Legal Situation	Legal Status Score (ASI)**	Entry	0.04	0.03	0.11	$X^2_{Int} = 1.00$
		9-Mon	0.04	0.01	0.03	$Z_{Entry/9-mo} = -1.9$
	Interviewer Rating - Legal Problems	Entry	1.09	1.60	2.22	$X^2_{Int} = 5.80$
		9-Mon	0.56	0.55	0.70	$Z_{Entry/9-mo} = -3.6^*$
	N of Illegal Activities - Past Month	Entry	0.33	0.00	0.00	$X^2_{Int} = 0.01$
		9-Mon	0.20	0.00	0.00	$Z_{Entry/9-mo} = -0.6$
	N of Days in Jail - Past Month	Entry	1.84	0.00	1.50	$X^2_{Int} = 0.01$
		9-Mon	0.17	0.27	0.00	$Z_{Entry/9-mo} = -1.5$

* Overall analyses (e.g., doubly multivariate repeated measures types of analyses) were not completed because of the drastic reduction in sample size associated with such analyses due to missing data (primarily 9-month follow-up data) - as is, the n's for most analyses = 40,11,9, respectively, which in total is substantially less than the 512 cases available at Intake. Also, X^2_{Int} is the value observed for the Kruskal-Wallis Test which is distributed as a Chi-square variable, Q represents Cochran's Q Test - distributed as a X^2 variable, and $Z_{Entry/9-Mo}$ = the Normal Approximation for the Wilcoxon (paired measures) Test.

** Higher scores signal a greater problem with legal issues.

Overall, the findings presented in Table 6 regarding Hypothesis 1b support the conclusion noted earlier. That is, the hypothesis would be partially rejected, but given that only 7 (or 1/6th) of the analyses completed across Tables 5 and 6 were significant, that rejection was certainly not universal across the array of criteria considered. Furthermore, the fact that roughly 29% of the tests showed that consumers' behavior/performance improved significantly between

intake and closure/9-months, suggests that the Program may be positively affecting consumers, but that improvement does not appear strongly related to whether or not the consumers participated in Aware I or Aware I & II, the primary supposition being evaluated.

Hypothesis 2b: Consumers with severe disabilities other than TBI will achieve greater outcomes in CAM than consumers with TBI.

This hypothesis, like Hypothesis 1b, could be conceptualized via a series of “mixed model” analyses where (a) the between groups factor is “Client has TBI vs. No TBI”, (b) the within subjects factor would be time (i.e., “Entry vs. Exit” or “Entry vs. 9-Months,” depending upon when the follow-up data were collected), and (c) the dependent or criterion variables could be any of the outcomes listed in Table 5 or Table 6. The results of the analyses related to Hypothesis 2b are summarized in Tables 7 and 8 - Table 7 deals with the tests based on the data secured at closure to the Program, while Table 8 addresses those tests involving the 9-month follow-up data. When reviewing these results, it should be remembered that due to the exploratory nature of the hypothesis posed, the number of statistical tests undertaken, the variant nature of the data (e.g., dichotomous as well as metric criteria), and the drastic reduction in sample sizes associated with the 9-month follow-up data reported in Table 8 (which has most likely negatively impacted the power of the associated statistical tests), the α -level per outcome listed in Tables 7 and 8 (12 and 30, respectively) was .05. So the overall α -level for each pair of outcome-related analyses would be no greater than .05, the associated α -levels per sub-hypothesis (i.e., the main effect for “Entry vs. Exit” and the interaction of “TBI vs. No TBI” by “Entry vs. Exit,” **which is Hypothesis 2b**) were each set at the .025 level. Finally, the interaction sub-hypotheses addressed for the dichotomous or non-metric outcomes involved the analyses of the differences observed between Entry and Exit across “TBI vs. No TBI” Groups, since a nonparametric alternative to the F-Test for interaction in the “Mixed Model ANOVA” does not currently exist. The related tests of the observed differences should yield results that are essentially equivalent to what would be observed if a nonparametric test for interaction existed. Furthermore, in the case of the metric criteria these tests of the differences would be basically equivalent to the F-Test for interaction in a “Mixed Model ANOVA.” (At this juncture it should also be noted that the observed results for the tests of the “within subject” effects (i.e., Entry vs. Exit” and “Entry vs. 9-Months”) in Tables 7 and 8 will be comparable or equivalent to

the “within subject” findings summarized in Tables 5 and 6. Any variations observed are due to differences in sample sizes caused by missing data on either the “TBI vs. No TBI” factor, the outcome variable(s), or both.)

A review of the sets of results presented in Tables 7 and 8 reveals that none of the interaction tests across the 42 outcome criteria listed reached the specified α -level of .025. Therefore, for this set of criteria Hypothesis 2b could not be rejected. The available data suggest that those CAM consumers who did not have a TBI did not benefit from their participation in the Program any more than did the consumers who had a TBI, at least in terms of the set of outcome-related criteria studied.

As noted earlier, the same 12 “Entry vs. Exit,” within subject factors found to be significant in Tables 5 and 6 were also significant in Table 7 and 8, respectively. These results, coupled with those for the interaction hypotheses, suggest that participation in the CAM Program is related to a number of positive changes in consumer-related outcomes, but that those changes do not appear to be directly linked to whether or not the consumer has experienced a TBI.

Hypothesis 3b: Multiple services delivered at the same physical site will have greater impact than services delivered at multiple sites.

This hypothesis, like Hypotheses 1a and 1b, needed to be modified somewhat to reflect the available data. This need is based primarily upon the fact that the available database does not contain information describing the specific services provided in sites other than the CAM offices - their duration, purpose, whether completed or not, their associated objectives and outcomes, who or what agency provided the services, nor the specific linkages of those off-site services with consumers’ treatment plans. Furthermore, in some instances the services may have been delivered via multiple sites rather than just a single alternative site. At the same time, the R2 database does contain a variable (referred to as “OffSite”) that serves to indicate the approximate proportion or percentage of services each consumer received that was delivered at an alternative site, i.e., a site other than the CAM office complex. (NOTE: For the purposes of this evaluation, if a service was delivered via the phone by a CAM staff member, it was not considered to be delivered at an alternative site.) The variable, OffSite, was very positively skewed and assumed values ranging from “no services provided at alternative site(s)” or 0.0 (56.9% of the CAM consumers) to “all services provided at alternative site(s)” or 1.0 (1.7% of CAM consumers).

Table 7
Summary Description of Selected Outcomes at Time of Closure for CAM Consumers Who Did/Did Not Experience a TBI

OUTCOME VARIABLE	STATISTICS		GROUP MEANS:		TEST STATISTICS
			Did Not Have a TBI	Had a TBI	
Frequency of Primary Drug Use (in last 30 days)	Average Days	Entry	2.08	2.17	$X^2_{Int} = 0.00$
		Exit	2.01	2.02	$Z_{Entry/Exit} = -2.5^*$
Number of Arrests (in last 24 months)	Average N of Arrests	Entry	1.57	1.69	$X^2_{Int} = 0.02$
		Exit	0.85	1.13	$Z_{Entry/Exit} = -6.9^*$
Number of Hospital Admits (in last 12 months)	Average N of Admits	Entry	0.28	0.46	$X^2_{Int} = 2.62$
		Exit	0.24	0.31	$Z_{Entry/Exit} = -2.5^*$
Number of Emergency Room Admits (in last 12 months)	Average N of Admits	Entry	0.32	0.38	$X^2_{Int} = 0.10$
		Exit	0.35	0.40	$Z_{Entry/Exit} = 1.0$
Number of Outpatient Admits or Visits (in last 12 months)	Average N Admits/Visits	Entry	1.33	1.76	$X^2_{Int} = 0.73$
		Exit	0.69	1.01	$Z_{Entry/Exit} = -3.0^*$
Number of Routine Visits to Dr/Dentist (last 12 months)	Average N of Visits	Entry	2.93	3.47	$X^2_{Int} = 0.28$
		Exit	2.80	1.84	$Z_{Entry/Exit} = -1.9$
Living Arrangements	% Own Place/Home	Entry	40.0%	38.1%	$X^2_{Int} = 0.53$
		Exit	46.2%	48.2%	$Z_{Entry/Exit} = 3.9^*$
Employment Status	% Employed	Entry	21.4%	19.9%	$X^2_{Int} = 4.05^*$
		Exit	23.4%	26.9%	$Z_{Entry/Exit} = 2.5^*$
Individual's Monthly Income	Average Monthly Income	Entry	\$277.82	\$275.28	$X^2_{Int} = 2.74$
		Exit	\$268.26	\$317.30	$Z_{Entry/Exit} = 0.0$
Primary Source of Income	% Salary/Wages	Entry	9.6%	5.5%	$X^2_{Int} = 0.01$
		Exit	10.4%	6.8%	$Z_{Entry/Exit} = 1.7$
CAM Goals Met	% Closed as Goals Met	Exit	11.5%	16.3%	$X^2_{Int} = 1.78$
CAM Goals Met or Referred Elsewhere	% Closed Goals Met or Referred	Exit	28.9%	29.9%	$X^2_{Int} = 0.05$

* The designated test statistics are significant at the level specified in the text. It should also be noted that the test statistics used due to the non-metric and/or very skewed nature of most of the data were as follows: Interaction hypotheses - Kruskal Wallis Test, which is distributed as a X^2 variable; and main effect hypotheses - Wilcoxon Test for related samples, which is distributed as a Z variables with larger n's. Furthermore, the maximum n's per "TBI vs. No TBI" groups were 147 and 220, respectively.

The associated average was .063 (or 6.3% of the services received) and standard deviation was .1574. For the purposes of the current analyses this variable was recoded into the following three levels: 1 = 0.0% of services received at alternative site(s), which covered 56.9% of the CAM consumers; 2 = 0.01% to 9.99% of services received at alternative site(s), which covered 26.8% of the CAM consumers; and 3 = 10.00% to 100.00% of services received at alternative site(s),

Table 8
Description of Selected Outcome-Related Findings After the Lapse of 9-Months for CAM
Consumers Who Did/Did Not Experience a TBI

OUTCOME SOUGHT	VARIABLES	TIMES	RESULTS:			
			GROUP MEANS:		STATISTICAL TESTS*	
			Did Not Have a TBI	Had a TBI		
Reduction in Substance Use	Self-reported AOD Problem	Entry 9-Mon	89% 61%	82% 58%	$X^2_{Int} = 0.01$ $Q_{Entry/9-mo} = 12.6^*$	
	Interviewer-reported AOD Problem	Entry 9-Mon	100% 79%	90% 67%	$X^2_{Int} = 0.11$ $Q_{Entry/9-mo} = 10.9^*$	
	Interviewer - Rating of Need for Alcohol Tx	Entry 9-Mon	3.50 1.50	3.06 1.67	$X^2_{Int} = 2.73$ $Z_{Entry/9-mo} = -4.4^*$	
	- Rating of Need for Drug Tx	Entry 9-Mon	3.12 1.32	2.53 1.03	$X^2_{Int} = 0.70$ $Z_{Entry/9-mo} = -4.9^*$	
	Reported Alcohol Use in Last 30 Days	Entry 9-Mon	48% 46%	56% 33%	$X^2_{Int} = 1.36$ $Q_{Entry/9-mo} = 1.7$	
	Reported Drug Use in Last 30 Days	Entry 9-Mon	21% 25%	34% 25%	$X^2_{Int} = 1.61$ $Q_{Entry/9-mo} = 0.1$	
	Alcohol Use Score (ASI)**	Entry 9-Mon	0.19 0.13	0.15 0.13	$X^2_{Int} = 0.54$ $Z_{Entry/9-mo} = -1.9$	
	Drug Use Score (ASI)**	Entry 9-Mon	0.06 0.03	0.04 0.02	$X^2_{Int} = 0.01$ $Z_{Entry/9-mo} = -1.7$	
	Improved Perception of Health and Well Being	Satisfaction with Life Score	Entry 9-Mon	18.72 20.31	12.81 16.42	$X^2_{Int} = 1.82$ $Z_{Entry/9-mo} = -2.8^*$
		Family Satisfaction Score - Couples	Entry 9-Mon	39.04 40.72	38.42 38.45	$X^2_{Int} = 0.65$ $Z_{Entry/9-mo} = 0.6$
Family Satisfaction Score - Singles		Entry 9-Mon	40.83 41.14	39.82 40.58	$X^2_{Int} = 0.01$ $Z_{Entry/9-mo} = 0.2$	
Physical Functioning (SF-36)		Entry 9-Mon	73.39 73.21	62.12 59.73	$X^2_{Int} = 0.31$ $Z_{Entry/9-mo} = -0.1$	
Role Functioning - Physical (SF-36)		Entry 9-Mon	50.93 47.32	43.69 48.65	$X^2_{Int} = 0.29$ $Z_{Entry/9-mo} = 0.3$	
Bodily Pain (SF-36)		Entry 9-Mon	57.86 55.36	54.03 46.19	$X^2_{Int} = 0.29$ $Z_{Entry/9-mo} = -1.8$	
General Health (SF-36)		Entry 9-Mon	55.68 54.64	58.33 54.89	$X^2_{Int} = 0.14$ $Z_{Entry/9-mo} = -1.8$	
Vitality (SF-36)		Entry 9-Mon	47.14 53.04	50.15 45.95	$X^2_{Int} = 3.51$ $Z_{Entry/9-mo} = 0.3$	
Social Functioning (SF-36)		Entry 9-Mon	65.63 63.39	61.29 59.12	$X^2_{Int} = 0.01$ $Z_{Entry/9-mo} = -0.7$	

Table 8 - Continued

OUTCOME SOUGHT	VARIABLES	TIMES	RESULTS:		STATISTICAL TESTS*	
			GROUP MEANS:			
			Did Not Have a TBI	Had a TBI		
Greater Employability and Employment	Role Functioning - Emotional (SF-36)	Entry 9-Mon	66.67 47.62	50.51 46.85	$X^2_{Int} = 2.09$ $Z_{Entry/9-mo} = -1.8$	
	Mental Health (SF-36)	Entry 9-Mon	60.00 65.71	56.42 57.46	$X^2_{Int} = 0.78$ $Z_{Entry/9-mo} = 0.0$	
	Reported Health Transition (SF-36)	Entry 9-Mon	3.00 3.21	3.36 3.70	$X^2_{Int} = 0.07$ $Z_{Entry/9-mo} = 1.2$	
	Employed at time of Interview	Entry 9-Mon	46% 36%	30% 28%	$X^2_{Int} = 0.04$ $Q_{Entry/9-mo} = 0.3$	
	Enhanced Sense of Community Integration	Total Community Integration Score	Entry 9-Mon	16.35 16.77	16.58 17.86	$X^2_{Int} = 0.60$ $Z_{Entry/9-mo} = 1.7$
		Home Integration Score (CIQ)	Entry 9-Mon	5.29 5.86	5.86 6.12	$X^2_{Int} = 0.19$ $Z_{Entry/9-mo} = 1.5$
Social Integration Score (CIQ)		Entry 9-Mon	7.35 7.14	7.19 7.73	$X^2_{Int} = 0.87$ $Z_{Entry/9-mo} = 0.1$	
Productivity Subscore (CIQ)		Entry 9-Mon	3.59 3.81	3.48 4.00	$X^2_{Int} = 0.16$ $Z_{Entry/9-mo} = 1.40$	
Improved Legal Situation	Legal Status Score (ASI)**	Entry 9-Mon	0.04 0.04	0.08 0.02	$X^2_{Int} = 2.45$ $Z_{Entry/9-mo} = -1.8$	
	Interviewer Rating - Legal Problems	Entry 9-Mon	1.08 0.71	1.61 0.50	$X^2_{Int} = 2.26$ $Z_{Entry/9-mo} = -3.68$	
	N of Illegal Activities - Past Month	Entry 9-Mon	0.00 0.18	0.37 0.09	$X^2_{Int} = 1.03$ $Z_{Entry/9-mo} = -0.6$	
	N of Days in Jail - Past Month	Entry 9-Mon	2.33 2.25	0.65 0.08	$X^2_{Int} = 0.01$ $Z_{Entry/9-mo} = -1.5$	

* Overall analyses (e.g., doubly multivariate repeated measures types of analyses) were not completed because of the drastic reduction in sample size associated with such analyses due to missing data (primarily 9-month follow-up data) - as is, the n's for most analyses = 28,34, respectively, which in total is substantially less than the 512 cases available at Intake. Also, X^2_{Int} is the value observed for the Kruskal-Wallis Test which is distributed as a Chi-square variable, Q represents Cochran's Q Test - distributed as a X^2 variable, and $Z_{Entry/9-Mo}$ = the Normal Approximation for the Wilcoxon (paired measures) Test.

** Higher scores signal a greater problem with legal issues.

which covered the remaining 16.3% of the CAM consumers. (NOTE: The percentages shown for each of the levels of OffSite are based upon the sample (and associated n) at entry into the CAM Program and will most likely not be equivalent to the percentages observed when entry and closure or 9-month follow-up data are combined.) The recoded version of OffSite served as

the “Between Groups” variable in a “Mixed Model ANOVA” that paralleled the analysis approach used in Tables 5 through 8.

Given the preceding, Hypothesis 3b could be rewritten as follows ---

Hypothesis 3b: The outcomes observed for consumers who received all their services at the CAM office site will be more positive than the outcomes observed for consumers who received increasing percentages of services at alternative sites (where the increasing percentages are defined by levels 2 and 3 of the variable OffSite as noted above).

The results evolving from the analyses completed in relation to the preceding hypothesis are summarized in Tables 9 and 10. As alluded to earlier, those analyses parallel the ones completed in relation to Hypotheses 1b and 2b (i.e., involved two somewhat distinct data sets (“Entry to Closure” and “Entry to Time of 9-Month Follow-up”), were focused upon two of the hypotheses normally addressed via a “Mixed Model ANOVA” - the main effect of the “within subjects” variable, “Entry vs. Exit”, and the interaction of “%age of Services Received Off Site” by “Entry vs. Exit”, and involved the set of 42 dependent or criterion variables listed in Tables 5 and 6). Furthermore, the results in Table 9 deal with the tests completed based on data secured at closure to the Program, while Table 10 addresses the tests completed based on data secured at closure to the Program. Also, when reviewing these results, it should be remembered that due to the exploratory nature of the hypothesis posed, the number of statistical tests undertaken, the variant nature of the data (e.g., dichotomous as well as metric), and the drastic reduction in sample sizes associated with the 9-month follow-up data reported in Table 10 (which has most likely negatively impacted the power of the associated statistical tests), the α -level per outcome listed in Tables 9 and 10 (12 and 30, respectively) was .05. So the overall α -level for each outcome-related analysis would be no greater than .05, the associated α -levels per sub-hypothesis (i.e., the main effect for “Entry vs. Exit” and the interaction of “%age of Services Received Off Site” by “Entry vs. Exit,” **which is “revised” Hypothesis 3b**) were each set at the .025 level. In addition, the interaction sub-hypotheses addressed for the dichotomous or non-metric outcomes involved the analyses of the differences observed between Entry and Exit across “%age of Services Received Off Site” Groups, since a nonparametric alternative to the F-Test for interaction in the “Mixed Model ANOVA” does not currently exist. The related tests of the observed differences should yield results that are essentially equivalent to what would be observed if a nonparametric test for interaction existed. Furthermore, in the case of the metric

criteria these tests of the differences would be basically equivalent to the F-Test for interaction in a “Mixed Model ANOVA.” (At this juncture it should also be noted that the observed results for the tests of the “within subject” effects (i.e., Entry vs. Exit” and “Entry vs. 9-Months”) in Tables 9 and 10 will be comparable or equivalent to the “within subject” findings summarized in Tables 5 and 6. Any variations observed are due to differences in sample sizes caused by missing data on either the “%age of Services Received Off Site” factor, the outcome variable(s), or both.)

A review of the sets of results presented in Tables 9 and 10 reveals that one of the 42 interaction tests reached the stated level of significance. That test (see Table 10) involved the criterion “Role Functioning – Physical” (derived from the SF-36 Health Survey). The associated means suggest that the significant effect resulted from substantial increases in criterion scores for the “All on Site” and “> 10% Off Site” Groups coupled with a substantial decrease in the scores for the “To 10% Off Site” Group. Clearly these results do not support revised Hypothesis 3b. (It should also be noted that the main effect tests for “Entry vs. Exit” that are significant parallel those reported in the previous sets of tables - an expected finding as described previously.)

DISCUSSION

Overall, the materials reported in the preceding sections serve (a) to describe the CAM Program and its clients and (b) to evaluate several elements from each of two families of potential hypotheses regarding the relationships between different Program-related outcomes and selected consumer traits and Program-delivery characteristics. While these outcomes help us better understand and document some of the key features of the CAM Program, they also serve to remind us that there is still a lot of work to be done as we strive to improve the services the CAM Program is able to provide those it serves.

The results summarized in Tables 1 and 2 would lead us to the following general description of the “average” client served by CAM ---

“the average CAM client would be a single Caucasian or African-American male, who is roughly 40 years old, lives either by himself or with relatives, is unemployed, and has no visible income stream at the time of admission into the Program”

PLUS

“he has a substance abuse problem and any of a number of co-existing disabilities (e.g., 38% have experienced a TBI, 24% have some type of physical disability, and over 22%

Table 9
Summary Description of Selected Outcomes at Time of Closure Experienced by CAM Consumers Who Received Services On and Off Site

OUTCOME VARIABLE	STATISTICS		WHERE SERVICES RECD:			TEST STATISTICS
			All on Site	To 10% Off Site	> 10% Off Site	
Frequency of Primary Drug Use (in last 30 days)	Average Days	Entry	1.98	2.28	2.18	$X^2_{Int} = 2.27$
		Exit	1.92	2.17	1.96	$Z_{Entry/Exit} = -2.5^*$
Number of Arrests (in last 24 months)	Average N of Arrests	Entry	1.67	1.64	1.18	$X^2_{Int} = 0.38$
		Exit	1.04	1.01	0.56	$Z_{Entry/Exit} = -6.9^*$
Number of Hospital Admits (in last 12 months)	Average N of Admits	Entry	0.32	0.33	0.45	$X^2_{Int} = 3.87$
		Exit	0.23	0.27	0.42	$Z_{Entry/Exit} = -2.5^*$
Number of Emergency Room Admits (in last 12 months)	Average N of Admits	Entry	0.25	0.31	0.90	$X^2_{Int} = 0.12$
		Exit	0.26	0.41	0.88	$Z_{Entry/Exit} = -1.0$
Number of Outpatient Admits or Visits (in last 12 months)	Average N Admits/Visits	Entry	0.75	2.25	2.52	$X^2_{Int} = 0.94$
		Exit	0.36	1.42	1.34	$Z_{Entry/Exit} = -3.0^*$
Number of Routine Visits to Dr/Dentist (last 12 months)	Average N of Visits	Entry	2.84	3.83	2.49	$X^2_{Int} = 3.64$
		Exit	1.84	2.71	3.65	$Z_{Entry/Exit} = -1.9$
Living Arrangements	% Own Place/Home	Entry	43.3%	37.9%	32.7%	$X^2_{Int} = 2.85$
		Exit	48.8%	46.8%	45.7%	$Z_{Entry/Exit} = 3.9^*$
Employment Status	% Employed	Entry	23.7%	16.4%	17.3%	$X^2_{Int} = 5.82$
		Exit	25.5%	25.0%	17.3%	$Z_{Entry/Exit} = -2.5^*$
Individual's Monthly Income	Average Monthly Income	Entry	\$312.04	\$225.96	\$331.43	$X^2_{Int} = 1.68$
		Exit	\$329.76	\$225.96	\$326.19	$Z_{Entry/Exit} = 0.0$
Primary Source of Income	% Salary/Wages	Entry	6.7%	7.8%	11.5%	$X^2_{Int} = 1.00$
		Exit	8.5%	7.7%	11.5%	$Z_{Entry/Exit} = 1.7$
CAM Goals Met	% Closed as Goals Met	Exit	10.0%	20.5%	9.8%	$X^2_{Int} = 7.82^*$
CAM Goals Met or Referred Elsewhere	% Closed Goals Met or Referred	Exit	23.8%	36.8%	29.4%	$X^2_{Int} = 6.17$

* The designated test statistics are significant at the level specified in the text. It should also be noted that the test statistics used due to the non-metric and/or very skewed nature of most of the data were as follows: Interaction hypotheses - Kruskal Wallis Test; and main effect hypotheses - Wilcoxon Test for related samples. Furthermore, the maximum n's per "Where Services Received" Groups were 213, 117, and 52, respectively.

are mentally ill, mentally retarded, or suffer from some form of severe mental problem)."

Furthermore, it has also been shown that the overall pool of consumers served by the Program over the last 5 years or so has remained relatively constant, except (a) there has been a general decrease in their education level over the 5 years considered and (b) the proportion of TBI clients served the first year (i.e., in 1997) was significantly greater than what it has been in subsequent

Table 10
Description of Selected Outcome-Related Findings for CAM Consumers After the Lapse of 9-
Months Who Received Services On and Off Site

OUTCOME SOUGHT	VARIABLES	TIMES	RESULTS:			STATISTICAL TESTS*	
			WHERE SERVICES RECD:				
			All On Site	To 10% Off Site	> 10% Off Site		
Reduction in Substance Use	Self-reported AOD Problem	Entry 9-Mon	89.9% 42.1%	85.7% 71.4%	85.7% 66.7%	$X^2_{Int} = 4.79$ $Q_{Entry/9-mo} = 12.6^*$	
	Interviewer-reported AOD Problem	Entry 9-Mon	100.0% 57.9%	87.5% 75.0%	100.0% 86.7%	$X^2_{Int} = 3.93$ $Q_{Entry/9-mo} = 10.9^*$	
	Interviewer - Rating of Need for Alcohol Tx	Entry 9-Mon	3.65 0.74	3.04 2.00	3.36 2.13	$X^2_{Int} = 5.96$ $Z_{Entry/9-mo} = -4.4^*$	
	- Rating of Need for Drug Tx	Entry 9-Mon	2.76 0.84	3.08 1.46	2.43 1.13	$X^2_{Int} = 0.06$ $Z_{Entry/9-mo} = -4.9^*$	
	Reported Alcohol Use in Last 30 Days	Entry 9-Mon	50.0% 31.6%	60.0% 42.9%	41.7% 46.7%	$X^2_{Int} = 3.68$ $Q_{Entry/9-mo} = -1.7$	
	Reported Drug Use in Last 30 Days	Entry 9-Mon	20.0% 21.1%	44.4% 25.0%	7.1% 26.7%	$X^2_{Int} = 6.20$ $Q_{Entry/9-mo} = 0.1$	
	Alcohol Use Score (ASI)**	Entry 9-Mon	0.12 0.07	0.18 0.16	0.21 0.17	$X^2_{Int} = 0.45$ $Z_{Entry/9-mo} = -1.9$	
	Drug Use Score (ASI)**	Entry 9-Mon	0.04 0.01	0.05 0.04	0.05 0.03	$X^2_{Int} = 1.0$ $Z_{Entry/9-mo} = -1.7$	
	Improved Perception of Health and Well Being	Satisfaction with Life Score	Entry 9-Mon	19.32 21.43	14.32 17.11	14.40 16.20	$X^2_{Int} = 0.02$ $Z_{Entry/9-mo} = 2.8^*$
		Family Satisfaction Score - Couples	Entry 9-Mon	38.9 39.9	39.3 39.8	38.1 38.0	$X^2_{Int} = 0.68$ $Z_{Entry/9-mo} = 0.6$
Family Satisfaction Score - Singles		Entry 9-Mon	43.5 42.5	37.5 38.0	40.0 44.6	$X^2_{Int} = 6.45$ $Z_{Entry/9-mo} = 0.2$	
Physical Functioning (SF-36)		Entry 9-Mon	69.1 60.0	61.5 60.5	75.3 79.3	$X^2_{Int} = 2.11$ $Z_{Entry/9-mo} = 0.1$	
Role Functioning - Physical (SF-36)		Entry 9-Mon	43.8 54.0	53.5 35.7	38.3 61.7	$X^2_{Int} = 8.96^*$ $Z_{Entry/9-mo} = 0.3$	
Bodily Pain (SF-36)		Entry 9-Mon	53.6 48.1	50.3 46.2	63.5 59.3	$X^2_{Int} = 1.28$ $Z_{Entry/9-mo} = -1.8$	
General Health (SF-36)		Entry 9-Mon	58.4 57.8	53.3 47.8	60.8 60.2	$X^2_{Int} = 0.70$ $Z_{Entry/9-mo} = -1.8$	
Vitality (SF-36)		Entry 9-Mon	56.9 55.3	46.9 44.3	47.0 53.3	$X^2_{Int} = 2.82$ $Z_{Entry/9-mo} = 0.3$	
Social Functioning (SF-36)		Entry 9-Mon	59.4 62.5	59.7 58.7	76.8 60.8	$X^2_{Int} = 4.87$ $Z_{Entry/9-mo} = -0.7$	

Table 10 - Continued

OUTCOME SOUGHT	VARIABLES	TIMES	RESULTS:			STATISTICAL TESTS*
			WHERE SERVICES RECD:			
			All On Site	To 10% Off Site	> 10% Off Site	
	Role Functioning - Emotional (SF-36)	Entry	62.5	50.0	68.9	$X^2_{Int} = 1.01$
		9-Mon	49.1	40.5	51.1	$Z_{Entry/9-mo} = -1.8$
	Mental Health (SF-36)	Entry	60.8	61.5	55.9	$X^2_{Int} = 1.42$
		9-Mon	63.0	60.0	61.9	$Z_{Entry/9-mo} = 0.0$
	Reported Health Transition (SF-36)	Entry	3.31	3.15	3.00	$X^2_{Int} = 1.21$
		9-Mon	3.37	3.54	3.60	$Z_{Entry/9-mo} = 1.2$
Greater Employability and Employment	Employed at time of Interview	Entry	35.0%	48.2%	26.7%	$X^2_{Int} = 3.35$
		9-Mon	15.8%	32.1%	46.7%	$Z_{Entry/9-mo} = -0.3$
Enhanced Sense of Community Integration	Total Community Integration Score	Entry	17.0	16.8	15.4	$X^2_{Int} = 2.40$
		9-Mon	17.2	17.2	17.6	$Z_{Entry/9-mo} = 1.7$
	Home Integration Score (CIQ)	Entry	5.7	6.0	4.6	$X^2_{Int} = 1.12$
		9-Mon	6.1	5.9	6.1	$Z_{Entry/9-mo} = 1.5$
	Social Integration Score (CIQ)	Entry	7.4	7.3	7.4	$X^2_{Int} = 0.76$
		9-Mon	7.8	7.1	7.4	$Z_{Entry/9-mo} = 0.1$
	Productivity Subscore (CIQ)	Entry	3.7	3.5	3.4	$X^2_{Int} = 6.93$
	9-Mon	3.3	4.1	4.1	$Z_{Entry/9-mo} = 1.4$	
Improved Legal Situation	Legal Status Score (ASI)**	Entry	0.01	0.06	0.10	$X^2_{Int} = 1.18$
		9-Mon	0.03	0.03	0.03	$Z_{Entry/9-mo} = -1.8$
	Interviewer Rating - Legal Problems	Entry	1.38	1.42	1.29	$X^2_{Int} = 0.74$
		9-Mon	0.53	0.61	0.60	$Z_{Entry/9-mo} = -3.6^*$
	N of Illegal Activities - Past Month	Entry	0.26	0.00	0.53	$X^2_{Int} = 1.85$
		9-Mon	0.42	0.00	0.00	$Z_{Entry/9-mo} = -0.6$
	N of Days in Jail - Past Month	Entry	2.78	0.04	2.62	$X^2_{Int} = 0.01$
		9-Mon	0.11	0.21	0.13	$Z_{Entry/9-mo} = -1.5$

* Overall analyses (e.g., doubly multivariate repeated measures types of analyses) were not completed because of the drastic reduction in sample size associated with such analyses due to missing data (primarily 9-month follow-up data) - as is, the n's for most analyses = 19,28,15, respectively, which in total is substantially less than the 512 cases available at Intake. Also, X^2_{Int} is the value observed for the Kruskal-Wallis Test which is distributed as a Chi-square variable, Q represents Cochran's Q Test - which is distributed as a X^2 variable, and $Z_{Entry/9-Mo}$ = the Normal Approximation for the Wilcoxon (paired measures) Test.

** Higher scores signal a greater problem with legal issues.

years (as though the Program initially focused upon serving consumers with a TBI, then broadened it focus to include individuals with any type of co-existing disability).

In addition to yielding the preceding characterization of who is being served by the CAM Program, the data collected as part of R2 have enabled us to learn more about how those individuals interact with the Program. More specifically, it appears that our "average" CAM

consumer receives services over the course of 129 to 216 days (i.e., 4.2 to 7.1 months), via 24 to 43 sessions of between .75 and .85 hours duration each (or a total of 18 to 36.6 hours spread across the designated 4.2 to 7.1 month timeframe). During the course of each episode or interaction a client has with CAM, roughly half of the total set of services they receive deals with case management issues (most often addressing interpersonal issues like treatment plan development and coordination (71.5% of all case management sessions)), while the remaining services received are distributed roughly equally across Individual Counseling, Group Counseling, Toxicological Screening, Assessment, and Reporting. Given the heavy case management emphasis inherent in the Program, over a quarter of the sessions involve the staff and/or consumers communicating over the phone (e.g., scheduling times for future session, reminder calls, discussing issues with other, client-linked service providers, and scheduling appointments with other service providers for the consumer). Results from related analyses (see Table 4) suggest that these Program characteristics were quite similar for both females and males, as well as for minority and non-minority consumers. The only significant differences observed were: (1) the average session length for males was somewhat longer than was the average session length for females, (2) the average session length for non-minorities was longer than that for minorities, and (3) a greater percentage of the case management services received by males, as contrasted with that for females, dealt with medication education and monitoring.

The three hypotheses (or more correctly, the three modified hypotheses) evaluated dealt with the relationships (a) between two Program characteristics (Hypothesis 1b - *Participated in No Aware, Aware I, or Aware I & II*; Hypothesis 3b - *Where Were Services Received, i.e., 0% Off Site, .01% to 10% Off Site, and 10.01% to 100% Off Site*) and numerous (43) Program-related outcomes, and (b) between one Consumer characteristic (Hypothesis 2b - *Do Not Have a TBI and Have a TBI*) and the same set of 43 Program-related outcomes alluded to in relation to Hypotheses 1b and 3b. Generally speaking, these hypotheses represent very limited samples from two distinct families or classes of hypotheses that could be raised - one deals with the relationships between each of an array of consumer demographic characteristics (e.g., any or all of the variables noted in Tables 1 and 2) and Program-related outcomes; and the second deals with the array of potential Program characteristics, a number of which are listed in Table 4. The specific hypotheses chosen from these families were meant to focus on those relationships concerning specific consumer or Program characteristics it was assumed would represent major

Program emphases or anticipated changes in service delivery in the CAM Program over the course of the RRTC grant cycle.

The three hypotheses evaluated and the associated findings are as follows:

- **Hypothesis 1b - CAM consumers who complete Aware I and Aware II (or equivalents) will show more improved outcomes (e.g., substance use reduction, increased employment, improved human community integration, and higher perceived well-being) than consumers who complete just Aware I, who in turn will show more improved outcomes that those consumers who have completed neither set of experiences.** The results indicate that overall, this hypothesis was partially rejected - seven of the 42 tests involving relationships between participation in Aware I and Aware I & II and changes in associated outcomes were found to be statistically significant (based on the fairly liberal “significance level” employed). Only four of those significant differences, however, actually affirmed the hypothesis as stated, i.e., those consumers who completed the Aware modules improved more than those who did not participate in Aware. The significant changes in the other three instances were not in keeping with the predictions posited via hypothesis 1b. Thus, it appears that while participation in Aware I and Aware I & II may positively “effect” several Program outcomes, those “effects” would certainly appear not to be universal in their impacts across the array of different outcomes or dependent variables considered. Furthermore, given the divergence in the results among the few tests that did reach significance, caution should be exercised in concluding that the Aware materials had a positive effect on consumer outcomes.

Although not directly stated in Hypothesis 1b, the statistical results related to the main effect, “entry vs. Exit” for the Program, summarized in Tables 5 and 6 did generally suggest that the CAM Program has positively impacted participants. Across these main effect tests 12 reached statistical significance and suggest the consumers improved on the related criteria during their time in the Program. These findings further suggest that the Program is having a positive impact on consumers, but that positive impact does not appear to be strongly correlated with whether or not they participated in Aware I or Aware I & II.

- **Hypothesis 2b - Consumers with severe disabilities other than TBI will achieve greater outcomes in CAM than consumers with TBI.** This hypothesis could not be rejected given the available outcome data. None of the 42 statistical tests reached the specified

significance level. Thus, it would seem that improvements in consumers' "Entry to Exit" outcome data are not substantially related to whether or not they had experienced a TBI, i.e., the available data provides no basis for claiming that consumers with disabilities other than a TBI are more positively impacted by their CAM experiences than are consumers who have experienced a TBI.

- **Hypothesis 3b** - The outcomes observed for consumers who received all their services at the CAM office site will be more positive than the outcomes observed for consumers who received increasing percentages of services at alternative sites (where the increasing percentages are defined by levels 2 and 3 of the variable OffSite). This hypothesis was not rejected either – the single significant test observed yielded results that were not in keeping with the prediction posited. Therefore, within the constraints afforded by the available data, it appears that whether services are provided at the suite of CAM Offices or elsewhere does not relate significantly to the benefits consumers experience from those services.

While the R2 data set was adequate to address the set of reformulated/refocused hypotheses posed as part of the single-site evaluative component, the analyses of those data revealed several basic methodological issues that need to be addressed as we continue our efforts to improve the services afforded consumers via the CAM model program. Included among those issues are the following:

- More attention needs to be paid to doing a better job of defining, both conceptually and operationally, the key independent variables to be tested and then ensuring that those variables are the ones incorporated into the formulation of future project hypotheses. During the current effort, this concern was clearly illustrated by the need to reformulate and refocus two of the three hypotheses evaluated so they matched the actual data collected.
- A related methodological concern deals with the conceptual and operational definitions of the Program outcomes or dependent variables employed in any hypotheses under consideration. Many of the outcome variables listed in Tables 5 through 10 were not "metric" or "continuous", normally distributed types of variable like those typically employed as criteria or dependent variables in research studies. These kinds of criterion shortcomings can have negative, limiting consequences in regard to one's ability to

establish “significant” relationships such as those posited in Hypotheses 1b, 2b, and 3b. In part, this issue was directly reflected in the current effort by the limited set of analytical techniques that could be employed and the need to evaluate a set of hypotheses defined on an “a priori basis” but without the presumed theoretical or empirical background. This limitation is, for example, reflected in the fact that almost half of the findings related to Hypothesis 1b were “negative” or not in the “direction” predicted by the hypothesis under test.

- Although the “quality” of the dependent variables one uses is critical to the overall “success” of a research study, the number of such variables employed in any given analysis can also be a concern, especially if those variables have no inherent linkages among them, either theoretical or operational, as well as among them and the programmatic activities/services afforded Program clients. (For example, from an analytical perspective it would probably be better to integrate the various “legal issue” variables used in Tables 6, 8 and 10 into a composite variable instead of using four separate variables.) While multivariate analyses might make this seem like a moot point, generally the more sophisticated the analytical technique one employs the “better” the data need to be - in regard to the underlying assumptions that need to be made regarding those data. At the same time, multivariate methods were not intended for use in analyzing disparate arrays of dependent variables that are unlimited in size. In addition, when the number of dependent variables is large and they do not meet the assumptions required to employ the more sophisticated analytical techniques, the researcher is left with the need to conduct too large a volume of tests and engage in an analytical “fishing expedition” with very little ability to control the overall alpha level and associated power of the resultant tests. This general limitation is something that occurred in the current study and efforts need to be undertaken to use the current data to help alleviate this issue in future studies, e.g., use the data to generate potential composite scores that have appropriate measurement properties and can be used in the future.
- While the hypotheses posed and evaluated as part of this work scope are interesting, one is left with the feeling that they may not adequately reflect the families of hypotheses that it would be possible to address using the **R2** database. For example, why were gender and minority status, or proportion of phone sessions, proportion of individual counseling

sessions, and intensity of Program involvement (e.g., Number of Program Sessions divided by Number of Days in Program), not included among the independent variables studied? In future evaluations a logical and encompassing rationale, which outlines why the hypotheses addressed were actually selected, should be provided. Such a development would reflect in part the growth that has occurred in the knowledge base underlying the field.

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