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Preliminary outcomes from the assertive continuing care experiment for adolescents discharged from residential treatment

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Abstract

In many treatment systems, adolescents referred to residential treatment have the most serious alcohol or other substance use disorders and are at high risk of relapse. Upon discharge, these adolescents are typically referred to continuing care services, however, linkage to these services is often problematic. In this study, 114 adolescents (76% male) who stayed at least 7 days in residential treatment were randomly assigned to receive either usual continuing care (UCC) or UCC plus an assertive continuing care protocol (ACC) involving case management and the adolescent community reinforcement approach. ACC participants were significantly more likely to initiate and receive more continuing care services, to be abstinent from marijuana at 3 months postdischarge, and to reduce their 3-month postdischarge days of alcohol use. Preliminary findings demonstrate an ACC approach designed for adolescents can increase linkage and retention in continuing care and improve short-term substance use outcomes.

Keywords: Adolescents; Substance use disorders; Continuing care; Preliminary outcomes; Experiment

1. Introduction

Alcohol and marijuana continue to be the major drugs of abuse among youth in the US, and the examination of relevant datasets reveals the level of use is strongly associated with other illicit drug and tobacco use, fatal motor vehicle crashes, risky sexual behavior, delinquent behaviors, externalizing disorders (e.g., conduct or attention deficit disorder), and Posttraumatic Stress Disorder (Clark, Lesnick, & Hegedus,1997; Dennis, Godley, & Titus, 1999; Deykin & Buka, 1997; Hser et al., 2001; Komro et al., 1999). The number of drug-using adolescents (age 12–17) accessing treatment increased 45% from 1993 to 1998 (Office of Applied Studies, 2000). Options for treatment vary based on the resources available in an adolescent's community. The least invasive forms of treatment are student assistance programs located in schools, followed by outpatient programs of various intensities and then residential treatment. Experts recommend that placement in a level of care should be based on a number of presenting characteristics including: the adolescent's substance use diagnosis/severity; intoxication and withdrawal risk; biomedical issues; psychological problems; treatment acceptance and resistence; relapse potential; environmental risk; legal pressure; and vocational pressure (American Society of Addiction Medicine [ASAM], 1996; Schoenberg, 1995).

To be assigned to residential treatment (Level III care) under American Society of Addiction Medicine's (1996) patient placement criteria, patients must exhibit significant deficits in their willingness to accept treatment, recovery environment, and have high relapse potential. Studies of treatment systems have shown adolescents placed in residential treatment do, in fact, have higher rates of substance, psychological, behavioral, motivational, environmental, legal and vocational problems (Dennis, Dawud-Noursi, Muck, & McDermeit, in press; Dennis, Scott, Godley, & Funk, 2000). The length of residential treatment varies based on a number of variables (e.g., need, funding, willingness, and cooperation), but generally averages about 1–3 months in the public treatment system. After residential treatment, adolescents are typically referred to continuing care, which

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usually includes outpatient treatment services and encouragement to attend self-help groups. It is also common for these adolescents to develop a personalized recovery plan with the goal of maintaining a substance-free lifestyle.

Outside of major cities, residential treatment programs draw from many communities and counties. Complicating matters further, referring communities often are lacking in adolescent outpatient treatment services or adolescent specific self-help groups. Even though referrals are made to continuing care treatment, many adolescent clients do not link to, or only participate minimally in, postresidential continuing care treatment (Alford, Koehler, & Leonard, 1991; Hoffman & Kaplan, 1991). In a study of adolescent clients discharged from two residential programs, Godley, Godley, and Dennis (2001) found only 36% of the clients discharged from residential treatment attended one or more continuing care sessions at community clinics. Poor linkage to continuing care services may contribute to high relapse rates for adolescents after residential treatment. Indeed, follow-up studies of standard practice report relapse rates of 60% during the first 90 days after discharge from treatment (Catalano, Hawkins, Wells, Miller, & Brewer, 1991; Brown, Vik, & Creamer, 1989; Kennedy & Minami, 1993; Dennis et al., in press; Godley, Godley, and Dennis, 2001). Investigators have recommended increasing treatment attendance during the first 90 days of continuing care (Kaminer, 2001; McKay, 1999).

Models of continuing care monitoring and reintervention occupy a central role in the long-term management of other chronic diseases and researchers have recently supported adapting the disease management model to the management of substance use disorders (e.g., McLellan, Lewis, O'Brien, & Kleber, 2000). Several investigators have recommended common approaches to continuing care (Bukstein, 1994; Catalano et al., 1991; Center for Substance Abuse Treatment, 1993; Donovan, 1998; McKay, 2001; Myers, Brown, & Mott, 1995; Richter, Brown, & Mott, 1991; Vik, Grizzle, & Brown, 1992). They recommend programs: (a) offer sufficient intensity and duration of contact; (b) target multiple life-health domains (e.g., educational, emotional, physical health, vocational, legal, psychiatric); c) be sensitive to the cultural and socioeconomic realities of the client; (d) encourage family involvement; (e) increase prosocial leisure habits; (f) encourage compliance with a wide range of social services to provide additional support; (g) focus on relapse prevention; and (h) provide cognitive behavior and problem solving skill training to help reduce cravings and to cope with anger, depression and anxiety.

Research on family involvement in treatment has shown it can further improve adolescent engagement, retention, substance use, and other problems (Bry, Conboy, & Bisgay, 1986; Henggeler et al., 1991; Joanning, Quinn, Thomas, & Mullen, 1992; Lewis, Piercy, Sprenkle, & Trepper, 1990; Liddle, Dakof, & Diamond, 1991; Santisteban et al., 1996; Szapoznik, Kurtines, Foote, Perez-Vidal, & Hervis, 1983) and should facilitate reentry to home and community after residential treatment. In a study of self-help group attendance following residential treatment, Kelly, Myers, and Brown (2000) found greater attendance was associated with improved outcomes even when controlling for pretreatment and treatment differences. Empirically, several longitudinal studies with both adults and adolescents have concluded participation in formal continuing care and/or self-help group meetings is a significant predictor of improvement at follow-up (Alford et al., 1991; Donovan, 1998; Hoffman & Kaplan, 1991; Kelly et al., 2000).

An intervention that includes many of the features recommended for continuing care intervention is the Community Reinforcement Approach (CRA) (Azrin, Sisson, Meyers, & Godley, 1982; Meyers & Smith, 1995). CRA is a behavioral intervention that helps clients restructure their environment with prosocial activities that compete against continued substance use. In addition, CRA examines the relationship between using behavior and other behaviors and teaches the client skills to improve daily communication and problem solving as well as overcoming resistance and obstacles to participating in prosocial activities. Over the past 30 years, CRA has proven effective in several outpatient clinical trials with adult alcoholics and other drug abusers (Miller, Meyers, & Hiller-Sturmhofel, 1999). Although untested as a continuing care strategy for adolescents, it is well-suited to follow residential treatment and was, in fact, used this way in its first two trials with adults (Azrin, 1976; Hunt & Azrin, 1973). The present study seeks to augment CRA with a component designed to assist the caregivers and improve problem solving and communication between caregivers and the client. In addition, since adolescent clients are frequently involved in the education, criminal justice, mental health and/or child welfare service systems, the addition of case management services (Godley, Godley, Pratt, & Wallace, 1994) was deemed necessary to help them access and negotiate complex services systems.

Though a review of the published literature did not find experimental studies of continuing care with adolescents, McKay's (2001) review of 12 experimental and two quasi-experimental continuing care studies with adults revealed mixed results. Findings from four of the 14 studies indicated adults with more intensive continuing care did significantly better than those with no ($n = 3$) or some ($n = 1$) continuing care, while the remaining 10 studies showed slight improvement or no difference between continuing care conditions. Research on continuing care strategies for adolescents is an outstanding need in the treatment effectiveness literature.

The purpose of the present study was to develop and experimentally evaluate an Assertive Continuing Care (ACC) protocol for adolescents after their discharge from residential treatment. Specifically, this study evaluates the extent to which ACC is more effective than usual continuing care (UCC) in terms of 1) increasing the likelihood, amount and content of continuing care, and 2) reducing the time until, amount of, and problems related to relapse. Since this study grew out of a need identified by treatment providers, the findings should be relevant to other adolescent treatment

organizations and provide an example of bridging the research to practice gap.

2. Materials and methods

2.1. Participants

Participants for this study were 114 adolescents admitted to a residential treatment program for youth. To be included in this study, adolescents had to meet criteria for a *Diagnostic and Statistical Manual of Mental Disorders* (4th ed) (American Psychiatric Association, 1994) diagnosis of current alcohol and/or marijuana dependence, be between the ages of 12 and 17, and reside in the multi-county central Illinois area targeted for the intervention. Potential participants were excluded if they left residential treatment prior to their seventh day, were a ward of the state child welfare department, did not intend to return to a target county upon discharge, were deemed a danger to self or others or exhibited active, uncontrolled psychotic symptoms. In all, 56 (27.7%) out of 202 clients did not meet eligibility criteria. The main reasons for ineligibility were leaving residential treatment prior to 7 days (9.9%) or returning to a juvenile correction facility prior to residential discharge (12.4%). The remainder were excluded from the study because: (a) they did not return to the target community at discharge ($n = 4$); (b) they were a danger to themselves or others ($n = 1$); (c) their psychosis interfered with understanding the study measurement ($n = 1$); or (d) they were a ward of the state ($n = 5$). Eighty-two percent of the eligible adolescents ($n = 120$) signed an informed consent agreement to participate in the study and 18% ($n = 26$) declined to participate. At the time analyses for this report began, 114 participants had completed the intervention period and 3-month follow-up, 2 were still in the intervention period, 2 had refused to participate in the follow-up interview, 1 became a ward of the state and was therefore no longer eligible to participate in the study, and 1 was located but unavailable.

2.2. Procedure

Adolescents and an accompanying family member/caregiver were approached about participating in the study during the first week of the adolescent's admission to residential treatment. They were provided an explanation of the nature and conditions of the study as part of a formal informed consent process under the supervision of Chestnut Health System's Institutional Review Board. Those who met all inclusion criteria and stayed in residential treatment at least 1 week were invited to voluntarily participate in the study.

Participants were blocked into one of eight mutually exclusive groups by crossing their gender, whether they were involved in the criminal justice or social welfare system, and if they met *DSM-IV* (American Psychiatric Association, 1994) criteria for dependence on a substance other than alcohol. Within each block they were then randomly assigned by the research coordinator to either UCC or ACC. The ratio of assignment to the ACC condition was periodically altered between 3:2 and 2:3 based on the caseload capacity of the ACC case manager. The final distribution was 63 (55%) in ACC and 51 (45%) in UCC.

2.3. Residential treatment

The residential program's length of stay was based on individual needs and the study sample's average length of stay was 49 days. The residential treatment program's core curriculum was based on a combination of rational emotive therapy (Walen, DiGiuseppe, & Dryden, 1992; Yankura & Dryden, 1990), social learning theory (Bandura, 1997a,b), and cultural work on the pathways to addiction and recovery (White, 1996). It included rotating group sessions on: 12-step self-help programs, counseling, spirituality, assertiveness training, relapse prevention, coping styles, stress management, decision making, self-esteem, (safe) recreational activities, education, living and health skills, and family groups.

Clients were discharged from residential treatment with recommendations for continuing care services, which usually included a referral to an outpatient treatment program for additional counseling and support for an alcohol and drug-free lifestyle and a recommendation to attend 12- step self-help groups in their home community. Many clients had ancillary problems that required psychiatric services, monitoring or intervention from the criminal justice system, and educational services to re-enter school or to initiate or continue GED services. These services could also be included in the written continuing care plan.

2.4. Continuing care conditions

2.4.1. UCC

At discharge, residential treatment staff made referrals for continuing care to local outpatient providers in each of the central Illinois counties. With minimal overlap, 12 treatment facilities in the target area were available to provide continuing care services to adolescents on an outpatient basis. A survey of these programs revealed considerable diversity in the amount of services offered. Four agencies offered intensive outpatient programs that met 3–5 days per week while eight agencies offered outpatient programs that met 1–2 times per week. The agencies reported services that included: referral to self-help groups; urine testing and feedback; relapse prevention and social skills training for the client; counseling for parents as well as the adolescent; and case coordination with schools and probation officers.

2.4.2. ACC

Participants assigned to this condition received the same referrals to continuing care services as those assigned in the UCC condition. In addition, they were assigned an ACC case manager for a 90-day period following discharge from residential treatment. The ACC case manager provided an intervention that included CRA procedures (Meyers & Smith, 1995) that had been adapted for adolescents (Godley, Meyers et al., 2001) and case management. The Adolescent Community Reinforcement Approach (ACRA) is accomplished by conducting a functional analysis of substance using behaviors as well as social activities and using client self-assessment to develop goals for treatment. Subsequent self-assessment ratings are used to help clients monitor success in meeting goals and to modify existing treatment goals or develop new ones. Therapeutic techniques include prosocial and other reinforcer access priming, sampling, relapse prevention, problem solving, and communication training. The latter two procedures are also incorporated into four sessions with caregivers (two with the caregiver only and two with both the client and caregiver). Optional procedures for coping with a lapse, anger management, and job finding are also available.

Case management services were included in ACC to provide adolescents and caregivers assistance in accessing needed services, prosocial and recreational activities after adolescents returned home. Case management included procedures for: (a) linking the client to necessary services and activities; (b) monitoring lapse cues and attendance at other needed services and activities; (c) advocacy for the client to access services when needed; and (d) social support for coping with a lapse or other challenging issues (Godley, Godley, Karvinen, & Slown, 2001).

Adolescents could be discharged to communities up to 75 miles away from the residential treatment center. All clients assigned to the ACC condition received home visits from the case manager to increase the likelihood of engagement and participation in continuing care services. In addition to home visits, the ACC case manager provided some transportation for job finding and other prosocial activities. Since much of the service area covered by this study was rural, transportation services, including home visits, were a critical component of the intervention. Therefore, a vehicle provided by the research unit and equipped with a cellular phone was assigned to the ACC case manager. Travel by case managers ranged from approximately 300 miles per month to 2,000 miles per month depending on client location and size of caseload. Case manager caseload size varied from a low of three to a high of 11.

2.4.2.1. Treatment fidelity. In order to promote and verify fidelity (Moncher & Prinz, 1991), case managers were trained in procedures that were documented in treatment manuals (Godley, Meyers et al., 2001; Godley, Godley, Karvinen, & Slown, 2001). Case manager sessions with the adolescents were closely supervised via audio tape review or observation, and data were collected from the participants at follow-up regarding the types of services in which they had participated during continuing care.

2.5. Measures: Global Appraisal of Individual Needs and Form 90

Baseline and follow-up data for this study were collected through interviews using the Global Appraisal of Individual Needs (GAIN) instrument (Dennis, 1999) and the Form 90 version (Miller, 1996; Miller & Del Boca, 1994) of the Time Line Follow Back (TLFB) interview (Sobell & Sobell, 1992, 1995; Sobell et al., 1980). Cross validation analyses of these two instruments showed the substance use measures were correlated .7 or higher (Dennis, Funk, Godley, Godley, & Waldron, under review). The GAIN has been normed on both adults and adolescents, and was used as the biopsychosocial clinical assessment at the treatment program. It is currently the main research assessment battery in over a dozen adolescent studies in the US. Test-retest reliability for days of use over a 48-hour period with 210 adolescents was .74 for marijuana and alcohol use. Internal consistency of key indices ranges from .92 to .71 with only the physical health index lower at .56. Form 90 test-retest for days of substance use with adults was .98 and .96 in two different samples (Tonigan, Miller, & Brown, 1997) and preliminary findings with adolescents suggest the instrument is internally reliable and sensitive to change following treatment for substance use disorders (Krinsley & Bry, 1991; Waldron, 1996; Waldron, Slesnick, Brody, Turner, & Peterson, 2001). Urine specimens were collected by research staff and screened for the presence of cannabinoids with EZ-Screen's qualitative enzyme immunoassay procedure (Medtox, Burlington, NC). Participants were administered breathalyzer tests using the Alco-Sensor III (Intoximeters, St. Louis, MO) during the same interview to measure breath alcohol concentration (BAC). To assess the validity of self-reported substance use, urine tests and interviews with a collateral (usually a parent) were conducted at both baseline and 3-month follow-up. Participants were compensated $50 for their time and transportation to a research interview. Collaterals were paid $20. Both could earn an additional $10 for attending within 1 week of their assigned interview date. Ninety-seven percent of the adolescents and 96% of the collaterals were interviewed at the 3-month follow-up with 94% of the interviews conducted within 2 weeks of the participant's due date.

2.6. Measures: Service Contact Logs

Service Contact Logs (SCL) were developed to track all ACC case management activities. The log contained fields that allowed the case manager to record what ACC procedure was conducted with which client, at what time, and in which location. These logs were completed daily by the case managers to ensure each session held with a client and/or a

family member was documented and reviewed by supervisory staff.

2.7. Data analysis

The intermediate outcomes of linkage to and participation in continuing care were measured using self-reported continuing care sessions (outpatient and intensive outpatient treatment) from the GAIN M90 at 3 months postdischarge plus case manager reports of ACC services provided. From these measures, the percentage of participants receiving any continuing care and the average number of sessions were compared. Substance use measures included the number of days the adolescent self-reported any alcohol, marijuana, or other substance use in the past 90 days on the GAIN. If a client reported no use in the past 90 days, he or she was coded as abstinent for that substance. Days until a client's first alcohol and first marijuana use after residential discharge were calculated using the Form 90 assessment.

For symptom severity, the GAIN's Substance Problem Index (SPI) (Dennis & Titus, 2000) was used. This scale contains 16 items: four abuse items and seven dependence items from the *DSM-IV*, plus five substance related issues symptoms (three of these are common screeners and two are from the *DSM-IV* list of symptoms for substance induced psychological and health disorders). The scale has an internal consistency of .93 ($N = 600$), with $M = 5.2$, $SD = 5.2$. The percentage of participants with no past-month symptoms was also computed for each group.

Since intake severity and length of stay in residential treatment were hypothesized to affect outcomes, they were used as covariates for substance use outcome analyses. The number of SPI items endorsed for the past year was used as the measure of severity. Residential length of stay (LOS) was the number of days in treatment. The skewness and kurtosis for both of these variables was less than 1. There were no significant differences between the groups on their intake severity (9.6 vs. 9.5 symptoms, n.s.d.) or length of stay (49 vs. 49 days).

SPSS version 10.0.7 was used for all of the statistical analyses. Chi-square tests were used to test differences between dichotomous variables collected at the 3-month follow-up interview from the two groups including the percentage receiving any type of continuing care and type of services received. A between-groups *t*-test was used to test the difference in the average number of continuing care sessions. A Kaplan-Meier survival analysis using the Wilcoxon-Gehan statistic was employed to test differences in days until first alcohol or marijuana use in the two groups. For the main analyses, repeated measures analysis of variance was used to test the time by group difference interaction in terms of days of alcohol use, days of marijuana use, and the number of substance problems measured with the SPI in the past month. The intake value and change in all three of these variables was sufficiently dimensional and normal (skew between 0.5 and 1.9) for testing with a general linear model. For these analyses, the residential length of stay and past-year SPI were entered as covariates. Effect sizes are reported for all statistically significant findings to assist in the interpretation of clinical importance.

3. Results

3.1. Characteristics of the sample

Of the total sample ($N = 114$), 76.3% were male, 73.7% were Caucasian, 16.6% were African American, 53.5% were age 17 or 18, 33.3% had not completed school beyond the eighth grade, 90.3% were unemployed, 32.5% were from two-parent families, and 82.5% had prior involvement with the juvenile justice system. All participants met criteria for a *DSM-IV* substance use disorder with 57.1% meeting alcohol dependence criteria, and 90.3% meeting marijuana dependence criteria. Overall, 87% of the sample began using alcohol or other drugs before the age of 15, 77.2% had at least one prior treatment for a substance use disorder, and 52.6% had a prior history of mental health treatment. Tables 1 and 2 provide demographic and clinical characteristics of partic-

Table 1
Demographic characteristics at baseline for participants assigned to the two continuing care groups[a]

Variable	Usual continuing care (UCC) ($n = 51$)	Assertive continuing care protocol (ACC) ($n = 63$)
Male	80%	73%
Race		
African American	18%	16%
Caucasian	75%	73%
Hispanic	2%	3%
Other	6%	8%
Age		
12–14	6%	8%
15–16	41%	38%
17–18	53%	54%
Education		
6–8th grade (Junior high school)	35%	32%
9–12th grade (High school)	65%	68%
Employment		
Full time (35+ hours per week)	10%	2%
Part time (1–34 hours per week)	3%	4%
Other	87%	94%
Family		
Two parents	38%	29%
Single parent	45%	65%
Other	17%	6%
Any criminal justice system involvement[b]	84%	81%
Probation	44%	37%
Parole	8%	6%
Other	52%	57%

[a] No significant difference.
[b] Subgroups below are not mutually exclusive.

Table 2
Clinical characteristics at baseline for participants assigned to the two continuing care groups[a]

Variable	Usual continuing care (UCC) (n = 51)	Assertive continuing care protocol (ACC) (n = 63)
Age of first use		
10 and under	18%	13%
11–14	69%	75%
15–18	14%	13%
Alcohol pattern[b]		
Any alcohol use	59%	65%
Weekly alcohol use	28%	24%
Any intoxication (5+ drinks)	49%	47%
Peak BAC > .35[c]	25%	16%
Alcohol abuse	28%	27%
Alcohol dependence	51%	62%
Drug use[b]		
Weekly Marijuana use	53%	57%
Weekly cocaine use	8%	10%
Weekly other drug use	8%	2%
Marijuana dependence	90%	91%
Cocaine dependence	22%	13%
Other drug dependence	14%	15%
Prior history		
Mental health treatment	58%	48%
Substance abuse treatment	75%	79%
Length of stay[d]		
1–3 weeks	28%	25%
4–12 weeks	71%	68%
13+ weeks	2%	6%
Successfully completed residential treatment[d]	53%	50%

[a] No significant difference.
[b] "Usage" based on the 90 days prior to intake; diagnosis based on lifetime.
[c] Blood alcohol content (BAC) estimated using method described in Dennis et al.
[d] Length of stay and completion of residential treatment immediately preceding continuing care.

ipants assigned to the two continuing care groups. These data depict a sample of adolescents with severe substance abuse problems, juvenile justice involvement, and prior treatment episodes, especially in comparison to outpatient adolescent substance abusers (Godley, Godley, & Dennis, 2001). The two groups did not differ at intake on any demographic or clinical characteristic. The average LOS in the residential program was 49 days for each group and 51% of the sample successfully completed this treatment (53% UCC and 50% ACC). Both residential LOS and treatment completion status were not significantly different between conditions. Because they could still explain additional individual variation in outcomes, we conducted our analyses both with and without them as covariates; this had no impact on the results so we used the more parsimonious solution. While treatment completion status has been shown to be useful in at least one previous study (Winters, Stinchfield, Opland, Weller, & Lattimer, 2000), prior research in the treatment system used for this study suggested it was relatively uncorrelated with treatment outcomes (Godley, Godley, Funk, Dennis, & Loveland, in press).

3.2. Fidelity measures

At follow-up, clients were asked about types of procedures/services they had received since their discharge from residential treatment. Table 3 shows the percentage of clients who reported receiving different types of procedures/services by treatment condition. Adolescents assigned to ACC were more likely than those assigned to UCC to report receiving any treatment procedures like those described in the ACRA manual (79% vs. 61%, $\chi^2_{(1)} = 4.73$, $p < .05$, $d = .42$). ACC adolescents were more likely to report participating in specific activities described in the manual, such as: being asked about the benefits of being drug free; talking about engaging in fun activities without alcohol or drugs; talking about ways to solve problems; talking about friends; and getting help with agency procedures. They also were more likely to report receiving family related services (71% vs. 41%, $\chi^2_{(1)} = 10.58$, $p < .001$, $d = .64$) like those reported in the manual, including: having someone work with the family in their home; having someone meet with their family two or more times; and having someone work with the family on communication skills training. Finally, adolescents assigned to ACC were more likely to report receiving case management services (79% vs. 59%, $\chi^2_{(1)} = 5.68$, $p < .05$, $d = .46$), including: calls from the counselor/case manager between appointments; encouragement to attend appointments; checking if appointments were attended; transportation assistance; and assistance in obtaining other services.

3.3. Linkage to and participation in continuing care

Assessment of postresidential engagement in UCC services was computed from GAIN M90 self-reports of services received. These self-reports were correlated with agency service utilization records ($r = .78$) on a 36% sample of all participants. This correlation did not differ by condition. The average number of UCC sessions provided by treatment agencies was not significantly different for the two groups (7.4 vs. 7.6 sessions, $t_{(112),} = -0.109$, $p > .10$). Since those in the ACC group could also receive continuing care services provided by the ACC case manager, we examined the case manager service logs to assess what percentage of the ACC group received services from an ACC case manager. Adolescents assigned to ACC were more likely than those in UCC to receive continuing care services (92% vs. 59%, $\chi^2_{(1)} = 17.69$, $p < .05$. $d = .86$). To calculate the number of continuing care sessions for the ACC group, we summed ACC sessions reported on the service contact logs and outpatient and intensive outpatient services reported on the GAIN M90 and compared these to the latter services reported by the UCC group. This analysis showed the ACC group received

Table 3
Content of services received by the two continuing care groups[a]

Variable	Usual continuing care (UCC) (n = 51)	Assertive continuing care protocol (ACC) (n = 63)	$\chi^2_{(1)}$
Any direct treatment services	61%	79%	4.73*
Ask you about benefits of drug free lifestyle	49%	72%	6.27*
Teach/review relapse prevention	41%	57%	2.87
Talk about fun w/o alcohol or drugs	53%	79%	8.98**
Ways to solve problems	53%	76%	6.77*
Talk about friends	51%	73%	5.88*
Required urine testing	51%	49%	0.04
Help with agency procedure	38%	67%	9.01**
Other treatment service	4%	11%	2.00
Any family Services	41%	71%	10.58***
Work with you at your home	6%	52%	28.20***
Meet w/family 2+ times	33%	63%	10.25**
Meet w/family re: communications	26%	49%	6.22*
Help family get other service	8%	19%	2.93
Any case management or other services	59%	79%	5.68*
Call between appointments	16%	51%	15.25***
Encourage you to attend appts.	49%	76%	9.04**
Check if you attended appts.	37%	65%	8.75**
Talk about probation	47%	51%	0.16
Talk with probation officer	48%	36%	1.61
Meet with school staff	22%	26%	0.33
Transportation assistance	25%	49%	6.69*
Help you get other service	10%	30%	7.03*

[a] Services received from any inpatient, outpatient or continuing care program in the 90 days after discharge.
* $p < .05$.
** $p < .01$.
*** $p < .001$.

more overall continuing care sessions in the 90 days after discharge than the UCC group ($M = 14.4$ vs. $M = 7.6$, $t_{(112),} = 2.78$, $p < .05$, $d = .48$). The difference in mean number of sessions was due to additional continuing care delivered directly by ACC staff.

3.4. Substance use outcomes at three months

Fig. 1 presents a survival analysis showing the median days to marijuana use in the 90 days after discharge was significantly longer for adolescents assigned to the ACC group than those assigned to UCC (90 days vs. 31 days, $\chi^2_{(1)} = 4.07$, $p < .05$, $d = .39$). Adolescents in the ACC group were also significantly more likely than those in UCC to still be abstaining from marijuana at 3 months (52% vs. 31%, $\chi^2_{(1)} = 5.08$, $p < .05$, $d = .43$). Though in the right direction, the differences in days to first alcohol use (83 days vs. 63 days) and rates of abstaining from alcohol (50% vs. 43%) were not significantly different.

Fig. 2 shows the days adolescents used alcohol and marijuana during the 90 days before and after residential treatment. Adolescents assigned to ACC decreased their percentage (post-pre/pre) of days using alcohol significantly more than those assigned to UCC (From 12.6 to 4.5 days [− 64%] vs. from 9.9 to 8.1 days [− 18%], Time × Condition $F_{(1,95)} = 5.62$, $p < .05$). Because repeated measures were involved in testing the interaction, the f-index (Cohen, 1988) was used. Interpretation of an f, effect size is: .10 for a small effect, .25 for a medium effect, and .40 for a large effect. The effect size for the preceding time by condition interaction was $f = .24$. Though in the right direction, the change in the days using marijuana had more variance and was not significantly different (− 60% vs. − 47% Time × Condition $F_{(1,95)} = 1.48$, n.s.d.).

Additional repeated measure ANOVAs were calculated for alcohol and marijuana quantity, *DSM-IV* abuse and dependence symptoms (SPI), days of illegal activities, days of employment, and days attending school. While both groups showed significant improvements over time, there were no significant Time × Condition interactions at the 3-month follow-up.

3.5. Validity of self-report

Several studies have demonstrated self-reported substance use is generally valid and detects more use than laboratory tests, on-site tests, and collateral reports (Buchan, Dennis, Tims, & Diamond, in press; Del Boca & Noll, 2000). In the present study, adolescent reports of substance use were compared with estimates made by a collateral (typically a mother or father), on-site urine tests for THC (50 ng/ml) and Breathalyzer tests for alcohol. Cohen's (1960) kappa statistic was used to evaluate agreement between collateral/urine tests and client self-report.

Use during the 90 days prior to intake and the 3-month follow-up period between the adolescents and their collat-

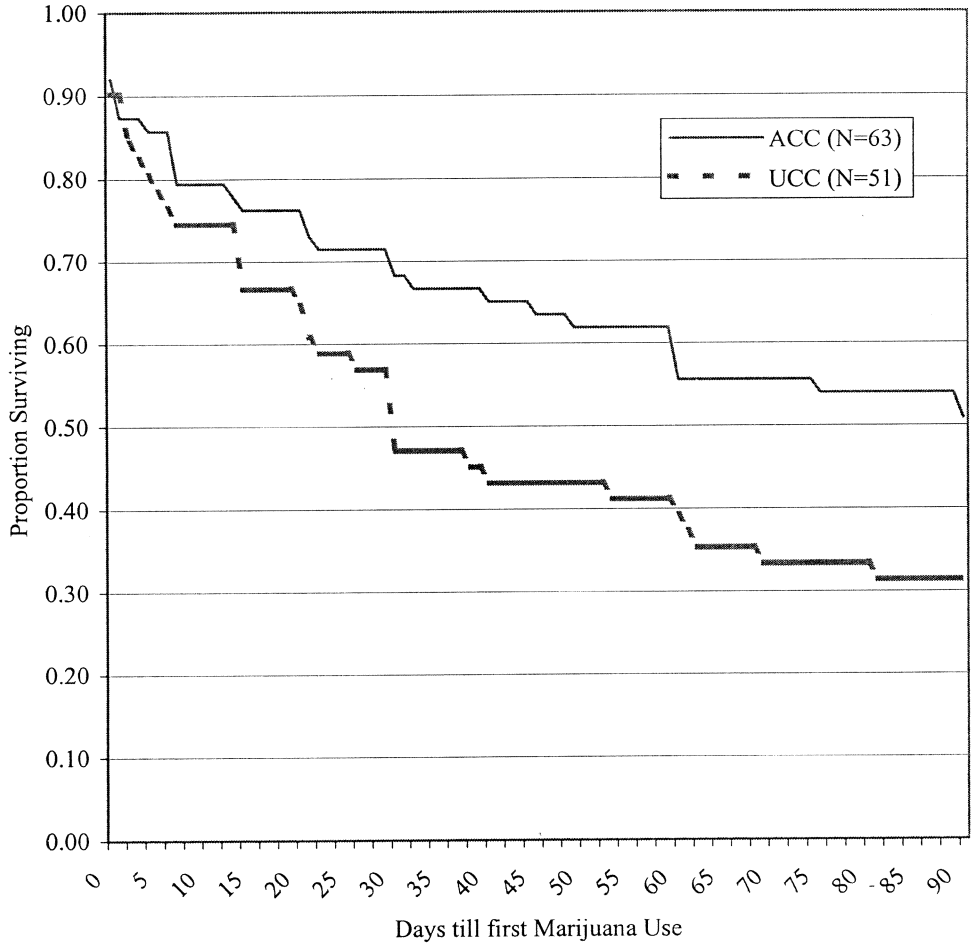

Fig. 1. Time to first use of marijuana.

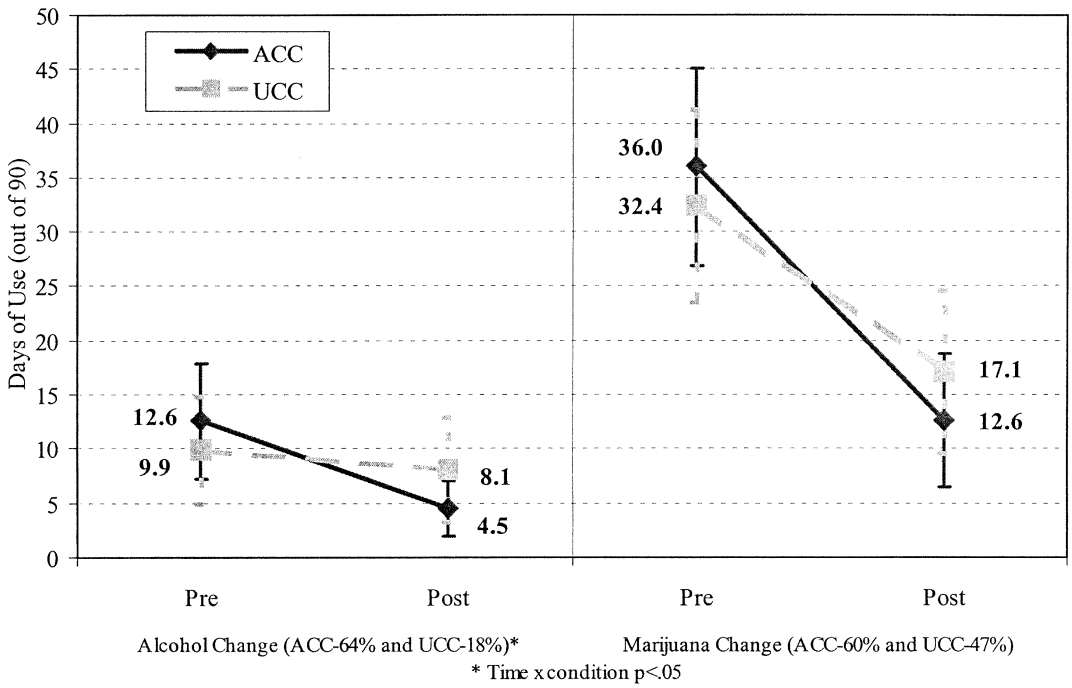

Fig. 2. Change in using alcohol and marijuana out of the last 90 days.

eral were compared. If both adolescents and collaterals reported use, if both reported no use or if the adolescent reported use but the collateral did not, this was classified as agreement. At intake (n = 58), there was a 89.7% (kappa = .69) agreement rate for report of any alcohol use and 98.3% (kappa = .92) for marijuana use. At follow-up (n = 88), the agreement rate for alcohol use and marijuana use were both 93.1% (kappa = .86).

Next, self reported recency of marijuana use was compared with on-site urine testing for THC (50 ng/ml or more). Urine results were compared with self-reported use in the past month. Agreement between the urine test and self report was defined as a) both positive test and report; b) both negative test and self-report; or c) negative test with positive self-report. At intake (n = 104), the agreement rate was 95.2% (kappa = .90) and at follow-up (n = 96) it was 87.5% (kappa = .75). We also attempted to compare self-reported alcohol use with breathalyser results, but none of the latter exceeded the .01 level despite some self-reports of recent use. The above results suggest self-reports of alcohol and marijuana use were, for the most part, valid.

4. Discussion

4.1. Summary

Results from this study demonstrate that adolescents assigned to the ACC condition received the intended intervention and that there were superior engagement, retention, and short-term substance use outcomes for the ACC condition compared to UCC. Compared to the UCC condition, the ACC protocol resulted in significantly more clients linking to continuing care. The ACC condition also demonstrated significantly better retention of clients in continuing care and were much more likely to receive specific continuing care treatment, family, and case management services. Adolescents assigned to the ACC condition had better substance use outcomes by increasing the time to first use of marijuana, increasing the rate of marijuana abstinence, and decreasing the percentage of days using alcohol. While trending in the hypothesized direction, tests of interaction effects for other outcome variables (e.g., SPI, quantity variables, illegal activity) did not reach statistical significance.

4.2. Implications

Based on our prior research on continuing care engagement (Godley, Godley, & Dennis, 2001), we expected continuing care linkage rates of 35% to 45% for the UCC group. Surprisingly, the UCC group demonstrated a 59% linkage to continuing care services. There is some anecdotal evidence that program directors improved referral procedures to UCC services after learning of the relatively poor linkage rates from our prior study. While it is difficult to know the rate of postresidential linkage to continuing care in typical practice settings, in treatment systems where linkage to continuing care is assumed (i.e., a referral is made without additional follow up by the referring agency), it is likely to be relatively low (<40%). Indeed, a recent analysis of statewide treatment services data for publicly funded programs revealed the observed rate of continuing care linkage to outpatient services for adolescents was 32% within 90 days after discharge from residential treatment. Given the preliminary nature of this report, the main finding and implications are: (a) the ACC model offers treatment providers the possibility of a two- to three-fold improvement in linkage to continuing care services; and (b) ACC services lead to a two-fold increase in average sessions, which results in better retention during the critical first 3 months after residential treatment and may lead to decreased substance use. Whether better engagement and retention lead to sustained improvement (beyond the initial 3 month follow-up) in substance use and related outcomes is currently being evaluated.

Although significantly more ACC clients reported receiving 13 of the 20 specific content services listed in the GAIN M90, we were concerned this finding might have been an artifact of their higher rate of continuing care engagement rather than actual differences in the mix of services. This issue was examined by subsetting to only those clients who reported receiving any postresidential continuing care services rather than all clients in both groups. The results changed only slightly, with 11 specific services still significantly more likely to be reported by the ACC group. This finding supports the conclusion that ACC also changed the mix of services received.

The significant decreases in substance use for the UCC group suggests the combination of residential treatment and UCC is relatively effective. This posed a greater challenge for the ACC protocol than a control group with no continuing care services (the latter was ruled out due to ethical considerations). Nevertheless, the addition of ACC resulted in further significant decreases in drug use compared to the UCC group. These findings are encouraging for several reasons. First, the ACC intervention incorporates client support and intervention recommendations from previous reviews of continuing care (McKay, 2001; Donovan, 1998). Specifically, ACC was based on a combination of case management and the ACRA (Godley, Meyers et al., 2001). While CRA has a long history of being used for treating alcohol and other substance use disorders in adults (Hunt and Azrin, 1973; Azrin, 1976; Azrin et al., 1982; Smith, Meyers, & Delaney, 1998; Higgins et al., 1991), this is its first application to adolescent continuing care. Modifying CRA for adolescents offers a broad-spectrum intervention that addresses not only substance abuse, but other issues such as the need for positive social/recreational enhancement, psychiatric intervention, employment, education, and legal issues. Second, randomizing participants to conditions, having several measurement sources for substance use, using multiple case managers, and

data collection personnel who were in no way connected to residential or continuing care services is a strength of the study and enhanced internal validity. Third, external validity and generalizability of this study is relatively high since: (a) it was designed to address a problem identified by treatment providers; (b) a high percentage of clients met eligibility requirements and over 80% of the eligible participants enrolled in the study; (c) clients were not excluded even with residential stays as short as 7 days; (d) residential treatment noncompleters (clients asked to leave the program/clients leaving against staff advice) were included; and (e) 97% of the sample completed the 3-month follow-up. Fourth, there have been no prior randomized clinical or field trials of continuing care with adolescents in the published literature. The positive findings from this study, while preliminary in nature, suggest additional controlled studies of continuing care are both feasible and needed.

4.3. Limitations

There are limitations of the present research that should be acknowledged. Positive outcome findings were limited to frequency measures of substance use. These results are limited to the first 114 participants enrolled and studied over the first 3 months of follow-up. The study will enroll additional participants and plans two more waves of 3-month follow-up intervals to assess the durability of these results. Subsequent follow-up waves will also be useful to examine whether additional outcomes variables that were not significant at 3 months, such as the substance abuse problem index, quantity measures, and measures of other life functioning begin to show significant differences.

Another concern was that the observed effects of ACC were largely due to ACC directly providing services (vs. better linkage to UCC services). ACC did not lead to higher engagement or retention rates in UCC programs or to self-help group attendance. It is quite possible some clients may feel pressed for time or do not see the need to participate in more than one continuing care treatment program. With respect to self-help group attendance, Kelly et al. (2000) reported more than twice the attendance at self-help meetings after residential treatment than either group in our study. Possible reasons for this are that the area served by this study simply did not have the quantity of meetings available as in the other study and perhaps more importantly, had fewer meetings devoted to adolescents in recovery.

4.4. Next steps

Ongoing research is now focused on the longer term effects of ACC in terms of the durability of the significant substance use findings and new outcome findings that may emerge in the course of the 6- and 9-month follow-ups. Depending on the results of the 6- and 9-month follow-ups, it may be necessary to extend the ACC protocol beyond a 3-month postresidential period. Subsequent analyses will also explore whether subgroups of clients respond differently to ACC.

In addition to studying the longer-term outcomes of this study, future research should examine whether ACC can be further strengthened. Case manager experience suggests some of the client goals for increased prosocial activity have not been sufficiently attained. One possibility is to address these gaps by supplementing ACC with contingency management procedures to reward prosocial activities by the adolescent. Contingency management is an approach that has effectively increased attendance at treatment as well as substance use outcomes in several adult substance abuse treatment studies (Higgins & Petry, 1999; Petry, Martin, Cooney, & Kranzler, 2000) and may prove useful in improving prosocial behavior in adolescents.

Another important area for research is to determine the likelihood of adoption of ACC in actual practice. The present study succeeded at incorporating ACC into a practice setting in terms of coordinating its services with both the residential and other UCC providers, and deploying case managers to conduct home visits across a broad geocatchment area. Nevertheless, it is unclear to what extent current reimbursement practices in different states would support this approach to service delivery. Treatment providers would also have to accept home-based service delivery for this approach to be viable. Future research should be conducted to assess implementation costs and benefits to society relative to UCC. Finally, given the fact the vast majority of adolescents with substance use disorders are treated in outpatient programs, an important extension of the current research is to study the adaptation of ACC procedures following outpatient treatment.

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