Mark Godley and Susan Godley

Mark Godley, PhD, and Susan Harrington Godley, RhD, are the two names I most associate with groundbreaking studies aimed at enhancing long-term recovery outcomes for adolescents following addiction treatment. They have done this through development of an approach to adolescent treatment (the Adolescent Community Reinforcement Approach) that seeks among other things to create a post-treatment family and social environment conducive to recovery and by pioneering assertive approaches to post-treatment continuing care for adolescents and their families. My own work conceptualizing a model of sustained addiction recovery management has been profoundly shaped by their respective studies and by our writing collaborations. The study below exemplifies the scientific rigor and clinical importance of their work.

William White

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The Effect of Assertive Continuing Care on Continuing Care Linkage, Adherence, and Abstinence Following Residential Treatment for Adolescents with Substance Use Disorders

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The Effect of Assertive Continuing Care on Continuing Care Linkage, Adherence, and Abstinence Following Residential Treatment for Substance Use Disorders in Adolescents

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Abstract

Aims. This study compared assertive continuing care (ACC) to usual continuing care (UCC) on linkage, retention, and a measure of continuing care adherence. Outcome analyses tested the direct and indirect effects of both conditions and level of adherence on early (months 1-3) and longer-term (months 4-9) abstinence.

Design. Two-group randomized design.

Setting. 11 counties surrounding a community-based residential treatment program in the Midwestern section of the United States.

Participants. 183 adolescents, ages 12 to 17, with one or more DSM-IV substance use dependence disorder and met ASAM placement criteria for non-medical residential treatment.

Intervention. Prior to discharge from residential treatment, participants were randomly assigned to receive either UCC, available at outpatient clinics in the 11-county study area, or ACC via home visits.

Measurements. Self-reported interview data were collected at intake, 3, 6, and 9 months post residential discharge. Urine test data and interviews with a caregiver were conducted at baseline and three months.

Findings. ACC led to significantly greater continuing care linkage and retention, and longer-term abstinence from marijuana. ACC resulted in significantly better adherence to continuing care criteria, which in turn, predicted superior early abstinence. Superior early abstinence outcomes for both conditions predicted longer-term abstinence.

Conclusions. ACC appears to be an effective alternative to UCC for linking, retaining, and increasing adherence to continuing care. Replication with larger samples is needed to further investigate the direct and indirect effects of ACC found in this study.

The Effect of Assertive Continuing Care on Continuing Care Linkage, Adherence, and Abstinence Following Residential Treatment for Substance Use Disorders in Adolescents

Treatment admissions for adolescents with alcohol and other substance use disorders continue to increase. In the United States, the annual number of adolescents admitted to residential treatment grew from approximately 15,000 to 24,000 between 1992 and 2002 (1).

Many states and purchasers of treatment have adopted the patient placement criteria developed by the American Society for Addiction Medicine (ASAM; 2), which restricts residential treatment admissions to those adolescents with the most severe problems. Recent work that compares the characteristics of adolescents placed in residential and outpatient treatment confirms that the former have more severe substance use problems, are more likely to have co-occurring mental health disorders, and have more severe family and school problems (3-4). Although studies of adolescent residential treatment reveal significant decreases in use after residential treatment (5-6), there is also evidence of high rates of relapse once adolescents return to their natural environment (7-8). Accordingly, continuing care (sometimes referred to as aftercare) has been widely recommended as a critical component for maintaining treatment gains after residential treatment for both adults and adolescents (3, 9-16).

Recent research demonstrating the importance of early sustained abstinence as a critical response to treatment in the prediction of long-term abstinence provides support for the possibility that linkage to and retention in continuing care following discharge from residential treatment could contribute to improving early sustained abstinence. In two studies of adults who were primarily dependent on cocaine and alcohol, retention in outpatient treatment and reduced use were not sufficient to predict long-term abstinence outcomes; only those with a period of sustained abstinence during (outpatient) treatment experienced sustained post-treatment abstinence (17-18). While the experimental approaches may have been more effective at retention and moving participants to early abstinence, it was whether the actual early sustained abstinence response (regardless of condition) was obtained that predicted long-term abstinence. This finding suggests that the impact of treatment was mediated by the early response to treatment, that multiple types of treatment could produce this response, and that it was the "early treatment response" that served as the key to subsequent sustained abstinence. Continuing care strategies have not been tested within this analytic model; however, the theoretical rationale for such services is consistent with promoting early and ongoing sustained abstinence. Although continuing care following residential treatment is recognized as the standard of practice in the treatment of substance use disorders (19-20), there is considerable evidence that many adult and adolescent clients do not link to a continuing care service following residential treatment (9, 21). For example, in a recent study of 13,248 adolescent residential discharges in 23 states, the Office of Applied Studies (OAS; 22) found that 38% completed successfully, another 10% were formally transferred to another level of care, 20% left against staff advice, and the remainder were administratively discharged without completing residential treatment. With an unplanned discharge rate of 52%, these data suggest that a significant barrier to continuing care may be due to the high unplanned discharge rate for adolescents leaving residential treatment. Other barriers to continuing care linkage and retention include (a) low perceived benefit relative to cost (23); (b) axis 1 comorbid diagnosis (24); and (c) distance from clinic (25-26).

Studies of both substance use disorders and other problems have addressed barriers to compliance with disease management strategies by using "assertive" approaches that transferred the responsibility for linkage and retention from the patient to the clinician. Therapist-initiated contacts have proven useful for depression treatment (27) and cigarette cessation (28), while home-visiting nurses have for public health interventions (29) and the prevention of nursing home placement of the elderly (30). Studies of therapist-initiated contacts with adolescent substance disordered patients are rare. Slesnick and Prestopnik (31) reported superior enrollment and retention in outpatient treatment for home visits compared to office visits. Therapist-initiated contact with adult patients has been reported with mixed outcome results (32-34).

Previously, we reported preliminary findings from a controlled study designed to improve linkage to and retention in continuing care services and treatment outcomes for adolescents discharged from residential treatment (21). Early findings from this five-year study showed that an assertive service delivery protocol using home visits, case management (21), and the community reinforcement approach (35-39) was significantly more likely than the usual continuing care (UCC) condition to link participants to assertive continuing care (ACC), despite the fact that nearly half of the participants in both conditions had unplanned discharges from residential treatment. Outcomes at the end of the three-month continuing care phase showed that a significantly greater proportion of ACC participants remained abstinent from marijuana compared to the UCC condition. Results for alcohol abstinence were marginally significant.

The purpose of this paper is twofold: (1) to update results reported in the preliminary findings paper (21) on the effect of ACC in linking and retaining adolescents in post-residential continuing care and its effect on abstinence outcomes; and (2) to extend the understanding of more effective continuing care in general, and ACC, in particular, by examining (a) its ability to increase a measure of general continuing care adherence (GCCA); (b) the extent to which continuing care adherence (from UCC and ACC) predicts early abstinence; and (c) the extent to which early abstinence then predicts longer-term abstinence outcomes. Thus, the analyses assume that ACC has a direct effect on GCCA and indirect effects on early abstinence (via GCCA) and sustained abstinence (via GCCA and early abstinence).

Methods

Participants

To be included in this study, the adolescents attending residential treatment had to meet criteria for a Diagnostic and Statistical Manual of Mental Disorders (DSM-IV; 40) diagnosis of current alcohol and/or other drug dependence, be between the ages of 12 and 17, and reside in the 11 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, 125 (36%) out of 351 adolescents did not meet eligibility criteria. The main reasons for ineligibility were leaving residential treatment prior to seven days (n=31) or returning to a juvenile correction facility prior to residential discharge (n=44). The remainder were excluded from the study because: (a) they did not return to the target community at discharge (n= 7); (b) they were a danger to themselves or others (n=1); (c) their psychosis interfered with understanding the study measurement (n=3); (d) they were a ward of the state (n=5); (e) did not complete the intake assessment (n=1); or (f) they were already participating in another study or were still in residential treatment when the study ended (n=33). Adolescents and an accompanying parent/caregiver were approached for participation in the study during the first week of the adolescents' admission to residential treatment. They were provided an explanation of the study and the informed consent process under the supervision of the Chestnut Health System's Institutional Review Board; 81% (183/226) signed an informed consent agreement to participate in the study and 19% (n=43) declined to participate.

Of the 183 adolescents participating in the study, 71% were male, 73% were Caucasian, 18% were African American, 45% were age 17 or 18 (M=16.2, S.D.=1.2), 37% had not completed school beyond the eighth grade (M=8.9, S.D.=1.4), 89% were unemployed, 33% were from two-parent families, and 82% had prior involvement with the juvenile justice system. All

participants met criteria for a DSM-IV substance use disorder, with the majority meeting dependence criteria for alcohol (54%) and marijuana (87%), and a few also meeting dependence criteria for cocaine (15%) or other drugs (14%). Overall, 88% of the sample began using alcohol or other drugs before the age of 15, and 70% had at least one prior treatment episode for a substance use disorder. The majority had one or more co-occurring psychiatric diagnoses (conduct disorder, ADHD, depression, anxiety, or a trauma-related disorder) and a history of mental health treatment. Participants assigned to the two conditions were statistically equivalent on demographic and clinical characteristics (see tables 1 and 2).

Insert Tables 1 and 2 about here

Residential Treatment

An adolescent's placement in residential treatment and his or her length of stay was based on individual needs, treatment goals, and progress. A detailed description of the residential program has previously been provided (21, 41). The average length of stay (LOS) in the residential program was 52 days for each group, and 52% of the sample had "as planned" discharges from residential treatment (51% UCC and 53% ACC). Neither residential LOS nor treatment completion status were significantly different between conditions.

Continuing Care Conditions

Usual Continuing Care (UCC). At discharge from residential treatment, staff made referrals to adolescent outpatient providers in an adolescent's home community for continuing care. No attempt was made to standardize or modify usual continuing care because the study was an attempt to compare assertive continuing care against usual practice, and so many different treatment agencies in the large geographical catchment area provided the service. There were 12 treatment facilities covering different geographical areas in the 11-county target area available to provide continuing care services to adolescents on an outpatient basis. A survey of these programs revealed considerable diversity in the type and frequency of services offered. Four agencies offered intensive outpatient programs that met three to five days per week, while eight agencies offered outpatient programs that met one to two times per week. The agencies reported services that included referral to self-help groups, urine testing and feedback, relapse prevention and social skills training, counseling for parents as well as the adolescent, and case coordination with schools and probation officers. Results of this survey were also used to develop and test a measure of "general continuing care adherence" (see data sources and measures section). The effort to link an individual youth with an outpatient provider varied based on the type of discharge, so that an adolescent being discharged "against staff advice" or "at staff request" only received a letter informing him or her where to go for further treatment, while an adolescent discharged "as planned" received a continuing care appointment date and time. Typically, appointments were scheduled within two weeks after discharge.

Assertive Continuing Care (ACC). Because prior evaluation studies (8, 21) showed that most adolescents did not receive continuing care following residential treatment, the ACC condition was developed to assure continuing care, either as an alternative or supplement to UCC. Participants assigned to this condition received the same types of referrals from their residential counselor to usual continuing care services as those assigned to the UCC condition. In addition, they were assigned an ACC case manager for a 90-day period following discharge from residential treatment. The goal of ACC was to link every participant assigned to this condition to

the services provided through ACC (even if they left against staff advice or at staff request), to meet weekly with adolescents and/or their caregivers throughout the first 90 days after residential treatment, to assist them in linking to other services, including UCC or needed ancillary services, to encourage the adolescent to meet new friends and try new prosocial activities, and to improve substance use outcomes after residential treatment. Adolescents received home visits from the case manager to increase the likelihood of linkage to ACC and ongoing participation. Travel by case managers in the primarily rural target area ranged from approximately 300 to 2,000 miles per month, depending on the case manager's geographical distribution and size of caseload. Caseload size varied from a low of three to a high of 11 adolescents.

Case managers provided the ACC intervention following two manuals: one outlined case management and the home-based approach (37) and the other was based on community reinforcement approach (CRA) procedures (35, 39) that were adapted and tested for adolescents (36, 38). Case management services included: (a) home visits; (b) help linking the adolescent to necessary services, including the provision of help to understand agency procedures and completion of paperwork; (c) transportation to needed services, for job finding assistance, or to a prosocial activity; (d) advocacy for the client to access services when needed; (e) monitoring lapse cues and attendance at other needed services and activities; and (f) social support for coping with a lapse or other challenging issues (37). As its name implies, the ACC model was assertive in its approach, so that for example, linkage did not mean merely referring an adolescent to another professional (e.g. a psychiatrist for medication evaluation), but also involved checking to see if they accessed the service, providing transportation to the appointment if necessary, and consultation with the referral afterwards.

Also delivered by the ACC case manager, the Adolescent Community Reinforcement Approach (ACRA) manual was a behaviorally-based intervention that sought to increase the positive, prosocial day-to-day activities of alcohol- and drug-abusing adolescents. ACRA included procedures for conducting a functional analysis of using behaviors as well as social activities, and using participant self-assessment to develop goals for treatment. Subsequent self-assessment ratings were used to help the adolescent monitor his or her success in meeting goals and to modify existing or develop new treatment goals. With the adolescent, case managers focused skill-building on increasing pro-social recreation, communication and problem solving skills, and relapse prevention. These procedures incorporated talking about ways to have fun without using substances and making non-substance using friends. In addition, sessions were held separately with the primary caregiver to explain the services and increase motivation to support their adolescent during ACC, to discuss research-proven techniques for improved parenting with adolescents, and to improve communication and problem solving skills. Toward the end of the three-month active continuing care phase, case managers met twice with the caregiver and adolescent together to practice communication skills, problem solving, and learn additional procedures for increasing positive interactions. Optional adolescent-focused procedures for coping with a lapse, anger management, and job finding were also available.

Adherence to continuing care protocols. In order to promote and verify fidelity (42), case managers were trained in procedures that were documented in treatment manuals (37-38) and supervised by one of the authors of the treatment manuals. Case manager sessions with the adolescents were closely monitored via audiotape review or direct observation and given corrective feedback by the supervisor. In addition, at three-months post-discharge (the end of the ACC condition), adolescents were asked if they received certain services that were standard in

the ACC protocol and not likely to be offered by UCC providers. When comparing six types of services between conditions, the ACC condition had a significantly higher percent of adolescents reporting receiving these services than did the UCC condition. These services included: working with the adolescent in the home, χ^2 (1, N = 175) = 61.8, $\underline{p} < .001$; talking with the adolescent about ways to have fun without drugs or alcohol, χ^2 (1, N = 175) = 22.6, $\underline{p} < .001$; talking with the adolescent about making new friends, χ^2 (1, N = 175) = 22.4, $\underline{p} < .001$; encouraging the adolescent to attend appointments, χ^2 (1, N = 175) = 24.0, $\underline{p} < .001$; providing the adolescent with transportation to appointments, χ^2 (1, N = 175) = 11.8, $\underline{p} < .001$; and helping the adolescent (needing to access ancillary services) with agency procedures and understanding their rights, χ^2 (1, N = 175) = 16.6, $\underline{p} < .001$. Essential ACC completion was defined as completing eight or more sessions (two thirds of the goal of one session per week) over the 90-day continuing care phase, and 68% of the adolescents assigned to ACC (69/102) met this criterion.

Procedures

Randomization. To reduce variance in the data, a randomized block design was used (43-44). Participants were placed into one of eight mutually exclusive blocks based on their gender, whether they were involved in the criminal justice or social welfare system, and if they met DSM-IV (40) criteria for dependence on a substance other than alcohol. Within each block, participants were randomly assigned to UCC or ACC using a random number generator in Microsoft Excel, with assignments being made independently by the Research Project Coordinator. 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 managers. The final distribution was 102 (56%) in ACC and 81 (44%) in UCC.

Intake and follow-up assessments. Intake assessments were administered during the first week of residential treatment and all participants who passed inclusion and exclusion criteria and signed the informed consent were retained for follow-up interviews and analysis using an intent-to-treat analysis (45). The follow-up interviews were administered at three, six, and nine months after the residential treatment discharge date. At the three-month follow-up wave only, the participant interviews were supplemented with urine testing and collateral interviews. Although it was not possible to blind staff to condition, research staff with no connection to the continuing care interventions administered all follow-up interviews and the rate of false negatives (urine vs. self-report) were not significantly different between the conditions. The follow-up rates were 96% at three months, 95% at six months, and 94% at nine months. There were 92% of the participants with data for all three follow-up waves and 95% of the data was collected within two weeks of the scheduled interview date.

Data Sources and Measures

This paper uses two main data sources summarized below and six specific measures defined in Table 3. Baseline and follow-up data for this study were collected through interviews using the Global Appraisal of Individual Needs (GAIN) instrument (46-47). The GAIN has been normed on both adults and adolescents (47). The measure of substance use has been validated to timeline followback, urine, and collateral reports (36, 48). Validity for the self-reported measures of substance use to urine tests and services to treatment records has been established (21).

Insert Table 3 about here

In order to measure linkage to and sessions of continuing care following residential treatment, the GAIN was supplemented with Service Contact Logs (SCL) that were developed to

track ACC case management activities. The log contained fields that allowed the case manager to record what ACC procedure was conducted with which participant, at what time, and in which location. These logs were completed daily by the case managers to ensure that each session held with an adolescent and/or a family member was documented and were reviewed by supervisory staff.

Imbedded within the GAIN, the General Continuing Care Adherence (GCCA) scale was based on an analysis of the common continuing care recommendations endorsed by 67% or more of the 12 UCC outpatient providers mentioned above (see Figure 1 in results for the list of items). These criteria form one construct with a Cronbach's alpha of .9 and can be treated as a unitary construct. To differentiate high from low GCCA, the median split (at seven of 12 criteria) was used to optimize statistical power in subsequent analyses.

Data Analysis Plans

All analyses were conducted using an intent-to-treat approach using SPSS version 13.0. Only the cases with all three follow-up interviews and all outcomes (92%) were used in these analyses. Chi-square tests were used to test differences between dichotomous variables collected at the three-month follow-up interview from the two conditions, including the percentage receiving any type of continuing care and for the items comprising the General Continuing Care Adherence (GCCA). A between groups t-test was used to test the difference in the average number of continuing care sessions.

The relationship between days of abstinence in the first three months after residential treatment discharge and the rate of abstinence in the subsequent six months resulted in a skewed distribution. Specifically, nearly two thirds of the adolescents abstinent in months four through nine were abstinent in the first three months. Thus, the substance use measure was dichotomized as abstinent or not abstinent. Logistic regression analysis was used to predict abstinence during continuing care (first three months after residential discharge) by condition and high adherence to continuing care (based on the median split on GCCA, high adherence meant endorsing seven of the 12 criteria) for abstinence from any AOD use, alcohol use, and marijuana use. Second sets of logistic regression analyses were used to predict abstinence following continuing care (months four to nine), using condition, high GCCA, and abstinence during continuing care as predictors.

Results

Linkage to and Participation in Continuing Care

In the 90 days after discharge, adolescents assigned to ACC were more likely than those assigned to UCC to link to continuing care services (94% vs. 54%, $\chi^2_{(1)} = 40.1$, $\underline{p} < .001$. $\underline{d}=1.07$). Usual continuing care was available to both conditions and the average number of UCC sessions attended was not significantly different by condition (7.1 vs. 6.3 sessions, $\underline{t}_{(173)} = 0.56$, $p > .10$). With the addition of ACC sessions (including individual and caregiver sessions), the ACC group received more days of continuing care sessions ($\underline{M} = 18.1$ vs. $\underline{M} = 6.3$, $\underline{t}_{(178)} = 4.66$, $\underline{p} < .001$, $\underline{d} = .64$). Also, the median number of continuing care sessions attended for the UCC condition was two compared to 15 for the ACC condition ($\chi^2_{(1)} = 29.6$, $\underline{p} < .001$. $\underline{d}= 0.90$).

Impact of ACC on GCCA

Figure 1 shows the percent of adolescents in each condition that reported receiving each of the GCCA criteria in the first 90 days after discharge. The ACC condition had a higher percent of participants meeting each criterion than did the UCC condition. Chi-square analysis revealed significant differences between the two conditions on all but four of the criteria for the

intent-to-treat analysis. Even after sub-setting to those participants who linked to continuing care in both conditions, the ACC participants were still significantly more likely to report meeting with parents one-two times a month (72% to 49%; $\chi^2_{(1, N = 84)} = 4.9$, $\underline{p} = .026$), weekly telephone contacts (62% to 27%; $\chi^2_{(1, N = 84)} = 10.1$, $\underline{p} = .002$), and following up on referrals (89% to 68%; $\chi^2_{(1, N = 84)} = 6.1$, $\underline{p} = .014$). The effect of ACC on GCCA interacted with the type of discharge from residential treatment. Within UCC, those with planned discharges from residential treatment were significantly more likely than those with unplanned discharges to have high GCCA (45% to 24%; $\chi 2_{(1, N = 78)} = 3.9$, $\underline{p} = .048$). Within ACC, both planned and unplanned discharge groups had a higher percent of adolescents with high GCCA than either UCC discharge group, and there was no significant difference between the two discharge type groups for those with high GCCA (69% vs. 59%; $\chi 2_{(1, N = 97)} = 1.03$, $\underline{p} = .31$). The last criterion in Figure 1 displays the percent of adolescents reporting high GCCA (above the median of seven criteria met) by condition (64% ACC vs. 35% UCC). The odds of having high GCCA were three times higher (Odds Ratio =3.35, $p<.05$) for adolescents in the ACC group than those in the UCC condition.

Insert Figure 1 about here

Direct and Indirect effect of ACC on early and long-term abstinence

Table 4 shows the direct effects of ACC (relative to UCC) on early (months one through three) and sustained (months one through nine) abstinence from any alcohol or other drug use (AOD), alcohol use, and marijuana use. Abstinence rates were more than 20% higher for ACC in five of six comparisons; however, the size of the difference reached statistical significance in only the comparison for sustained marijuana abstinence, the most frequently used substance. As shown in the last column of Table 4, a primary problem with this contrast is power.

While the ACC group was more likely to participate in continuing care and report high GCCA, there was a subgroup of adolescents in the UCC group who did go to continuing care and who had high adherence as well. To explore the extent to which ACC was having indirect effects via GCCA and the initial response to treatment, we incorporated them into a logistic regression analysis.

Insert Table 4 about here

Table 5 presents the odds ratios (and their 95% confidence intervals in parenthesis) from the logistic regressions for predicting abstinence during the first three months after residential discharge as a function of ACC and high GCCA. Abstinence during the fourth through ninth month after residential treatment discharge was predicted using ACC, high GCCA, and being abstinent during the first three months after residential treatment discharge. Analyses were conducted for any alcohol or other drug (AOD) use, alcohol only, and marijuana only (two most commonly used substances). Hosmer and Lemeshow's (49) test for goodness of fit indicated that each of the models in Table 5 were a good fit to the data ($\underline{p}$ values for marijuana abstinence at four to nine months were .08, and the rest were over .30).

Insert Table 5 about here

Alcohol and Other Drug (AOD) Use. Only high GCCA was a significant predictor of abstinence from any alcohol or drug use during the first three months after residential treatment discharge. Those adolescents who had high GCCA were twice as likely to be abstinent for the entire three months. While ACC predicted those with high GCCA, it did not predict early abstinence. High GCCA was not a significant predictor of abstinence during the fourth through ninth month after residential treatment, while early abstinence was. Adolescents who reported abstinence during the first three months after residential treatment discharge were over 11 times more likely to remain abstinent during months four through nine.

Alcohol Use. There was a similar pattern for predicting abstinence from alcohol use as from any AOD use. Those adolescents with high GCCA were almost twice as likely to be abstinent from alcohol during the first three months after their residential discharge. During the fourth through ninth month after discharge, the only significant predictor for abstinence from alcohol was reported abstinence during the prior three months. Moreover, those adolescents who were abstinent from alcohol during the first three months after discharge from residential treatment were over five times as likely to be abstinent from alcohol during the fourth through ninth month after discharge.

Marijuana Use. A similar pattern was also revealed for predicting abstinence from marijuana use. Those adolescents with high GCCA were almost twice as likely as those who were not to report abstinence from marijuana during the first three months after discharge from residential treatment. Adolescents who were abstinent from marijuana use during the first three months after discharge were more than 11 times more likely to be abstinent from marijuana use during the fourth through ninth months after residential treatment discharge.

Discussion

Results of this study demonstrate that ACC was significantly more effective than UCC in linking adolescents to and providing them with continuing care following residential treatment. Although the UCC clinics were staffed with adolescent counselors available to see patients for continuing care after residential treatment, the rate of linkage in the ACC condition nearly doubled the UCC rate. It is likely that the home-visiting case managers in the ACC condition led to the higher linkage rates, but this alone was not sufficient to produce high linkage and retention. Case manager assertiveness in dealing with multiple missed home visit appointments led to multiple rescheduling attempts and, when necessary, unscheduled “drop by” sessions to achieve high linkage and retention with many ACC participants. Conversely, the outpatient continuing care standard of practice is characterized by office-based services, which require the patient (and family) to be sufficiently motivated and resourced to get to the clinic for care. In the present study, this approach resulted in 54% of the UCC patients linking to continuing care; in other studies, linkage rates have ranged from 35%-45% (21, 50).

This study also found that the odds of high adherence to continuing care criteria (GCCA) were significantly higher for those in ACC. The combination of improved linkage, retention, and adherence suggest implementation advantages for an assertive continuing care model compared to the standard of practice. Main effects for ACC were demonstrated over the total nine-month period for marijuana abstinence but not alcohol or other drugs. Additional analyses provide preliminary evidence that ACC has an indirect effect (via increased GCCA) on early abstinence and an indirect effect on longer-term abstinence (via increased GCCA and early abstinence). Note that for the smaller proportion of UCC adolescents who also achieved high GCCA, its

relationship to early abstinence (and early abstinence to sustained abstinence) were the same. Given that the effects of ACC were mediated by the same kind of general continuing care adherence factors that were, to a lesser degree, evident as a result of UCC, it is important to consider the change mechanisms of ACC. From this study, it is not possible to deconstruct the key components of ACC, but it is plausible that any of the following intervention features, either alone or in combination contributed to higher GCCA: (a) the case manager's "assertiveness" (i.e., the case manager taking the responsibility for maintaining contact over time through home visits; phone calls); (b) ACRA; (c) weekly audiotape review and supervision to prevent model drift; and (d) case management to assist the client and caregiver access ancillary services.

Limitations. A significant limitation of this study was the lack of statistical power to reliably measure the direct effect of ACC on abstinence. Although all tested effects were in the right direction (five of six over 20% improvement, three of six with effect sizes over .2), only one of the six comparisons reached statistical significance. Modern guidelines for establishing a "mediation" process (51) suggest first establishing the relationship between random assignment and proximal outcomes, then demonstrating that the introduction of the mediator reduces or eliminates the relationship. However, later authors (52-53) acknowledge that these criteria may be too conservative as the outcomes become more distal and when there are multiple intervening events that can be assumed to have effects on the outcome. Thus the evidence presented here should be viewed as "suggestive" of a mediation process, and needs to be replicated with a larger sample.

While high general continuing care adherence is associated with better short-term (and indirectly long-term) abstinence, it is important to acknowledge that it does not automatically imply abstinence. Even among those adolescents who had high values on the GCCA scale, 57% relapsed during the subsequent six months. While ACC was associated with higher rates of sustained abstinence for nine months (Table 4), the withdrawal of ACC was associated with a non-significant trend towards increased relapse in months four through nine (Table 5). Thus while ACC helped to delay relapse, when it was withdrawn, slightly more adolescents in this condition eventually relapsed. This finding suggests that three months of post-residential continuing care may not be sufficient to overcome the risk of relapse for some. This recommendation is in line with McKay's (54) recommendation for adaptive treatment strategies that increase or decrease continuing care frequency and intensity in response to patient functioning.

The study has other limitations that are important to acknowledge including: (a) the long-term outcomes were limited to nine months post-residential discharge and based only on self-report; and (b) the findings are from a single residential program site. Self-report of substance use has been shown by others (55-56) to be generally useful under research conditions especially when using interviewers not associated with the clinical intervention and providing participants the assurance of confidentiality. In an earlier report of this study, validity checks against urine tests and collateral reports were encouraging (21). Finally, findings based on results from a single site are useful but require replication using additional sites to increase generalizability.

Clinical Implications. There are a number of clinical implications that can be made based on these findings with respect to continuing care following residential treatment. First, lapse/relapse potential following residential discharge is high; therefore, shortening the time to first continuing care session may help promote and sustain early abstinence. An assertive approach to continuing care that reaches adolescents and their families through home visits and telephone calls is likely to facilitate early service initiation, increase and maintain adherence to

continuing care criteria, and may result in a greater likelihood of early sustained abstinence. Second, since many adolescent residential programs draw from a large geographical area, it is important for the residential program to form effective and efficient referral alliances with the larger network of outpatient programs that are both the source of many referrals and the place to which most adolescents return after discharge. Residential and corresponding outpatient providers might consider a series of teleconferences or face-to-face meetings with the adolescent beginning early in the residential stay to shorten the time between discharge and linkage to continuing care. Third, linkage to continuing care services for patients with unplanned residential treatment discharges is possible and may help prevent or minimize relapse consequences for patients who otherwise might be lost to continuing care. The residential-outpatient coordination process should include consent to participate in continuing care early in the residential stay, sharing adolescent locator information, and notifying the outpatient provider of both planned and unplanned discharges. Future research should study whether this approach has beneficial effects on adolescents with unplanned residential discharges. Fourth, the present study suggests that improving adherence to continuing care services during the first three months after residential discharge may be an important mechanism for producing sustained abstinence. Further research is needed to test for replication of the mediation effect of continuing care adherence and to assess the importance of the 12 continuing care adherence criteria.

Conclusion. This study provides support for the proposed theoretical model of abstinence by significantly improving adherence to continuing care criteria, which resulted in significant short- and longer-term abstinence effects. These findings are consistent with studies of outpatient cocaine-dependent adults (18, 57-58) and outpatient adolescents (59) that suggest the best predictor of long-term outcomes is not the type or amount of treatment/intervention, but the initial response to treatment. While there was some evidence of a small-harm reduction effect (21), the larger and stronger effect was found for adolescents who achieved 12 or more weeks of abstinence immediately following residential discharge. The ACC approach also demonstrated a main effect for marijuana abstinence through the nine-month follow-up period; however, alcohol and other drug abstinence did not reach statistical significance. Given the paucity of studies on adolescent continuing care, these findings encourage further research into assertive approaches to linking youth to continuing care services and improving general continuing care adherence, especially in the first 90 days following residential discharge. The relationship between GCCA and early abstinence was established, and it appears that an assertive approach such as ACC leads to higher levels of adherence to continuing care criteria. It is also clear that some clients with low GCCA were able to achieve early abstinence, while some with high GCCA were not. Further research is needed to better identify adolescents in each of these subgroups and test alternative approaches for increasing GCCA and early sustained abstinence, such as telephone continuing care (60-61) and Recovery Management Checkups (62) may lead to additional practice guidelines for the field. Each of these studies used an assertive approach that shifts the responsibility for linking and maintaining contact from the patient to the clinician. Additional approaches such as contingency management (63) should also be tested with adolescents to increase motivation to participate in continuing care and reinforce early abstinence. Controlled research using these approaches may lead to improved clinical outcomes and research on continuing care.

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Table 1: Demographic Characteristics at Residential Intake for Participants Assigned to the Two Continuing Care Groups\a

Variable		Usual Continuing care (UCC) (n=81)	Assertive Continuing Care (ACC) (n=102)
Male		73%	70%
Race:	African American	17%	18%
	Caucasian	76%	71%
	Hispanic	3%	3%
	Other	4%	9%
Age:	12-14	10%	11%
	15-16	48%	42%
	17-18	42%	47%
Education:	6-8th grade (Junior High School)	41%	33%
	9-12th grade (High School)	59%	67%
Employment:	Full time (35+ hours per week)	3%	11%
	Part time (1-34 hours per week)	4%	3%
	Other	94%	86%
Family:	Two parents	29%	37%
	Single parent	63%	50%
	Other	8%	13%
Any Criminal Justice System Involvement\b		83%	81%
	Probation	44%	50%
	Parole	5%	8%
	Other	49%	49%

\a No significant differences.

\b Subgroups below are not mutually exclusive.

Table 2: Clinical Characteristics at Residential Intake for Participants Assigned to the Two Continuing Care Groups\a

Variable		Usual Continuing care (UCC) (n=81)	Assertive Continuing Care (ACC) (n=102)
Age of First Use:	10 and under	16%	18%
	11-14	73%	70%
	15-18	11%	13%
Alcohol Pattern\b:	Any Alcohol Use	62%	57%
	Weekly Alcohol Use	26%	28%
	Any intoxication (5+ drinks)	47%	47%
	Peak BAC > .35 \c	18%	23%
	Alcohol Abuse	30%	34%
	Alcohol Dependence	52%	55%
Drug Use\b:	Weekly Marijuana Use	57%	50%
	Weekly Cocaine Use	7%	8%
	Weekly Other Drug Use	10%	10%
	Marijuana Dependence	89%	86%
	Cocaine Dependence	17%	13%
	Other Drug Dependence	15%	13%
Mental Health:	Major Depressive Disorder	38%	38%
	Generalized Anxiety	35%	41%
	High Traumatic Stress	35%	37%
	ADHD	59%	55%
	Conduct Disorder	64%	70%
Prior History of:	Mental Health Treatment	60%	47%
	Substance Abuse Treatment	69%	71%
Length of Stay\d:	1-3 weeks	28%	22%
	4-12 Weeks	65%	70%
	13+ weeks	6%	9%
Successfully Completed Residential Treatment\d:		51%	53%

\a No significant differences.
\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 the residential treatment immediately preceding randomization.

Table 3: Summary of Key Measures

Condition (ACC): A dichotomous variable for randomized condition with Assertive Continuing Care =1 and Usual Continuing Care =0.

Discharge Status: Adolescents categorized as: "As Planned" for treatment complete and "Unplanned" for leaving Against Staff Advice or leaving At Staff Request.

Linkage to and Sessions of Continuing Care: 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 three months post-discharge plus case manager reports of ACC services provided from the SCL's.

General Continuing Care Adherence (GCCA): A count of continuing care services adolescents reported receiving (out of 12). This scale was developed by interviewing providers of continuing care services at 12 different organizations in the catchment area. See Figure 1 for list of services. Cronbach's alpha for this measure was .90.

Abstinence During the One-Three Months Post-Discharge: Defined as no self-reported use during the first three months after residential discharge. Comparing immediate abstinence with urine screens for marijuana at three months, the false negative rate (client reports no use but has positive urine screen) is 8% with a kappa of .83.

Abstinence During the Four-Nine Months Post-Discharge: Defined as no self-reported use during the fourth through the ninth months (measured at the six- and nine-month post-discharge interviews).

Table 4 Direct Effects of ACC on Sustained Abstinence

Substance	Remained Abstinent for	UCC (n=78)	ACC (n=98)	Percent Increase\a	Effect Size\b	Chi-Square	p	Power
Any AOD	3 months	28%	38%	36%	**0.21**	1.91	0.20	29%
	9 months	19%	28%	44%	0.17	1.66	0.22	29%
Alcohol	3 months	44%	50%	14%	0.13	0.60	0.45	12%
	9 months	26%	31%	20%	0.10	0.53	0.50	11%
Marijuana	3 months	39%	52%	34%	**0.29**	2.98	0.10	41%
	9 months	26%	41%	59%	**0.32**	**4.45**	**0.04**	56%

\a (ACC%-UCC%)/UCC%

\b Cohen's effect size d = 2*ASIN(ACC%) - 2*ASIN(UCC%)

Note, bolded cells on the right are more than 20% increase in abstinence, effect size of .2 or more, probability of type 1 error less than .05, and power over 80% (none).

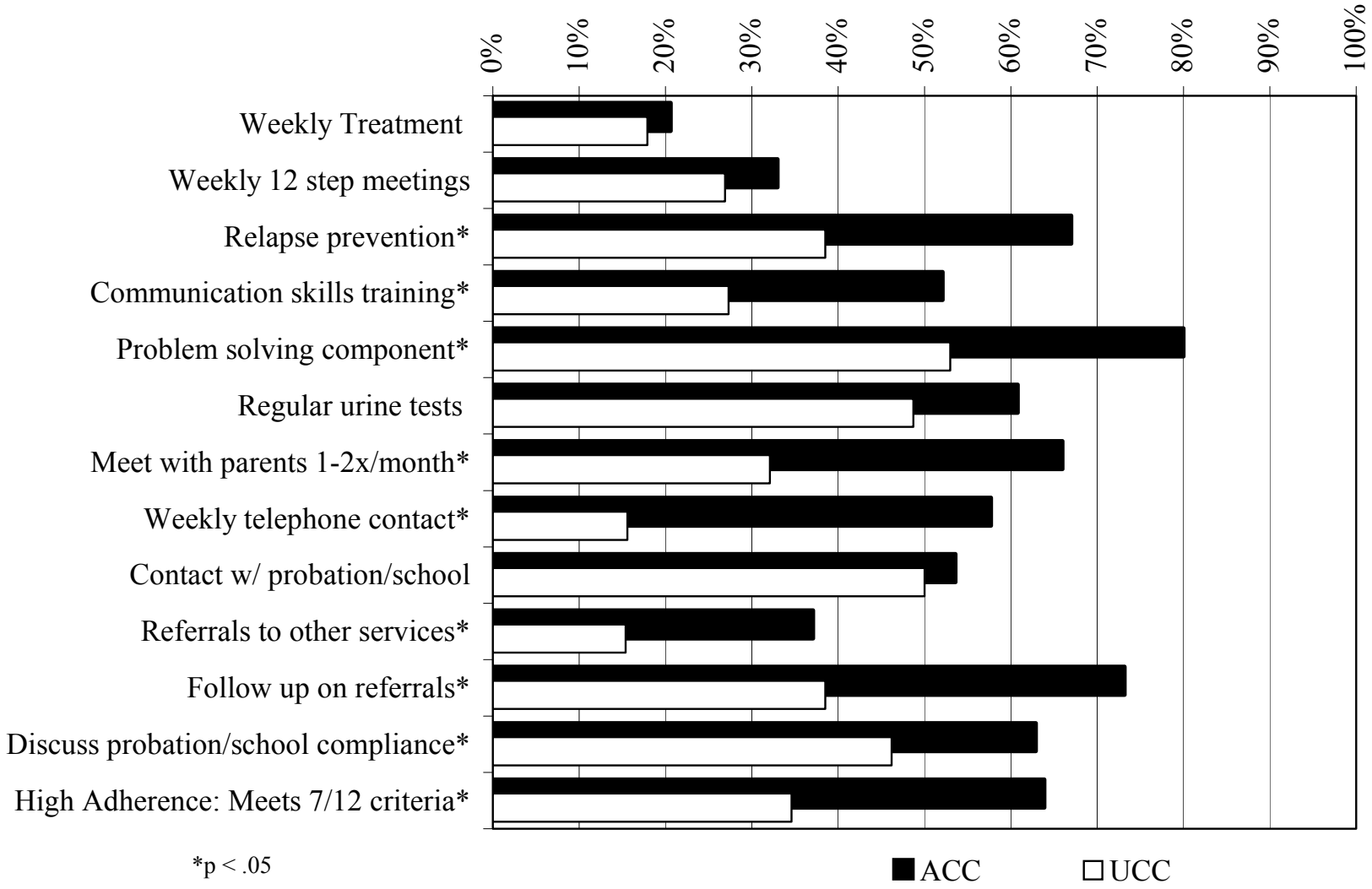
Table 5. Odds Ratios for Direct and Indirect Effects of ACC on GCCA and Abstinence

Dependent Variable	Predictors	Odds Ratio (95% confidence intervals) GCCA Median Split	Abstained during the 1-3 Months Post-Discharge	Abstained during the 4-9 Months Post-Discharge
Above Median on GCCA	ACC	**3.35*** (1.79, 6.25)*	--	--
AOD Use	ACC	--	1.27 (0.64, 2.49)	0.60 (0.28, 1.29)
	High GCCA	--	**2.16*** (1.10, 4.23)	0.76 (0.35, 1.67)
	Abstinent 1-3 Months	--	--	**11.16*** (5.12, 24.33)
Alcohol Use	ACC	--	1.05 (0.56, 1.97)	0.67 (0.33, 1.34)
	High GCCA	--	**1.94*** (1.04, 3.64)	1.04 (0.51, 2.10)
	Abstinent 1-3 Months	--	--	**5.47*** (2.77, 10.81)
Marijuana Use	ACC	--	1.41 (0.75, 2.66)	0.69 (0.33, 1.46)
	High GCCA	--	**1.98*** (1.05, 3.72)	0.76 (0.36, 1.62)
	Abstinent 1-3 Months	--	--	**11.15*** (5.31, 23.40)

Note. ACC=random assignment to Assertive Continuing Care, High GCCA= Above median (7+ out of 12 criteria) on General Continuing Care Adherence.
* $p < .05$

Figure 1. General Continuing Care Adherence (GCCA) Services by Condition.

This figure reports the percent of adolescents in each condition meeting each of GCCA criteria in the first 90 days after discharge. The last set of bars are the percent meeting seven or more of 12 criteria (i.e., above the median).


0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
100%
Weekly Treatment
Weekly 12 step meetings
Relapse prevention*
Communication skills training*
Problem solving component*
Regular urine tests
Meet with parents 1-2x/month*
Weekly telephone contact*
Contact w/ probation/school
Referrals to other services*
Follow up on referrals*
Discuss probation/school compliance*
High Adherence: Meets 7/12 criteria*
ACC
UCC

*p < .05