Treating Homeless Clients with Severe Mental Illness and Substance Use Disorders: Costs and Outcomes

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ABSTRACT: This study compared the costs and outcomes associated with three treatment programs that served 149 individuals with dual disorders (i.e., individuals with co-occurring severe mental illness and substance use disorders) who were homeless at baseline. The three treatment programs were: Integrated Assertive Community Treatment (IACT), Assertive Community Treatment only (ACTO), and standard care (Control). Participants were randomly assigned to treatment and

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followed for a period of 24 months. Clients in the IACT and ACTO programs were more satisfied with their treatment program and reported more days in stable housing than clients in the Control condition. There were no significant differences between treatment groups on psychiatric symptoms and substance use. The average total costs associated with the IACT and Control conditions were significantly less than the average total costs for the ACTO condition.

INTRODUCTION

Approximately 50% of those individuals who suffer from severe mental illness also have a co-occurring substance use disorder (Regier et al., 1990). These dual disorder individuals are more prone than other people with severe mental illness to experience a number of other negative outcomes, including higher relapse rates, more frequent hospitalizations, more physical health problems, greater violence, higher incarceration rates, and more homelessness (see Drake et al., 2001a). The presence of both disorders poses difficulties not only for individual consumers, but also for service systems. For example, dual disorder individuals incur significantly more treatment costs than other clients with severe mental illness (Bartels et al., 1993; Dickey & Azeni, 1996). Clinicians often regard dual disorder clients as more resistant to treatment and less compliant with treatment regimens. Given the high prevalence of the co-occurring conditions, the severity of their problems and the expensive cost of care, it is imperative that service systems find effective ways to serve these individuals.

Traditionally, most service systems have followed an approach of "parallel treatment" for persons with dual disorders. With parallel treatment, agencies and individual practitioners specialize in treating either mental illness or substance abuse; few programs offer both mental health and substance abuse treatment within the same treatment program. In practice, however, dual disorder clients are often excluded from one or both systems of care. In those rare instances when dual disorder clients do receive treatment from both systems, treatment interventions are rarely co-ordinated and clients are left to their own devices to assimilate the often disparate messages sent to them by the mental health and substance abuse therapists. Research suggests that the client outcomes of such treatment approaches are generally poor (see Drake et al., 2001a).

Integrated Treatment

Over the past 15 years a movement to create "integrated treatment" models for dual disorder clients has gained momentum. The essential feature of integrated treatment is that the same clinician (or team of clinicians) provides both mental health and substance abuse treatment in a co-ordinated manner. There has been considerable variability and evolution in the design of integrated treatment for dual disorder clients. Recent research and theory suggests integrated treatment should incorporate the following key components: (a) assertive out-reach, which is needed to engage many dual disorder individuals into treatment; (b) motivational interventions, which are needed to gradu-ally help individuals who are not committed to abstinence to develop personal goals for substance abuse recovery; (c) a stages-of-treatment approach, which includes the following phases: engagement, persua-sion, active treatment, relapse prevention; (d) cognitive behavioral counseling, which helps people develop skills for an abstinent life style; and (e) interventions to strengthen social networks supportive of recovery. Interventions must also take a long-term perspective, be culturally competent and comprehensive. The integrated treatment approach to substance abuse can be combined with various types of mental health services, such as residential programs, case manage-ment and assertive community treatment.

Recent policy initiatives have promoted integrated treatment as a preferred treatment approach for dual disorder individuals. For example, the President's New Freedom Commission on Mental Health (2003) and the Substance Abuse and Mental Health Administration support integrated treatment as one of six recommended evidence-based practices (Drake, Mueser, Brunette, & McHugo, 2004). There is considerable consensus about the importance of integrated treatment for dual disorder individuals. In addition, the research evidence sup-porting the efficacy of integrated treatment is growing, although still limited (Drake et al., 1998b, 2001b). The research designs of many earlier studies were inadequate. In addition, studies of integrated treatment have used different interventions, employed different out-come measures, and reported different results in various domains. For example, in one of the better designed studies, clients who received integrated treatment decreased their substance use more than clients in standard case management, but there was no difference between the two conditions in terms of psychiatric symptoms (Drake et al., 1998a). There also has been relatively little research on the effectiveness of

integrated treatment for specific subpopulations of people with severe mental illness, such as those who are incarcerated or those who are homeless. Although two prior studies (Drake, Yovetich, Bebout, Harris, & McHugo, 1997; Meisler, Blankertz, Santos, & McKay, 1997) suggested that integrated treatment may be an effective treatment approach for dual disorder homeless persons, neither of these studies used an experimental research design.

Some researchers have argued that the ideal way to serve dual disorder individuals is to combine assertive community treatment (ACT) with integrated treatment (Phillips et al., 2001). Considerable research has documented that clients with severe mental illness experience more improvement on many outcome variables with ACT than other treatments (Bond, Drake, Mueser, & Latimer, 2001; Mueser, Bond, Drake & Resnick, 1998). The current project compares the effectiveness of three treatment approaches: (1) integrated treatment plus assertive community treatment (IACT); (2) assertive community treatment only (ACTO); and (3) standard care (Control).

Cost of Treating Dual Disorder Individuals

The current project also conducted a detailed cost comparison of IACT, ACTO, and standard care. Prior research has generally found no difference between ACT and other treatments in terms of the total societal costs incurred in treating individuals with severe mental illness (Essock, Frisman, & Kontos, 1998; Weisbrod, 1983; Wolff, Helminiak, & Diamond, 1995), including those who were homeless at baseline (Lehman et al., 1999; Wolff et al., 1997). However, the distribution of costs is quite different. ACT programs typically have greater direct treatment costs than standard programs, because they have smaller client to staff ratios. On the other hand, ACT programs typically incur less inpatient mental health costs.

Only two studies have compared the costs of integrated treatment vs. other treatments for treating dual disorder individuals. Jerrell (1996) reported that a behavioral skills program had lower mental health costs than either a 12-step program or an intensive case management program. However, this quasi-experimental study did not examine a number of other important categories of costs, such as criminal justice expenses, other health care costs, and maintenance costs, and there were significant differences between groups in costs at baseline. Jerrell also reported that there were significant treatment implementation problems, so that the study results may not generalize to a situation

where the treatment models are implemented with greater fidelity. In a randomized study Clark et al. (1998) compared standard case management to integrated treatment. The total costs of the integrated treatment condition were not significantly less than the standard case management program.

Study Hypotheses

Researchers for this study had the following hypotheses: (1) IACT and ACTO clients would show more improvement on days in stable housing than Control clients; (2) IACT and ACTO clients would show more improvement on the psychiatric symptom measures than the Control clients; (3) IACT and ACTO clients would be more satisfied with their treatment program than Control clients; and (4) IACT clients would show more improvement on the substance measures than both ACTO and Control clients.

We expected the total societal costs associated with the IACT condition to be less than the total costs of either the ACTO or Control conditions. We also predicted that the outpatient costs for both the IACT and ACTO groups would be greater than the outpatient costs for the Control clients; on the other hand, we expected the inpatient treatments costs would be greater for the Control clients than the IACT and ACTO clients. We also hypothesized that specialized substance abuse treatment costs of the IACT clients would be less than costs for the ACTO and Control clients, because the IACT program would be providing substance abuse treatment directly.

METHOD

Sample and Research Design

To be eligible for this study individuals had to meet the following criteria: (1) be literally homeless, i.e., currently staying in an emergency shelter, living in an abandoned building, sleeping in a car, or sleeping in a public place such as bus depot, park, etc.; (2) have a severe mental illness operationalized as schizophrenia, atypical psychosis, bipolar disorder, recurrent major depression, schizo affective disorder, or delusional disorder; (3) have a DSM-IV substance use disorder; (4) and not be currently enrolled in an intensive case management program. The Structured Clinical Interview for DSM-IV AXIS I Disorders (SCID) developed by First, Gibbon, Spitzer, and Williams (1996) was used to obtain both the psychiatric and substance use diagnoses.

The 196 eligible participants were randomly assigned to one of the three conditions: (1) IACT, (2) ACTO, or (3) Control. Participants were followed for a period of 24 months. The sample size for this project was reduced to 149, because 29 (19%)

participants did not sign a release of information form granting access to service utilization data from other agencies and 18 (12%) participants could not be located for a follow-up interview.

The 149 participants had the following demographic characteristics. 80% of the sample were men. Seventy-three percent of the sample were African Americans, 2% other minorities, and 25% Caucasian. The mean age was 40 years and ranged from 18 to 66. The majority of participants (58%) had at least a high school education and were never married (57%). The sample reported a mean of 12.5 days homeless in previous month. Almost half of the sample (48%) received a current diagnosis of schizophrenia, 19% had schizoaffective disorder, 11% had atypical psychotic disorder, 11% had bipolar disorder, 9% had major depression-recurrent disorder, and 2% had delusional disorder. The average Global Assessment of Functioning score (American Psychological Association, 2000) was 43.66, indicating considerable impairment. All of the participants had one or more substance use disorders; 46% met criteria for a substance dependence disorder for alcohol and/or drugs; 64% met criteria for substance abuse disorder for alcohol and/or drugs. Forty percent had an alcohol-only diagnosis, 18% had a drug-only diagnosis, and 42% had both drug and alcohol disorders. Cocaine (or crack) was the most frequently used drug (34%) followed by cannabis (19%).

Procedures

IRB approval was obtained for the study procedures. Participants were recruited from a variety of settings, including emergency shelters, soup kitchens, psychiatric hospitals, and street locations frequented by homeless people. A research screener first observed and talked briefly with numerous homeless individuals, trying to discern whether an individual might be eligible for the project. Once the screener suspected that a given individual might qualify for the project, the person was invited to be formally screened for project eligibility. Informed consent was obtained for this process and individuals were paid $10 to complete the SCID and answer the other eligibility questions. The 258 individuals who were not eligible for the project were referred to other agencies for services. The most frequent reason for lack of eligibility was failure to meet the severe mental illness criterion (70% of the non-eligibles).

Eligible participants were introduced to a research interviewer who obtained informed consent for the treatment study and completed a baseline interview. The research interviewer then arranged for each study participant to be linked with their assigned treatment condition. Often the research interviewer transported participants to the location of the assigned treatment program. Participants were interviewed monthly for 24 months, although not every variable was measured monthly. Participants were paid $5 for the shorter interviews which took less than 30 min. Participants were paid $10 for the longer quarterly interviews which usually lasted for about an hour. Interviews were conducted at a location convenient for the participants, including the research office, treatment agencies, emergency shelters, and the residences of participants. With one exception, all interviewers had master's degrees in social work, counseling, gerontology, or clinical psychology; one interviewer only had a bachelor's degree in social work, but she had 15 years experience working with homeless people with mental illnesses.

Treatment Conditions

The IACT condition was implemented at a small community mental health agency. A new IACT clinical team was created for this project, although many of the staff had prior experience providing ACT to homeless people with severe mental illness. The

ACTO condition was implemented in two other mental health agencies in the community. One of the agencies had a psychosocial rehabilitation day treatment on site which was also used by some of the study participants. The other agency operated its own transitional housing facility which was used by some of its participants. Both the IACT and ACTO teams received training and follow-up consultation from project personnel regarding ACT treatment principles and practices. Additionally, research personnel and national experts provided the IACT team with training and consultation on integrated treatment principles and services. The IACT had a substance abuse specialist on staff and provided substance abuse services directly as part of the ACT team. These services included individual substance abuse counseling and bi-weekly treatment groups. The ACTO team was instructed to refer clients to other community providers for outpatient or individual substance abuse services and to 12-step groups.

Participants assigned to the standard care control condition were shown a list of community agencies that provided mental health and substance abuse treatment. Research staff also provided these participants with current information about openings at the various agencies and provided linkage assistance to help participants access services at these agencies.

Treatment Implementation and Outcome Measures

Treatment Implementation.   Every month participants reported on how many days that they had seen a staff member of their assigned treatment program. In addition, participants indicated how many days during the past month that a staff member of the assigned program had talked with them about their substance use. Research staff also assessed the treatment fidelity of the conditions to ideal standards of assertive community treatment, using a revised version of the Dartmouth Assertive Community Treatment Scale (DACTS) developed by Teague, Bond, and Drake (1998). Based on monthly observations of team meetings and interviews with clinical staff, research staff rated the IACT and ACTO programs on the DACTS at two points in time, 12 and 24 months after project initiation. The DACTS used in this study consisted of 26 items measuring the human resources, organizational characteristics, and service operations of the IACT and ACTO teams (Winter & Calsyn, 2000). Each item was rated on a 5-point scale, where high scores indicated an ideal level of fidelity with the ACT model. The research staff also evaluated the IACT and ACTO programs using a similar 5-point scale on nine pilot items designed to assess the integrated treatment philosophy (e.g. use of motivational interviewing, comprehensive substance abuse assessment, and a skills-approach to substance abuse counseling).

Client Satisfaction.   Every 3 months participants reported their satisfaction with the assigned treatment program using a 10-item scale developed for this project. Items from existing scales were modified to be more appropriate for the target population and treatment settings. For each item participants indicated their degree of satisfaction on a 6-point scale, with higher scores indicating greater satisfaction. Alphas for this scale ranged from .85 to .89. Participants were only asked to complete the client satisfaction scale if they had seen their assigned program within the past 3 months. Twenty-two percent of the participants in the IACT group, 19% in the ACTO group, and 76% in the Control group had at least one missing value on this variable. Missing values were replaced with the mean client satisfaction score from available time points for that participant. Two participants in the Control group who had missing values on all 8-time points were eliminated from this analysis.

Stable Housing.   Every month participants reported on their housing situation. Days living in stable housing (i.e., living in one's own apartment or a boarding home) were used in this study.

Mental Health.   The 24 item Brief Psychiatric Rating Scale (BPRS) was used to assess psychiatric symptoms (Lukoff, Nuechterlein, & Ventura, 1986). The BPRS has been widely used to assess psychiatric symptoms in patients suffering from severe mental illness. For each item, scores can range from 1 = "no symptoms" to 7 = "extremely severe". The average item score was used in this analysis.

Substance Use.   Participants were asked to report the number of days in the past 90 days that they had used alcohol and also the number of days they used other substances. Because a significant number of participants only used alcohol, there were many "zero" values on days used other substances. Therefore, to eliminate skewness, we created a "highest days used" variable for each participant based on which substance (alcohol or drugs) they used most frequently. In addition, every 3 months the research interviewer assessed the severity of both alcohol and drug use with two 5-point scales that have been used in many previous studies (Carey, Coco, & Simmons, 1996; Drake, Osher, & Wallach, 1989). Higher scores indicated greater severity with 1 = client has not used alcohol (or drugs), and 5 = meets criteria for severe use plus related problems are so severe that make non-institutional living difficult. Again, to eliminate skewness in the data we created a "highest substance abuse" rating for each participant, depending on which substance (alcohol or drugs) the participant abused the most.

Measurement of Service Use and Cost Variables

This study classified costs into the following major categories: Outpatient Costs, Inpatient Costs, Emergency Shelter Costs, and Total Costs. Outpatient Costs had the following sub-categories: Direct Treatment for the IACT and ACTO conditions, Other Mental Health, Other Substance Abuse Treatment, Physical Health Care, and Psychosocial Rehabilitation Center. Inpatient Costs had the following sub-categories: Mental Health, Substance Abuse, and Physical Health Care.

Detailed service utilization and cost data, along with data on income maintenance benefits, were collected for each study participant for 24 months following random assignment and for the 6-month period immediately preceding assignment. Service use data were obtained from service agencies, claims records, and participant self-report. Services provided by the intervention agencies were valued at their average resource costs, which were based on a full cost accounting of the resources used to produce the services. Payment rates were used to value other health and mental health services. Total costs are expressed in 2001 dollars. The data collection and costing methods used here are consistent with other published studies (Clark et al., 1998; Wolff et al., 1997; Wolff, Helminiak, & Tebes, 1997).

The unit costs of the intervention agencies were based on their fiscal data, which was augmented to reflect the fair market rate for owned space and the value of time contributed by volunteers (valued at the minimum wage). Services provided by the Department of Mental Health (DMH) were valued in terms of their current year costs; and DMH contracted services were valued in terms of their current year payment amounts to the providers of the services. Utilization of other health and mental health services was determined from the management information systems of state and local facilities. Medicaid claims data were used to identify services provided to these clients by facilities located in and around St. Louis. To ensure completeness, these records

were verified against self-report data and administrative records received from five hospitals located in and around St. Louis. Mean Medicaid payment rates were used to value health and mental health services provided by these other agencies. Utilization of emergency shelter services was based on participant self-report information and priced according to an inflation-adjusted rate used by Culhane, Metraux, and Hadley (2002).

In addition to treatment costs, this study also estimated transfer payments and other maintenance benefits. The Maintenance Cost categories were Social Security (FICA), Social Security Disability Insurance (SSDI), Supplemental Security Income (SSI), and income maintenance benefits (e.g., food stamps, TANF, General Relief). Maintenance costs were also valued at their current year payment amounts.

Data Analyses

A 3 × 5 (or 3 × 4 if no baseline assessment) ANOVA design was used to analyze the dependent variables. Treatment condition (IACT, ACTO, and Control) was a between-groups factor and Time (baseline, 1–6 months, 7–12 months, 13–18 months, and 19–24 months) was a within-groups factor. Post-hoc analyses were done using the Tukey's HSD procedure with significance levels set at $p < .05$. Variables that were measured more frequently than every 6 months were aggregated using an average function. There was no baseline assessment for program contacts, substance abuse contacts, or client satisfaction. We also used the Huynh-Feldt correction for the time main effect and treatment condition by time interaction since they all violated the sphericity assumption.

Power estimates were calculated using the software program G*Power (Erdfedler, Faul, & Buchner, 1996). For the purposes of these calculations, it was estimated that there were three levels of the between-subjects factor and five levels of the within-subjects factor, although each dependent variable is not always examined at five time periods. The sample size for these calculations was determined by averaging the sample sizes that occur across the study dependent variables, which range from 139 to 149 ($m = 147$). The population correlation between the individual levels of the repeated measures factor (ρ) was estimated by averaging the observed correlations between the study dependent variables of interest ($\rho = .64$). Assuming a potential moderate effect size (using Cohen's convention of .25) and an alpha level of .05, a sample size of 147 produces 90% power to detect a between-subjects effect and 100% power to detect a within-subjects effect and interaction of between-subjects and within-subjects effect.

RESULTS

Attrition

As indicated earlier only 149 of the original 196 participants provided data for this cost study. Statistical analyses of demographic, diagnostic and outcome variables at baseline were made to determine if the participants in this study were different from the 47 participants who did not provide data for this study. One-way ANOVA's and chi-square analyses indicated that the two samples differed at the $p < .05$ level of significance on only two of 24 variables. The final study sample reported significantly fewer days of alcohol use and significantly more

days of stable housing at baseline than individuals who did not provide service utilization data. The researchers also made treatment group comparisons on the baseline assessment of the five outcome variables for the final sample of 149. There were no significant treatment group differences ($p < .05$) on four of the outcome variables. However, there was a significant difference on the BPRS, $F(2, 146) = 3.833$, $p = .02$, $\eta^2 = .07$. The IACT clients had a significantly ($p < .05$) lower mean on the baseline BPRS than both ACTO or control clients.

Treatment Fidelity and Treatment Diffusion

The average DACTS scores for the IACT and ACTO teams were moderately high. In year 1, the average item score was 3.85 for the IACT condition and 3.67 for the ACTO condition. In year 2, the average item scores were 3.85 for the IACT condition and 3.64 for the ACTO condition. Fidelity data suggested some treatment diffusion occurred. For example, on the DACTS item that measured the intensity of individualized substance abuse services provided by the team to clients, the IACT team scored in a high range (average 4.4 for the 2 years) but the ACTO teams scored in a moderate range (3.16), indicating that the ACTO teams provided some substance abuse treatment to their clients. Key informant reports indicated that during the course of the project the ACTO programs obtained some training on integrated treatment.

Treatment Implementation

Program Contact.   Table 1 displays the program contact data for the three conditions over the four time periods. There was a significant main effect of treatment condition on the program contact variable, $F(2, 143) = 40.87$, $p < .001$, $\eta^2 = .36$. Post-hoc analyses indicated that the ACTO condition had significantly more contact with their clients than both the IACT and Control conditions, and the IACT program had significantly more contact with their clients than the control clients. There was no main effect of time, $F(3, 429) = .45$, $p = .68$, $\eta^2 = .01$, nor treatment condition by time interaction, $F(6, 429) = .87$, $p = .50$, $\eta^2 = .01$. Although we had hypothesized that the ACTO and IACT programs would have more contact with their clients than the control condition, we had not expected the ACTO condition to have more contact with their clients than the IACT program.

There was also a main effect of treatment condition in terms of substance abuse treatment contacts from the assigned program,

$F(2, 143) = 9.60$, $p < .001$, $\eta^2 = .12$. Post-hoc analyses indicated that the clients in the ACTO and IACT conditions had more substance abuse treatment contacts with their assigned program than Control clients. However, there was no difference between the ACTO and IACT conditions in terms of substance abuse treatment. We had expected the IACT clients to report more substance abuse treatment with their case managers than ACTO clients. There was no main effect of time, $F(3, 386) = .69$, $p = .56$, $\eta^2 = .01$, nor treatment condition by time interaction, $F(5, 386) = .72$, $p = .64$, $\eta^2 = .02$.

Outcomes

Client Satisfaction. Table 2 displays the means and standard deviations for the outcome variables of the three treatment conditions across the four measurement periods. There was a significant main effect of treatment on client satisfaction, $F(2, 144) = 3.46$, $p = .03$, $\eta^2 = .05$. Post-hoc analyses indicated that clients in the ACTO and IACT conditions were significantly more satisfied with their treatment than clients in the Control condition. There was no significant difference in client satisfaction between the IACT and ACTO conditions. There was no main effect of time, $F(3, 410) = 1.17$, $p = .32$, $\eta^2 = .01$, nor treatment condition by time interaction, $F(6, 410) = 1.70$, $p = .12$, $\eta^2 = .02$.

Stable Housing. The main effect of treatment on stable housing was statistically significant, $F(2, 145) = 3.76$, $p = .03$, $\eta^2 = .05$. Post-hoc analyses indicated that clients in both the ACTO and IACT conditions had significantly more days in stable housing than Control clients. There was no significant difference between the IACT and ACTO clients in terms of days in stable housing. There was also a main effect of time on stable housing, $F(3, 440) = 66.20$, $p < .001$, $\eta^2 = .31$. In general, over time the clients increased the numbers of days in stable housing. Post-hoc analyses indicated that all of the increases between successive time periods were statistically significant, except the last two time periods. There was no significant treatment by time interaction, $F(6, 440) = 1.93$, $p = .07$, $\eta^2 = .03$.

Mental Health. There was no significant effect of treatment condition on the BPRS scale, $F(2, 139) = 2.34$, $p = .10$, $\eta^2 = .03$. There was a main effect of time, $F(3, 438) = 41.72$, $p < .001$, $\eta^2 = .23$, indicating that client symptoms improved over time. Post-hoc analyses indicated that most of the improvement occurred during the first 6 months of

treatment. There was no treatment by time interaction, $F(6, 438) = 1.12$, $p = .35$, $\eta^2 = .02$.

Substance Use. There was no main effect of treatment condition on the interviewer rating of substance use, $F(2, 136) = .32$, $p = .72$, $\eta^2 = .01$. There was a main effect of time, $F(4, 516) = 18.35$, $p < .001$, $\eta^2 = .12$; substance abuse severity ratings decreased over time. There was no treatment condition by time interaction, $F(8, 516) = .69$, $p = .69$, $\eta^2 = .01$. On the days of substance use variable, there was no main effect of treatment, $F(2, 144) = .63$, $p = .53$, $\eta^2 = .01$. There was a main effect of time, $F(4, 506) = 3.95$, $p < .01$, $\eta^2 = .03$; over time participants reported using substances less often. Post-hoc analyses indicated that most of the reduction in substance use occurred in the first 6 months of treatment. There was no treatment by time interaction, $F(7, 506) = .42$, $p = .89$, $\eta^2 = .01$.

We also did a comparison of the differences between the two agencies that implemented the ACTO condition. There were no significant differences between the two agencies on any of the outcome variables. However, there was a significant difference between the two agencies on the program contacts variable. The agency that operated a psychosocial rehabilitation day treatment program had significantly ($p < .05$) more contact with their clients than the agency that operated its own transitional housing facility.

Costs

Table 3 displays the means and standard deviations for the cost variables for each treatment condition for the five measuring periods. One of the most striking patterns in the data is the large standard deviations for most of the cost categories. Such large standard deviations indicate that some people had low costs, while other individuals had substantial costs. In fact, for any one time period many individuals incurred no costs for the more specific categories, such as physical health costs. Therefore, using parametric statistics to compare group differences on specific cost categories was not appropriate. Thus, statistical comparisons were only made for the major cost categories (i.e., outpatient, inpatient, emergency shelter, total, and maintenance).

Post-Treatment and Outpatient Costs. There was a significant main effect of treatment condition for outpatient treatment costs, $F(2, 146) = 12.47$, $p < .001$, $\eta^2 = .15$. Post-hoc analyses indicated that the

TABLE 1

Average Monthly Contacts by Time and Condition: Mean and Standard Deviations

	Months 1–6		Months 7–12		Months 13–18		Months 19–24	
	M	(SD)	M	(SD)	M	(SD)	M	(SD)
Program contacts								
IACT (N = 46)	3.51	(2.34)	3.82	(2.85)	4.16	(3.33)	4.61	(4.36)
ACTO (N = 54)	6.85	(4.60)	6.64	(4.54)	6.98	(5.30)	6.62	(4.56)
Control (N = 49)	1.77	(2.18)	1.39	(2.11)	1.69	(2.63)	1.28	(1.70)
SA treatment contacts								
IACT (N = 46)	1.21	(1.70)	1.27	(1.45)	1.24	(1.43)	1.31	(1.99)
ACTO (N = 54)	1.16	(2.41)	0.97	(1.87)	0.99	(1.91)	0.64	(1.08)
Control (N = 49)	0.39	(1.04)	0.17	(0.55)	0.10	(0.31)	0.16	(0.48)

IACT and Control program cost significantly less than ACTO program, but there was no significant difference in outpatient treatment costs between IACT and Control. There was also a significant effect of time, $F(3, 374) = 39.64$, $p < .001$, $\eta^2 = .21$. Post-hoc analyses indicated that the outpatient treatment costs were significantly greater after the study began than in the prior 6 months. There was an interaction between treatment condition and time, $F(5, 374) = 6.10$, $p < .001$, $\eta^2 = .08$, such that the ACTO condition increased their outpatient costs at a faster rate than the other two conditions.

As expected, direct treatment costs represented the largest share of the outpatient costs for both the IACT and ACTO conditions (see Table 3). "Other outpatient mental health treatment" was the largest outpatient cost category for the Control condition. Clients in the IACT condition incurred less outpatient substance abuse costs than the other conditions as expected. As Table 3 indicates, outpatient mental health costs from other agencies were also lowest in the IACT condition.

Inpatient Costs. There was no main effect of treatment condition for inpatient costs, $F(2, 146) = .10$, $p = .90$, $\eta^2 = .01$. Also, there was no main effect of time, $F(4, 512) = 1.58$, $p = .19$, $\eta^2 = .01$; nor was there any interaction between treatment condition and time, $F(7, 512) = .45$, $p = .87$, $\eta^2 = .01$. Inspection of Table 3 indicates that mental health

TABLE 2

Means and Standard Deviations for Outcome Variables by Time and Condition

	Baseline		Month 6		Month 12		Month 18		Month 24	
	M	(SD)	M	(SD)	M	(SD)	M	(SD)	M	(SD)
Client satisfaction										
IACT (N = 46)	—	—	5.00	(0.74)	5.10	(0.95)	5.10	(0.70)	5.09	(0.74)
ACTO (N = 54)	—	—	5.17	(0.75)	5.23	(0.84)	4.94	(1.04)	4.99	(0.89)
Control (N = 49)	—	—	4.66	(0.95)	4.75	(0.99)	4.79	(1.03)	4.67	(1.03)
Stable housing										
IACT (N = 46)	5.49	(9.05)	8.19	(9.68)	14.18	(12.33)	17.01	(12.51)	18.29	(12.12)
ACTO (N = 54)	2.74	(6.67)	5.77	(7.42)	13.87	(11.66)	18.19	(11.63)	17.78	(12.68)
Control (N = 49)	2.78	(6.75)	5.02	(8.62)	11.34	(12.04)	10.55	(12.87)	12.59	(13.27)
BPRS										
IACT (N = 46)	2.15	(.49)	1.94	(.42)	1.82	(.52)	1.81	(.54)	1.66	(.46)
ACTO (N = 54)	2.41	(.61)	2.01	(.44)	1.83	(.37)	1.97	(.47)	1.88	(.54)
Control (N = 49)	2.44	(.64)	1.98	(.58)	1.92	(.54)	1.98	(.56)	1.86	(.60)
Substance use rating										
IACT (N = 46)	3.52	(0.81)	3.15	(1.09)	3.07	(0.96)	2.83	(1.30)	2.76	(1.11)
ACTO (N = 54)	3.59	(0.66)	2.98	(1.31)	2.86	(1.32)	3.02	(1.26)	2.70	(1.28)
Control (N = 49)	3.67	(0.83)	2.93	(1.19)	2.78	(1.18)	2.69	(1.10)	2.62	(1.15)
Days used substances										
IACT (N = 46)	10.07	(9.50)	6.88	(6.61)	8.28	(7.40)	7.85	(8.51)	7.43	(8.06)
ACTO (N = 54)	7.51	(9.18)	6.25	(7.84)	6.06	(8.70)	6.62	(8.45)	6.77	(8.86)
Control (N = 49)	9.64	(9.58)	6.34	(7.52)	7.46	(7.98)	7.10	(7.92)	6.42	(7.84)

treatment represented the largest share of the inpatient treatment costs, followed by substance abuse treatment, and then physical health care. It is also important to point out that the standard deviations for inpatient treatment costs were quite large; many individuals incurred no inpatient treatment costs, while a few individuals had very lengthy and expensive hospitalizations. For example, during months 1–6 of the study, 39% of the sample incurred no inpatient costs; and during months 19–24, 60% of the sample had no inpatient costs.

Emergency Shelter Costs.   There was no main effect of treatment condition on emergency shelter costs, $F(2, 146) = .26$, $p = .77$, $\eta^2 = .01$. However, there was a main effect of time, $F(3, 458) = 10.04$, $p < .001$, $\eta^2 = .06$. Shelter costs decreased over time. Post-hoc analyses indicated that shelter costs increased in the first 6 months of treatment and then decreased to levels lower than the pre-treatment period. The treatment condition by time interaction was not statistically significant, $F(6, 458) = .85$, $p = .54$, $\eta^2 = .01$.

Total Costs.   There was a main effect of treatment condition on total costs, $F(2, 146) = 4.00$, $p = .02$, $\eta^2 = .05$. Post-hoc comparisons indicated that the IACT and Control conditions had significantly lower total costs than the ACTO condition, but there was no significant difference in total costs between IACT and Control. A careful inspection of Table 3 indicates that greater outpatient treatment costs (direct treatment costs, other outpatient mental health costs, and substance abuse treatment costs by other agencies) incurred by the ACTO condition is primarily responsible for the significant difference between treatment conditions in terms of total costs. There was a main effect of time, $F(3, 501) = 3.19$, $p = .02$, $\eta^2 = .02$. Post-hoc analyses indicated that costs increased significantly in the first 6 months of the study and then leveled off. There was no significant treatment condition by time interaction, $F(7, 501) = 1.25$, $p = .28$, $\eta^2 = .02$.

Maintenance Payments.   Table 4 displays the maintenance payments that participants received over the course of the study. There was no main effect of treatment condition on total maintenance payments received, $F(2, 146) = .51$, $p = .60$, $\eta^2 = .01$. There was, however, a main effect of time, $F(3, 440) = 9.69$, $p < .001$, $\eta^2 = .06$. On average, the amount of maintenance payments that participants received increased over time. Post-hoc analyses indicated that the amounts received between the first two time periods were not significantly

different from each other; nor were the amounts received during the last two time periods significantly different from each other. However, the maintenance payments received at non-adjacent study periods was significantly different from each other. There was no treatment condition by time interaction, $F(6, 440) = .47$, $p = .89$, $\eta^2 = .01$.

We also analyzed the cost data with non-parametric statistics. The results were virtually identical to the ANCOVA analysis. The only difference concerned the treatment group effect on total outpatient costs. Post-hoc comparisons using ANCOVA found that outpatient costs were significantly greater for ACTO than IACT and Control, but there was no difference between IACT and Control. Post-hoc comparisons using the non-parametric Mann–Whitney test also found that ACTO costs were significantly greater than IACT and Control. In addition, IACT costs were significantly greater than Control costs in the Mann–Whitney analysis.

DISCUSSION

Client Outcomes

The results provide partial, modest support for the study's hypotheses concerning the effectiveness of IACT and ACTO on client outcomes. As predicted clients in both the IACT and ACTO conditions had better housing and consumer satisfaction outcomes than did Control clients who received standard care, replicating previous research comparing ACT with other treatments (Bond et al., 2001). These findings are important in light of the plethora of problems experienced by dual disorder individuals, and because other treatment studies typically show poor outcomes for homeless people with dual disorders (see Morse, 1998).

Contrary to our prediction, the IACT and ACTO conditions did not produce better outcomes in terms of psychiatric symptoms. Drake et al. (1998a) also found that integrated treatment was no more effective than standard case management in reducing psychiatric symptoms. Past research comparing ACT with standard care has produced mixed results in terms of psychiatric symptoms; some studies report superior outcomes for ACT, whereas other studies report no differences (Bond et al., 2001).

Also, contrary to our prediction, IACT did not reduce substance use more than ACTO or Control. The treatment fidelity and treatment diffusion problems noted earlier probably contributed to the absence of significant findings in this area. A prior study had reported that the

TABLE 3

Costs in Dollars per 6-Month Period By Treatment Condition

Service Category		Prior 6 Months	Months 1–6	Months 7–12	Months 13–18	Months 19–24
IACT (N = 46)						
Outpatient costs	Mean	1128	4659	6126	5941	6851
	SD	2968	4429	7042	4990	5728
Direct treatment	Mean	–	2917	3086	3237	3702
	SD	–	1879	2871	2404	3416
Other outpatient mental health	Mean	830	1000	2389	2130	2584
	SD	2303	2255	4299	2934	3464
Other outpatient substance abuse	Mean	165	158	216	190	67
	SD	599	463	876	613	292
Physical health	Mean	133	585	435	370	486
	SD	267	1417	625	621	829
Psychosocial rehabilitation center	Mean	–	0	0	13	12
	SD	–	0	0	89	80
Inpatient costs	Mean	6916	7041	4453	4790	4269
	SD	12,624	12,880	8024	9217	7679
Mental health	Mean	5649	4879	3071	3472	3167
	SD	11,291	11,049	7164	7779	6485
Substance abuse	Mean	1047	2037	807	1104	385
	SD	3126	7704	3687	3719	2080
Physical health	Mean	220	125	575	214	718
	SD	1079	597	2202	900	2334

TABLE 3   (Continued)

Service Category		Prior 6 Months	Months 1–6	Months 7–12	Months 13–18	Months 19–24
Emergency shelter	Mean	862	1707	1385	854	603
	SD	1131	2432	2598	1991	1972
Total service costs	Mean	8938	13,436	11,978	11,606	11,744
	SD	14,563	14,591	11,708	11,343	9220
ACTO (N = 54)						
Outpatient costs	Mean	2056	8683	11,773	12,685	12,565
	SD	4071	6512	10,231	10,960	11,271
Direct treatment	Mean	–	5958	5675	4983	4353
	SD	–	4094	3499	3174	2980
Other outpatient mental health	Mean	1303	1792	4871	6244	6745
	SD	3317	2647	7414	7866	8405
Other outpatient substance abuse	Mean	303	249	483	516	346
	SD	921	912	1104	1255	1053
Physical health	Mean	450	664	573	681	849
	SD	1057	1131	1004	1520	1558
Psychosocial rehabilitation center	Mean	–	20	171	262	272
	SD	–	82	548	609	708
Inpatient costs	Mean	6961	6146	4549	4031	6164
	SD	12,255	10,284	14,937	9808	14,519
Mental health	Mean	4883	4949	3746	2919	5133
	SD	10,862	9454	13,886	8410	14,139
Substance abuse	Mean	1770	705	455	358	299
	SD	5026	2678	1554	1116	1394

Physical health	Mean	308	492	347	753	732
	SD	1314	2317	1144	4992	3160
Emergency shelter	Mean	1275	2109	1301	666	392
	SD	1841	3543	2996	2376	1771
Total service costs	Mean	10,353	16,975	17,681	17,416	19,139
	SD	14,622	13,589	19,316	16,404	20,649
CONTROL (N = 49)						
Outpatient costs	Mean	2149	4099	4500	5023	4616
	SD	4161	6551	8011	8791	8792
Direct treatment	Mean	–	0	0	0	0
	SD	–	0	0	0	0
Other outpatient mental health	Mean	889	2718	3123	3861	3698
	SD	1708	5699	6745	7478	7447
Other outpatient substance abuse	Mean	650	589	334	180	316
	SD	1821	1557	1083	621	970
Physical health	Mean	610	792	1044	982	600
	SD	1307	1862	3333	2598	1855
Psychosocial rehabilitation center	Mean	–	0	0	0	2
	SD	–	0	0	0	11
Inpatient costs	Mean	6019	5099	5832	4107	3299
	SD	15,548	10,036	18,968	11,259	7348
Mental health	Mean	4195	3777	2636	1701	2731
	SD	13,965	9238	9577	3614	6393

TABLE 3 *(Continued)*

Service Category		Prior 6 Months	Months 1–6	Months 7–12	Months 13–18	Months 19–24
Substance abuse	Mean	1510	989	734	437	432
	SD	3978	2727	1895	1643	1525
Physical health	Mean	314	333	2462	1968	136
	SD	1487	1210	16,379	10,587	689
Emergency shelter	Mean	1569	1972	1039	1143	888
	SD	2154	3001	1965	2305	2569
Total service costs	Mean	9792	11,242	11,397	10,282	8805
	SD	16,848	13,592	21,778	14,166	13,039

amount of improvement in the substance abuse domain was highly correlated with the fidelity of the integrated treatment program (McHugo, Drake, Teague, & Xie, 1999). However, it is important to note that many clients, regardless of treatment condition, reduced their substance use as evidenced by the significant time effects on both the self-report of days used substances variable and the interviewer rating of substance abuse severity.

Cost Findings

The results also partially supported the cost predictions. As expected, IACT participants had the lowest substance abuse treatment costs from other outpatient agencies. As expected, ACTO did have outpatient costs higher than standard community services; surprisingly, however, the outpatient costs for IACT and standard community services were comparable. Contrary to expectations, the differences in inpatient costs across the three treatment conditions were not statistically different. Prior cost studies have generally reported lower inpatient costs for ACT vs. other treatments. At least four possible explanations can be offered for our discrepant results. First, the IACT and ACTO programs in this study did not control admissions and discharges to inpatient facilities. Second, Missouri, like most other states, has undertaken a number of procedures to reduce inpatient mental health costs in the past decade. Therefore, current ACT programs probably have less impact on reducing inpatient costs than earlier ACT programs (e.g., Weisbrod, 1983). Third, large variances and relatively small sample sizes make it harder to detect between group differences. Finally, recent studies in the United Kingdom also found that ACT programs are no more effective than other interventions in reducing hospital costs (Holloway & Carson, 1998; UK 700 Group, 1999).

The cost findings reported here are partially consistent with results of the Clark et al. (1998) study. Comparing integrated treatment to standard case management for a dual disorder sample, Clark and colleagues found no significant cost differences between integrated treatment and standard care in terms of total societal cost or any service component. Our study also found no cost difference between IACT and standard care. The cost results concerning IACT and the Control condition are not surprising. Control client costs are as high as IACT because dual disordered clients incurred considerable costs through a variety of outpatient and inpatient providers; thus it was *not* less expensive to rely on standard community services for this population.

TABLE 4

Average Maintenance Cost in Dollars Per 6 Month Interval and Treatment Condition

		Prior 6 Months	Months 1–6	Months 7–12	Months 13–18	Months 19–24
IACT (N = 46)						
FICA	Mean	685	724	568	491	624
	SD	1559	1843	1653	1587	1502
SSI	Mean	1009	1102	1288	1516	1608
	SD	1578	1650	1662	1980	2061
SSDI	Mean	856	949	1003	1019	1055
	SD	1794	1827	1853	1872	1923
Income maintenance	Mean	130	209	358	328	254
	SD	261	281	526	535	382
Total maint. costs	Mean	2680	2985	3217	3354	3541
	SD	2139	2486	2192	2363	2395
ACTO (N = 54)						
FICA	Mean	934	444	310	224	129
	SD	3412	820	652	458	292
SSI	Mean	593	737	757	1424	1235
	SD	1083	1178	1337	2281	1708
SSDI	Mean	1572	1958	2060	2104	2267
	SD	1812	2211	2327	2299	2443
Income maintenance	Mean	125	228	229	22	262
	SD	231	322	281	333	313
Total maint. costs	Mean	3226	3367	3354	3973	3893
	SD	3480	2362	2583	2363	2188
CONTROL (N = 49)						
FICA	Mean	350	433	411	559	489
	SD	815	925	959	1966	1922
SSI	Mean	782	937	1066	1546	1485
	SD	1268	1939	1623	2048	1767
SSDI	Mean	1560	1570	1618	1700	1738
	SD	2087	2049	2059	2189	2306
Income maintenance	Mean	185	245	264	281	260
	SD	364	348	389	434	405
Total maint. costs	Mean	2876	31,845	3359	4088	3971
	SD	2019	2341	2029	3200	2995

More puzzling was the finding in the present study that the costs for IACT clients were significantly less than for ACTO clients. As reported, IACT and ACTO showed major differences in outpatient costs in this study. ACTO had greater direct treatment costs due to greater overhead costs. ACTO also had higher costs than IACT for other community provider outpatient mental health costs because they referred many clients for psychiatrist consultation rather than utilizing their own team psychiatrist as recommended by the ACT model. Thus, some of the cost differences observed in this study are undoubtedly due to local conditions and less than desired treatment fidelity to the ACT model.

It is also important to remember that the present study, like the Clark et al. investigation, involved a small sample size (less than 100 per treatment group) and non-normal cost distributions. Extreme variation in costs for a few individuals in relatively small samples adds instability to aggregate statistics and to trend statistics. This type of instability is characteristic of real world community programs, however. A few individuals with extreme behavioral problems can skew the average costs for the program. Thus, one needs to be cautious in generalizing our cost results to other IACT or ACTO programs. Further studies to replicate these findings are needed.

Study Limitations

This study's conclusions should be interpreted somewhat cautiously, because of treatment implementation problems, treatment drift, attrition and concerns about generalizability to other samples. Although the IACT team received moderately high fidelity ratings for integrated treatment, there were no significant differences between the IACT and ACTO conditions in terms of the self-report data from consumers on the frequency of substance abuse contacts with their assigned program. Further, the absolute frequency of these substance abuse interventions in the IACT condition (as indicated by self-report) was low. Thus, treatment fidelity may have been insufficient to produce the desired changes in substance use. Also, key informant reports indicated that some treatment diffusion occurred, with the ACTO teams providing some substance abuse treatment directly. The net effect of these two problems would be to reduce treatment group differences. Similar implementation and diffusion problems have been reported in other studies on integrated treatment (see Drake et al., 1998).

Sample attrition was another potential methodological problem; 22% of the original sample was excluded from these analyses because they

did not authorize the release of the service utilization data necessary for the cost analyses. However, given that there were few significant baseline differences between the sample used in this study and those individuals who did not provide service utilization data, attrition probably did not affect the internal validity of the study but may have reduced statistical power. It should also be noted that clients in the control condition also had fewer assessments on the client satisfaction measure, because many control clients were not in treatment at one or more of the assessment points. Nevertheless, we think that there is little doubt that clients in the IACT and ACTO groups were truly more satisfied with their treatment than clients in the control conditions, many of whom dropped out of control treatment conditions.

Future researchers should consider including the Substance Abuse Treatment Scale (SATS), which is calibrated more finely than the rating scales used in this study. The SATS has detected client change in other treatment studies of dual disorder individuals (McHugo, Drake, Burton, & Ackerson, 1995). Also, given difficulties in subject recall, especially for persons impaired by severe mental illness and substance abuse, researchers may want to use the Timeline Follow Back (TLFB) procedure (Sobell, Maiston, & Sobell, 1980) for collecting self-report information on substance use. These additional measures might improve the ability of future researchers to detect treatment differences on substance abuse.

In addition, the costs reported here are specific to St. Louis and to this sample of study participants. To the extent that resource costs and production methods vary among communities and payment rates vary by state, the absolute and relative costs reported for St. Louis may not generalize to other parts of the country. But it is unlikely that any one community will produce a representative set of findings because local conditions vary particularly by community and in ways that are not systematic. As with all cost studies, this study provides evidence on the absolute and relative differences among particular interventions located in a particular community. By using consistent methods to measure effects and costs, researchers can compare findings across studies to determine which effects appear robust and independent of differences in conditions and samples.

CONCLUSION AND RECOMMENDATIONS

Despite its limitations, this study was methodologically superior to most previous research evaluating the effectiveness of treatment

programs for dual disorder individuals. It employed a randomized design, had minimal attrition and followed clients for 2 years. The findings suggest that both assertive community treatment and integrated treatment combined with assertive community treatment show modest promise for improving the lives of homeless people with co-occurring severe mental illness and substance abuse disorders. Further, the study provides some data which indicate that integrated treatment combined with assertive community treatment probably costs no more than standard care, yet provides better outcomes for dual disorder clients. However, because of the implementation problems described earlier, this study did not provide a definitive test of the merits of integrating substance abuse services as part of assertive community treatment.

More research is also needed on the most cost-effective ways to serve people with dual disorders. The length of follow-up should also be increased. Clinical experience and theoretical perspectives suggest that recovery from substance abuse for dually diagnosed persons is a longitudinal perspective that often takes years (Drake et al., 2001a; Test, Wallisch, Allness, & Ripp, 1989). Finally, in addition to studies on outcomes and costs, descriptive and process evaluation research is also warranted. In particular, more research is needed to identify the client characteristics, service ingredients, and environmental factors that predict recovery for dual disorder clients.

Integrated treatment programs can also be enhanced in several ways. Integrated teams should employ more full-time substance abuse counselors, particularly if the caseload contains mostly dual disorder clients. Since the initiation of this project, the practice of integrated treatment has continued to evolve, and teams should incorporate the latest treatment technology, such as that emerging from the evidence-based project on dual disorders (Brunette, Drake, & Lynde, 2002). Teams should frequently monitor the fidelity of integrated treatment programs, using recently expanded and refined measures (Brunette et al., 2002; Mueser, Noordsy, Drake, & Fox, 2003); researchers and program administrators should quickly respond to treatment implementation problems in order to assure the highest levels of fidelity. Researchers and program developers should also consider combining integrated treatment with other intervention strategies that may produce quicker and higher rates of recovery. In particular, residential and supportive housing arrangements (Bassuk, 2003; Brunette, Drake, Woods, & Hartnett, 2001; Brunette, Mueser, & Drake, 2004), certain

psychotropic medications (see Drake et al., 2001a), contingency management, and community reinforcement approach (Smith & Myers, 1995) appear to be promising partners for inclusion with integrated treatment. Combining various treatment approaches may lead to even more effective and less costly services for this vulnerable population of people with severe mental illness and co-occurring substance abuse disorders.

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REFERENCES

American Psychiatric Association (2000). *Diagnostic and statistical manual for mental disorders (DSM-IV-IR)*, Washington, D.C.: American Psychiatric Association.

Bartels, S. J., Teague, G. B., Drake, R. E., Clark, R. E., Bush, P. & Noordsy, D. L. (1993). Service utilization and costs associated with substance abuse among rural schizophrenic patients. *Journal of Nervous and Mental Disease*, *181*, 227–232.

Bassuk, E. L. (2003). *Supportive housing for homeless families: Setting a research and evaluation agenda*, Seattle, WA: Presentation to the Bill & Melinda Gates Foundation.

Bond, G. R., Drake, R. E., Mueser, K. T. & Latimer, E. (2001). Assertive community treatment for people with severe mental illness – Critical ingredients and impact on patients. *Disease Management & Health Outcomes*, *9*, 141–159.

Brunette, M., Drake, R. E., Lynde, D. W. (2002). *Integrated dual disorders treatment implementation resource kit*, Rockville, MD: Center for Mental Health Services, Substance Abuse and Mental Health Services Administration.

Brunette, M. F., Drake, R. E., Woods, M. & Hartnett, T. (2001). A comparison of long-term and short-term residential treatment programs for dual diagnosis patients. *Psychiatric Services*, *52*, 526–528.

Brunette, M. F., Mueser, K. T. & Drake, R. E. (2004). A review of research on residential problems for people with severe mental illness and co-occurring substance use disorders. *Drug and Alcohol Review*, *23*, 471–481.

Carey, K. B., Coco, K. & Simons, J. (1996). Concurrent validity of clinicians' ratings of substance abuse among psychiatric outpatients. *Psychiatric Services*, *47*, 842–847.

Clark, R. E., Teague, G. B., Ricketts, S. K., Bush, P. W., Xie, H. McGuire, T. G., (1998). Cost-effectiveness of assertive community treatment versus standard case management for persons with co-occurring severe mental illness and substance use disorders. *Health Services Research*, *33*, 1285–1308.

Culhane, P. P., Metraux, S. & Hadley, T. (2002). Public denies reductions associated with placement of homeless persons with severe mental illness in supporting housing. *Housing Policy Debate*, *13*, 107–163.

Dickey, B. & Azeni, H. (1996). Persons with dual diagnosis of substance abuse and major mental illness: Their excess costs of psychiatric care. *American Journal of Public Health*, *86*, 973–977.

Drake, R. E., Essock, S. M., Shaner, A., Carey, K. B., Minkoff, K. Kola, L., (2001a). Implementing dual diagnoses services for clients with severe mental illness. *Psychiatric Services*, *52*, 469–476.

Drake, R. E., Goldmann, H. H., Leff, H. S., Lehman, A. F., Dixon, L. Mueser, K. T., (2001b). Implementing evidence-based practices in routine mental health service settings. *Psychiatric Services*, *52*, 179–182.

Drake, R. E., McHugo, G. J., Clark, R. E., Teague, G. B., Xie, H., Miles, K. & Ackerson, T. H. (1998a). Assertive community treatment for patients with co-occurring severe mental illness and substance use disorder: A clinical trial. *American Journal of Orthopsychiatry*, *68*, 201–215.

Drake, R. E., Mercer-McFadden, C., Mueser, K. T., McHugo, G. J. & Bond, G. R. (1998b). A review of integrated mental health and substance abuse treatment for patients with dual disorders. *Schizophrenia Bulletin*, *24*, 589–608.

Drake, R. E., Mueser, K. T., Brunette, M. F. & McHugo, G. J. (2004). A review of treatments for people with severe mental illness and co-occurring substance use disorders. *Psychiatric Rehabilitation Journal*, *27*, 360–374.

Drake, R. E., Osher, F. C. & Wallach, M. A. (1989). Alcohol use and abuse in schizophrenia: A prospective community study. *Journal of Nervous and mental Disease*, *177*, 408–414.

Drake, R. E., Yovetich, N. A., Bebout, R. R., Harris, M. & McHugo, G. J. (1997). Integrated treatment for dually diagnosed homeless adults. *Journal of Nervous and Mental Disease*, *185*, 298–305.

Erdfedler, E., Faul, F. & Buchner, A. (1996). G*Power. A general power analysis program. *Behavior Research Methods, Instruments and Computers*, *29*, 1–11.

Essock, S. M., Frisman, L. K. & Kontos, N. J. (1998). Cost-effectiveness of assertive community treatment teams. *American Journal of Orthopsychiatry*, *68*, 179–190.

First, M. B., Gibbon, M., Spitzer, R. L. & Williams, J. B. W. (1996). *User*'s guide for the structured clinical interview for DSM-IV Axis I disorders (research version 2.0), New York: American Psychiatric Publishing Inc.

Holloway, F. & Carson, J. (1998). Intensive case management for the severe mentally ill: Controlled trial. *British Journal of Psychiatry*, *172*, 19–22.

Jerrell, J. M. (1996). Cost-effective treatment for persons with dual disorders. *New Directions for Mental Health Services*, *70*, 79–91.

Lehman, A. F., Dixon, L., Hoch, J. S., DeForge, B., Kernan, E. & Frank, R. (1999). Cost-effectiveness of assertive community treatment for homeless persons with severe mental illness. *British Journal Psychiatry*, *174*, 346–352.

Lukoff, D., Nuechterlein, K. H. & Ventura, J. (1986). Manual for the expanded brief psychiatric rating scale. *Schizophrenia Bulletin*, *2*, 594–602.

McHugo, G. J., Drake, R. E., Burton, H. L. & Ackerson, T. H. (1995). A scale for assessing the stage of substance abuse treatment in persons with severe mental illness. *Journal of Nervous and Mental Disease*, *183*, 762–767.

McHugo, G. J., Drake, R. E., Teague, G. B. & Xie, H. (1999). Fidelity to assertive community treatment and client outcomes in the New Hampshire dual disorders study. *Psychiatric Services*, *50*, 818–824.

Meisler, N., Blankertz, L., Santos, A. B. & McKay, C. (1997). Impact of assertive community treatment on homeless persons with co-occurring severe psychiatric and substance use disorders. *Community Mental Health Journal*, *33*, 113–122.

Morse, G. (1998). A review of case management for people who are homeless: Implications for practice policy and research. In L.B. Fosburg & D.O. Dennis (Eds.), *Practical lessons: The 1998 National symposium on homeless research*. U.S. Department of Housing and Urban Development/U.S. Department of Health and Human Services.

Mueser, K., Bond, G. R., Drake, R. E. & Resnick, S. G. (1998). Models of community care for severe mental illness. A review of research on use management. *Schizophrenic Bulletin*, *24*, 37–74.

Mueser, K. T., Noordsy, D. L., Drake, R. E. & Fox, L. (2003). *Integrated treatment for dual disorders: A guide to effective practice*, New York: Guildford Publications.

Phillips, S. D., Burns, B. J., Edgar, E. R., Mueser, K. T., Linkins, K. W., Rosenheck, R. A., Drake, R. E. & McDonel Herr, E. C. (2001). Moving ACT into standard practice. *Psychiatric Services*, *52*(6), 771–779.

President's New Freedom Commission on Mental Health (2003). *Achieving the promise: Transforming mental health care in America*. SAMHSA SMA 03-3832.

Regier, D. A., Farmer, M. E., Rae, D. S., Locke, B. Z., Keith, S. J., Judd, L. J. & Goodwin, F. K. (1990). Comorbidity of mental disorders with alcohol and other drug abuse: Results from the

Epidemiologic Catchment Area (ECA) study. *Journal of American Medical Association*, *264*, 2511–2518.

Smith, J. E. & Meyers, R. J. (1995). *Handbook of alcoholism treatment approaches: Effective alternatives*, 2Allyn & Bacon: Needham Heights.

Sobell, M. B., Maiston, S. A. & Sobell, L. C. (1980). Developing a prototype for evaluating alcohol treatment effectiveness. In Sobell, L. C., Sobell, M. B., Ward, E.(Eds.*Evaluating alcohol and drug abuse treatment effectiveness*Pergamon, New York.

Teague, G. B., Bond, G. R. & Drake, R. E. (1998). Program fidelity in assertive community treatment: Development and use of a measure. *American Journal of Orthopsychiatry*, *68*, 216–232.

Test, M. A., Wallisch, L. S., Allness, D. J. & Ripp, K. (1989). Substance use in young adults with schizophrenic disorders. *Schizophrenia Bulletin*, *15*, 465–476.

UK 700 Group (1999). Intensive versus standard case management for severe psychotic illness: A randomized trial. *Lancet*, *353*, 2185–2189.

Weisbrod, B. A. (1983). A guide to benefit-cost analysis, as seen through a controlled experiment in treating the mentally ill. *Journal of Health Politics, Policy and Law*, 7, 808–845.

Winter, J. P. & Calsyn, R. J. (2000). The Dartmouth Assertive Community Treatment Scale (DACTS): A generalizability study. *Evaluation Review*, *24*, 319–388.

Wolff, N., Helminiak, T. W. & Diamond, R. J. (1995). Estimated societal costs of assertive community mental health care. *Psychiatric Services*, *46*, 898–906.

Wolff, N., Helminiak, T. W., Morse, G. A., Calsyn, R. J., Klinkenberg, W. D. & Trusty, M. L. (1997). Cost-effectiveness evaluation of three approaches to case management for homeless mentally ill clients. *American Journal of Psychiatry*, *154*, 341–348.

Wolff, N., Helminiak, T. W. & Tebes, J. (1997). Getting the cost right in cost-effectiveness analyses. *American Journal of Psychiatry*, *154*, 736–743.