Modified Therapeutic Community for Co-occurring Substance Use & Mental Disorders

Research Studies

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Modified Therapeutic Community for Co-occurring Disorders

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05. Randomized trial of a re-entry modified therapeutic community for offenders with co-occurring disorders: Crime outcomes. (2012). Sacks, S., Chaple, M., Sacks, J.Y., McKendrick, K., & Cleland, C.M. *Journal of Substance Abuse Treatment*, *42*(3), 247-259. DOI: 10.1016/j.jsat.2011.07.011; Clinical Trials Registry # NCT00249756; PII: S0740-5472(11)00148-6.

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06. Sacks, S., McKendrick, K., Sacks, J.Y., & Cleland, C. (2010). Modified therapeutic community for co-occurring disorders: Single investigator meta-analysis. *Substance Abuse, 31*(3), 146-161. DOI: 10.1080/08897077.2010.495662; NIHMSID #212261; PMCID #3058619

NREPP — Modified Therapeutic Community

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http://nrepp.samhsa.gov/ViewIntervention.aspx?id=144

01

Modified Therapeutic Community for homeless MICAs: Treatment outcomes

De Leon, G., Sacks, S., Staines, G., & McKendrick, K. (2000).

American Journal of Drug & Alcohol Abuse
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01. Modified Therapeutic Community for homeless mentally ill chemical abusers: Treatment outcomes

Abstract

This study compared homeless mentally ill chemical abuser (MICA) clients (n = 342), male and female, sequentially assigned to either of two modified therapeutic community programs (TC_1 and TC_2) and to a treatment-as-usual (TAU) control group. Follow-up interviews were obtained at 12 months post baseline and at time F (on average more than 2 years post baseline) on a retrieved sample of 232 (68%) clients and 281 (82%) clients, respectively. Outcome measures assessed five domains: drug use. crime, HIV risk behavior. psychological symptoms, and employment. Individuals in both modified TC groups showed significantly greater behavioral improvement than TAU at 12 months and time F, and the modified TC_2, with lower demands and more staff guidance was superior to modified TC_1. Completers of both TC programs showed significantly greater improvement than dropouts and a subgroup of TAU clients with higher exposure (i.e., more than 8 months) to other treatment protocols. The present findings support the effectiveness and longer term stability of effects of a modified TC program for treating homeless MICA clients.

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Modified Therapeutic Community for Homeless Mentally Ill Chemical Abusers: Treatment Outcomes

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ABSTRACT

This study compared homeless mentally ill chemical abuser (MICA) clients (n = 342), male and female, sequentially assigned to either of two modified therapeutic community programs (TC_1 and TC_2) and to a treatment-as-usual (TAU) control group. Follow-up interviews were obtained at 12 months postbaseline and at time F (on average more than 2 years postbaseline) on a retrieved sample of 232 (68%) clients and 281 (82%) clients, respectively. Outcome measures assessed five domains: drug use, crime, HIV risk behavior, psychological symptoms, and employment. Individuals in both modified TC groups showed significantly greater behavioral improvement than TAU at 12 months and time F, and the modified TC_2, with lower demands and more staff guidance, was superior to modified TC_1. Completers of both TC programs showed significantly greater improvement than dropouts and a subgroup of TAU clients with high exposure (i.e., more than 8 months) to other treatment protocols. The present findings support the effectiveness and longer term stability of effects of a modified TC program for treating homeless MICA clients.

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INTRODUCTION

Co-occurring Mental Illness and Chemical Abuse

The co-occurrence of psychiatric and chemical abuse problems has been reported in the range from 20% to 50% (1–8) among mental health clients and from 50% to occasionally as high as 90% among drug treatment clients (9–12). Homeless mentally ill chemical abusers (MICAs) constitute a most problematic subgroup of homeless people and place unique demands on the homeless, mental health, and drug treatment systems.

A variety of programs, both with and without elements to address homelessness, have been initiated by treatment facilities to respond to the combined problems of mental illness and substance abuse (13). From a review of the literature, Drake and colleagues tentatively concluded that:

> Integrated treatment, especially when delivered for 18 months or longer, resulted in significant reductions of substance abuse and, in some cases, substantial rates of remission, as well as reductions in hospital use, and/or improvements in other outcomes. (14, p. 601)

To date, information on treatment approaches for MICA clients with histories of homelessness is limited. These "triple disorder" clients demand treatment responses that contend with mental illness and substance problems embedded in a disaffiliated lifestyle. Long recognized as a major drug abuse treatment approach, particularly for the socially disaffiliated, the therapeutic community (TC) has an established record of effectiveness in reducing clients' drug use and criminality, while increasing their employment (15–18). Both short- and long-term follow-up studies of TC programs for drug abuse found that clients also demonstrated improvement in psychological well-being after treatment (19–25). The conjunction of social and psychological gains in these addict populations provided a convincing rationale for extending TC approaches to clients with dual disorders. Today, however, few studies report on efforts to implement these approaches with MICA clients.

Rahav and colleagues (26) studied homeless MICA men in two conditions, a modified TC program in a residential drug treatment agency and a standard community residency with enhanced drug treatment services. Remaining 1 year or longer in the modified TC was associated with significantly more improvements in psychological status during treatment compared with those with long stays in the standard community residence program. No posttreatment results are reported.

This paper is the sixth in a series of reports on the evaluation of a modified TC treatment implemented in a community residence setting for homeless MICA clients. Previous papers described the social/psychological characteristics (27); relationships among the key dimensions of homelessness, mental illness, and substance abuse (28); and economic analysis of treatment (29, 30; M. French, K. McCollister, S. Sacks, K. McKendrick, and G. De Leon, unpublished manuscript, 1999). This paper reports treatment outcomes for modified TC clients at 12-month and approximately 24-month postbaseline in five domains: substance use, criminality, employment, human immunodeficiency virus (HIV) risk behavior, and psychological symptoms.

METHODS

Research Design

In accord with the research design, homeless MICA clients were assigned to one of three treatment options in the residential treatment phase: (a) modified TC, moderate intensity (modified TC_1); (b) modified TC, low intensity (modified TC_2); and (c) treatment as usual (TAU). The study compared clients at baseline, 12 months postbaseline, and again at time *F*, which is defined as the last follow-up point postbaseline available for each client.

The clients, who were referred from homeless shelters and psychiatric facilities, were assigned sequentially to one of the two modified TC conditions as program openings became available. If no opening existed when a client was referred, his or her name was placed in chronological order on a waiting list; the next vacancy in either of the modified TC treatment programs was offered to the client at the top of the list. When no vacancy existed in either modified TC program, clients were assigned to TAU. The use of sequential (rather than random) assignment provided a serviceable design, responsive to field realities, to assess the functioning of homeless MICAs assigned to specially adapted TCs as compared to MICA clients receiving services customarily available in urban settings. (For a further discussion of sequential assignment, see Ref. 31.)

Treatment Conditions

Modified TC_1. Modified TC_1, described in detail in other papers (32–34), was similar to standard TCs in structure, process, and interventions; however, the modifications were adapted to the MICA's particular difficulties, including

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psychiatric symptoms, cognitive impairments, and reduced level of functioning. The planned duration of stay in the program was 12 months.

Modified TC_1 included administration of psychiatric medications, increased flexibility in required program activities, reduction in the duration of various activities, less confrontation, increased emphasis on psychoeducational instruction, fewer sanctions, more explicit affirmation for achievements, greater sensitivity to individual differences, and greater responsiveness to the special developmental needs of the clients. In sum, modified TC_1 was adapted to MICA clients in three critical ways: increased flexibility, less intensity, and greater individualization.

Modified TC_2. Modified TC_2 was essentially a variation of modified TC_1. The two programs were similar in planned duration of stay, structure, stages, and array of interventions; however, modified TC_2 differed from modified TC_1 in several ways. First, clients were allowed greater freedom to come and go from the residential facility early in treatment. Second, clients left the residential program to attend a MICA day treatment program offered in the community. Third, peer responsibility was reduced in terms of the duties clients and staff shared for operating the facility. Fourth, staff provided more direct assistance to clients in running program interventions and in directing client activities. Fifth, the program was structured to have fewer activities and shorter interactions.

Overall, modified TC_2 may be characterized as a further modification of the TC for homeless MICAs, one that places still fewer demands on clients and that is even more flexible in accommodating individual needs and deficiencies. Nevertheless, the core features of the TC program remain with both models, with a common reliance on peer self-help and the community as both the context and agent for change (i.e., using community-as-method) (35).

TAU (control). "Treatment as usual" (TAU) is a term used to capture the variety of treatment (and nontreatment) options presented to homeless MICA clients when discharged from shelters and psychiatric facilities.

These TAU options included other MICA-specific or general residential programs and other supported housing programs, with or without day treatment services, those receiving case management services, as well as those discharged to self or to another family member, with or without follow-up. Many ended up back on the streets. With few exceptions, the program services received by the TAU group were fewer, less specific to the needs of MICA clients, not as well organized, and less related to a cohesive perspective and approach than those received by the modified TC groups. TAU reflects the reality of services available

in large urban areas for the disaffiliated, hard-to-serve, homeless MICA, affording a unique opportunity to compare the typical service situation with structured and enriched modified TC treatment.

Treatment Facilities

The modified TC programs were small, congregate care facilities resembling group homes located in Brooklyn, New York. Both were operated by a not-for-profit agency specializing in the residential rehabilitation of severely and persistently mentally ill clients. The TAU condition, as noted, involved a variety of settings and agencies, principally community residences, psychiatric hospitals, and shelters.

Sample

Referrals to this study came from homeless facilities and psychiatric hospitals located in all sections of New York City. The admission criteria were inclusionary for psychiatric disorder and homelessness: All admitted clients had a primary mental illness Axis I referral diagnosis (usually schizophrenia or major depression), a secondary Axis I referral diagnosis of substance abuse/dependent disorder, and a history of homelessness. Each client met the New York City/New York State criterion for homelessness, having been in a shelter or on the streets for a minimum of 14 of the past 60 days. Virtually all clients had an extensive history of psychiatric hospitalization and were on psychotropic medication at the time of referral. The diagnosis and history of homelessness were based on psychiatric and clinical social work assessments as established by the referral agency and verified by the service agency participating in this study. Finally, 95% of clients showed evidence of substance use/dependence at the time of referral.

A total of 365 clients were referred to the study; 342 were admitted, 7 (2%) refused to participate, and 16 (4%) were deemed ineligible. The last consisted of those who were discharged as not meeting program criteria, those who dropped out prior to the baseline interview, or those whose cognitive functioning level was insufficient to permit an interview.

Of the 342 admissions, 183 were assigned to modified TC_1, 93 to modified TC_2, and 66 to TAU. Of the 183 assigned to modified TC_1, 119 (65%) were interviewed at 12-month postbaseline. Of the 93 clients assigned to modified TC_2, 65 (70%) received 12-month postbaseline interviews, and of the 66 assigned to

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TAU, 48 (73%) received 12-month postbaseline interviews. The corresponding samples at time *F* were 149 for modified TC_1 (81%), 79 for modified TC_2 (85%), and 53 for TAU (80%).

Measures

This paper presents results for 12 continuous variables considered critical to understanding treatment effectiveness. The measures employed were drawn from the Center for Therapeutic Community Baseline Protocol (36) and standard psychological scales. The 12 outcomes cover five domains: substance use, criminality, HIV risk behavior, psychological dysfunction (not diagnosis), and employment.

Substance use (three measures). Data were collected for the 6 months prior to interview on the frequency of alcohol intoxication and the use of 17 illicit drugs. The separate items of illegal drug use generated two indices: the number of different types used (0 to 17) and the highest frequency of use. The frequency codes for both alcohol intoxication and illegal drug use (highest of 17 items) were from 0 (none) to 8 (more than once a day). The resulting three measures of substance abuse were frequency of alcohol intoxication, number of different types of illicit drugs used, and highest frequency of illicit drug use. As a general check on internal reliability, Cronbach alpha was computed for the items to measure the frequency of use of the 17 illicit drugs. The resulting value (.55) shows the items are related and meet the minimum requirements for using a measure in research.

Criminality (two measures). Questions were asked to determine participation in 17 illegal activities over the last 6 months. Data from the category of "use or possession of illegal drugs" were excluded from the analyses to minimize artifactual overlap between the measures of substance abuse and the measures of illegal activities. The remaining 16 items generated two indices: the number of different types of crimes committed (range 0 to 16) and the total number of crimes committed. The number of crimes committed for each crime type was coded from 0 (none) to 9 (more than 500). To create the index for the total number of crimes committed, individual crime items were assigned their median value and summed. The sum of the items was then returned to the original coding scheme. Again, as a general check on internal reliability, the Cronbach alpha was computed for the items to measure the number of times clients engaged in each

of the 16 specific illegal activities. The value produced (.67) meets the standard for use of a measure for research purposes.

HIV risk behavior (two measures). Data were collected concerning both drug- and sex-related HIV risk behaviors during the last 6 months. These measures included the number of times a client used needles (using the same scale as for the number of crimes committed) and the number of sex partners.

Psychological dysfunction (four measures). Measures consisted of total scores from the major scales of psychological symptoms, including the Beck Depression Inventory (BDI) (37, 38), the Shortened Manifest Anxiety Scale (SMAS) (39), the Symptom Check List 90-Revised Global Severity Index (SCL 90-R) (40), and the Tennessee Self-Concept Sub-Scale (TSCS) (41).

Prosocial behavior (one measure). Employment data were used to indicate prosocial interaction. Categories of employment were none (0), part-time irregular or odd jobs (1), part-time regular (2), and full time (3).

Analytic Plan

The analytic plan compared the three treatment conditions (i.e., modified TC_1, modified TC_2, and TAU) on all 12 outcome measures at three points in time: baseline, 12 months postbaseline, and the last follow-up time period available for each client (time *F*, approximately 24 months postbaseline). Analysis of variance (ANOVA) tests revealed no significant group differences on baseline scores for any of the outcome measures. Comparisons were also conducted on 26 demographic and other client characteristics. The modified TC_1 group was compared to the modified TC_2 group, followed by a full analysis among all three treatment groups. Chi-square tests were used on all dichotomous or categorical data (e.g., ethnicity, marital status). Continuous data (e.g., age) were tested using ANOVA techniques. Again, no statistical group differences emerged; however, to ensure that potential group differences in the outcome analysis were minimized for subsamples of clients who completed follow-up interviews, the multivariate analyses included standard predictors, or covariates, of follow-up scores: age, gender, and ethnicity (black/non-black).

The outcome analyses at 12 months and time *F* focused on intent-to-treat bivariate comparisons of pre-post change for each of the three treatment groups. Paired *t* tests were used to assess the amount of change from baseline to postbase-

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line on the 12 outcome measures representing five domains (i.e., substance use, criminality, HIV risk behavior, psychological distress, and employment). Ordinary least-squares (OLS) regressions were then conducted to test for differential group change on the 12 outcome measures. The OLS regression model consisted of the postbaseline outcome score (dependent variable), two dummy variables for treatment condition (independent variables: modified TC_1 and modified TC_2; comparison group: TAU), and four covariates (baseline outcome score, age, gender, and ethnicity). A separate multivariate test was performed to test the difference in pre-post change between the two modified TC conditions. The regression model was adjusted by using only one measure of treatment condition (independent variable).

The time *F* analysis was conducted to assess longer term effects while maximizing sample size to ensure power to detect differential group change. Data from the last follow-up interview completed for each client were used in the time *F* analysis. Specifically, the average number of days from baseline to time *F* interviews was 749 (SD = 303) for all clients: 782 for the combined modified TC groups (SD = 319), 794 (SD = 342) for modified TC_1, 757 (SD = 271) for modified TC_2, and 610 (SD = 163) for TAU. Overlap between the 12-month postbaseline and the time *F* follow-up was minimal; only 13% of the time *F* data came from 12-month interviews (15% modified TC_1, 12% modified TC_2, and 9% TAU). Thus, for the intent-to-treat modified TC samples, time *F* analysis assessed outcomes 9–18 months after separation from primary treatment.

The covariates for the time *F* analysis were the same as in the 12-month analysis, but also controlled for time to follow-up and for time at risk as the point of last interview varied across individuals. *Time to follow-up* is the total number of days between the baseline and the follow-up interview. *Time at risk* is the total number of days to follow-up minus days in all treatments. Survival curve analysis indicated that the two modified TC groups were followed significantly longer than the TAU group, but did not differ in time to last follow-up from one another. The difference between modified TC and TAU is attributable to a delay in beginning sequential assignment to TAU and the finite period for follow-up ending May 1997.

RESULTS

Profiles

Table 1 presents a profile of the homeless MICA clients based on several major demographic and background measures. Approximately three-quarters of

Table 1. Baseline Profile of Clients Who Are Mentally Ill Chemical Abusers

Variable	Total (n = 342)	TAU (n = 66)	Modified TC total (n = 276)	Modified TC_1 (n = 183)	Modified TC_2 (n = 93)
Gender					
Male	75	73	76	78	72
Female	25	27	24	22	28
Marital status					
Married/living together	3	5	2	3	0
Separated/divorced/widowed	23	27	22	22	21
Never married	74	68	76	74	79
Any children	47	50	46	48	42
Ethnicity					
White	11	14	11	11	11
Black	70	59	72	72	73
Hispanic	18	27	16	17	14
Other	<1	0	<1	0	2
Age					
Mean	35.35	36.96	35.20	35.24	35.11
(Standard deviation)	(6.89)	(6.54)	(6.97)	(7.10)	(6.74)
Education					
Less than 12 years	64	65	63	67	58
12 years only	20	20	20	18	23
More than 12 years	16	15	17	15	20
Number of residences in last year					
Mean	3.05	3.27	3.00	3.00	2.99
(Standard deviation)	(1.40)	(1.36)	(1.41)	(1.49)	(1.27)
Lifetime DIS diagnosis					
Any Axis I Serious	60	57	60	63	55
Substance abuse/dependence	95	97	95	94	96
Employment	7	9	7	5	10

the sample were male; the same proportion had never been married. Most clients were in their mid-30s, and about half had one or more children. Over two-thirds were African-American. Almost two-thirds had not completed high school, and few had been employed in the last 6 months. The typical client reported three residences in the last year, an indicator of residential instability and homelessness. Of the sample, 60% had an Axis I serious (lifetime) disorder, as measured by the Diagnostic Interview Schedule (DIS; Ref. 42). Axis I serious is comprised of three DIS diagnoses: major depression, mania, and schizophrenia. Based on the same diagnostic instrument, virtually all clients had a lifetime diagnosis of substance abuse or dependence.

Comparisons between modified TC_1 and modified TC_2 are also depicted in

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Table 1. No statistically significant differences emerged for either type of group comparison. The lack of significant differences among the groups supported the sequential assignment procedures.

Outcomes

To focus on the comparative outcomes, the multivariate results are presented in the tables, while the bivariate results concerning group change are summarized. With respect to the latter, positive behavior change was obtained on several outcome measures at 12-month postbaseline for the modified TC_1, modified TC_2, and TAU groups. The less modified TC_1 group improved statistically on 7 of the 12 outcome measures across four domains: reduced frequency of alcohol and drug use, criminality, increased employment, and improvements on the SMAS and the TSCS. The more modified TC_2 group improved statistically on 9 of the 12 outcome measures across all outcome domains. Significant reductions were indicated for all measures of alcohol and drug use and criminality. The modified TC_2 group also showed decreased number of sex partners, increased employment, and improvements on the BDI and SMAS scores. TAU clients showed significant improvement on three of the outcome measures in three domains: reductions in illegal drug use and crime and decreased SMAS scores. Overall, the two modified TC groups produced more significant findings than TAU (i.e., 7 and 9 versus 4, respectively), although at least some of the difference between groups may be explained by the larger sizes of the two modified TC groups.

Table 2 shows the results of multivariate analysis of comparative change on the outcome measures. The regression models were generally significant. Significantly greater change for the modified TC_1 group compared to the TAU group occurred on one outcome measure, employment status. Stronger results emerged for the modified TC_2 group. When compared to the TAU group, the modified TC_2 group showed greater change on the four outcome variables for substance use measures and employment.

The modified TC and TAU comparisons above were clarified in an assessment of differences between the modified TC conditions. Modified TC_2 was superior to modified TC_1 in both retention and 12-month follow-up outcomes. Whereas 56% of the residents assigned to modified TC_2 were retained for 12 months, only 34% of the modified TC_1 subjects were retained for the same time period (chi square 12.05, $p < .002$).

In multivariate test results comparing the two modified TC groups at 12 months postbaseline, the modified TC_2 group showed significantly greater im-

Table 2. Ordinary Least-Square Regression Assessing Change from Baseline to 12 Months Postbaseline, Comparing Each Modified Treatment Community (TC) to Treatment-as-Usual (TAU) Clients

Outcome	Model statistics: Mult R	R^2	p (F test)	Modified TC_1 vs. TAU, Beta (p)	Modified TC_2 vs. TAU, Beta (p)
Substance use					
Alcohol to intoxication	0.27	0.07	.01[a]	−0.04 (.63)	−0.17 (.05[b])
Frequency of illegal drug use	0.26	0.07	.02[b]	−.06 (.48)	−0.24 (.01[a])
Number of different illegal drugs	0.32	0.10	.000[c]	−0.02 (.82)	−0.23 (.01[a])
Crime (not drug use)					
Number of crimes committed	0.26	0.07	.02[b]	0.03 (.77)	−0.13 (.13)
Number of different crime types	0.25	0.06	.03[b]	0.04 (.66)	−0.08 (.33)
HIV risk behavior					
Needle use (number of times)	0.19	0.04	.20	0.03 (.75)	−0.03 (.28)
Number of sex partners	0.51	0.26	.000[c]	0.04 (.58)	−0.04 (.56)
Psychological dysfunction					
Beck Depression Inventory	0.42	0.18	.000[c]	0.04 (.65)	−0.14 (.14)
Manifest Anxiety Scale	0.50	0.25	.000[c]	0.09 (.33)	0.01 (.91)
SCL90-R Global Severity Index	0.49	0.24	.000[c]	0.07 (.45)	−0.02 (.82)
Tennessee Self-Concept Scale	0.58	0.33	.000[c]	0.16 (.10)	0.11 (.25)
Prosocial behavior: employment (none, part time, full time)	0.32	0.10	.001[c]	0.28 (.001[c])	0.33 (.000[c])

Control variables included baseline score, age, ethnicity, and gender.
[a] $b < .01$.
[b] $p < .05$.
[c] $p < .001$.

provement on four measures in three domains. Differential improvement for the modified TC_2 group included illegal drug use (i.e., highest frequency of drug use, number of different types of drug use), crime (i.e., number of crimes committed), and psychological dysfunction (i.e., BDI scores).

The pattern of results at longer term follow-up was similar to that at 12 months. At time F, the modified TC groups improved on more variables than the TAU

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Table 3. Ordinary Least-Square Regression Assessing Change from Baseline to Time *F*, Comparing Each Modified Therapeutic Community (TC) Group to Treatment-as-Usual (TAU) Clients

Outcome	Model statistics: Multiple R	R^2	p (F test)	Modified TC_1 vs. TAU, Beta (p)	Modified TC_2 vs. TAU, Beta (p)
Substance use					
Alcohol to intoxication	0.35	0.13	.000[a]	−0.06 (.52)	−0.17 (.05[b])
Highest illegal drug	0.28	0.08	.02[b]	−0.11 (.21)	−0.23 (.01[c])
Number of different illegal drugs	0.32	0.10	.002[c]	0.01 (.96)	−0.17 (.05[b])
Crime (not drug use)					
Number of crimes committed	0.31	0.10	.002[c]	−0.18 (.04[b])	−0.27 (.001[a])
Number of different crime types	0.31	0.10	.003[c]	−0.21 (.02[b])	−0.27 (.001[a])
HIV risk behavior					
Needle use	0.16	0.03	.55	−0.14 (.12)	−0.11 (.20)
Number of sex partners	0.41	0.17	.000[a]	−0.10 (.22)	−0.09 (.27)
Psychological dysfunction					
Beck Depression Inventory	0.47	0.22	.000[a]	−0.11 (.17)	−0.32 (.000[a])
Manifest Anxiety Scale	0.47	0.23	.000[a]	0.00 (1.0)	−0.17 (.03[b])
SCL90-R Global Severity Index	0.45	0.20	.000[a]	0.02 (.80)	−0.11 (.20)
Tennessee Self-Concept Scale	0.60	0.36	.000[a]	0.10 (.25)	0.11 (.20)
Prosocial behavior: employment (none, part time, full time)	0.37	0.14	.000[a]	0.22 (.01[c])	0.31 (.000[a])

Control variables included baseline score, age, ethnicity, gender, time to last follow-up, and time at risk.

[a] $b < .001$.

[b] $p < .05$.

[c] $p < .01$.

group. The multivariate comparisons shown in Table 3 indicated that significant differences between modified TC_2 and TAU occurred on eight variables and between modified TC_1 and TAU on three variables. Although not shown, multivariate analyses indicated that the modified TC_2 group differed positively from the modified TC_1 group on number of illegal drugs, BDI, and SMAS scores.

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Thus, controlling for other variables, all groups showed improvements at time *F*, but the largest and most consistent changes occurred in the more modified TC_2 group.

Treatment Completers, Dropouts, and Treatment as Usual

Several additional analyses further explored the outcome differences across the groups by disaggregating the intent-to-treat sample. Multivariate analyses compared longer term (time *F*) outcomes of modified TC completers (those who received at least 365 days of residential treatment), modified TC dropouts, and TAU. The results for each analysis are summarized briefly.

First, improvement for modified TC completers was consistently and significantly greater than for modified TC dropouts. Among the modified TC dropouts, days in treatment did not relate to time *F* outcomes, although days in treatment effects were obtained on four variables in the drug use and criminal domains at 12-month postbaseline.

Second, compared to TAU, modified TC completers had significantly greater improvement in four of the five domains, including all measures of substance use, criminality, and prosocial behavior, and on two measures of psychological dysfunction (i.e., BDI and SMAS scores). No significant differences emerged between modified TC dropouts compared to TAU, although bivariate results revealed improvements for both groups on several of the outcome variables.

Third, an attempt was made to compare more directly modified TC and TAU approaches among subgroups with members that received similar "dosages" of treatment. This analysis was confined to the 12-month postbaseline sample as a majority of the TAU clients were not at risk at time *F*. Most were receiving some drug treatment in inpatient or outpatient psychiatric settings when located and interviewed. Regression analyses simultaneously compared each group of modified TC completers to a TAU high-treatment group, those who received more than the median of 254 days in various TAU treatments.

As compared to the high-treatment TAU group, modified TC_1 completers showed significantly greater improvement on 7 of the 12 outcome variables, including two measures of drug use, both measures of criminality, needle use, number of sex partners, and employment. Modified TC_2 completers showed significantly greater improvement compared to the TAU high-treatment group on six outcome measures: alcohol to intoxication, two measures of illegal drug use, both crime measures, and employment.

These analyses confirm that improvements occurred in all three conditions. Those who completed TC treatment showed better outcomes than TC dropouts

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and compared to TAU clients who received other services of high or comparable intensity. TC dropouts and TAU clients revealed smaller, but similar, improvement at postadmission follow-up.

DISCUSSION

The findings of this study point to the comparative effectiveness of the TC approach and, more particularly, of a more modified TC model. This conclusion is supported by the intent-to-treat analysis of outcomes at 12 and approximately 24 months (time *F*) postbaseline. At 12-month follow-up, clients in the more modified TC_2 differed significantly from TAU clients on all measures of substance abuse and employment, while clients in the less modified TC_1 differed from TAU clients only on employment. Similar results were obtained at time *F*. The modified TC groups produced similar and superior longer term outcomes compared to the TAU group.

Results obtained from the disaggregated sample further clarify the effectiveness of modified TC treatment. Compared to modified TC dropouts, the completers in both modified groups showed the largest and most consistent improvement across all of the outcome domains. Moreover, completers from each of the modified TC conditions showed significantly greater improvement compared to the TAU high-treatment group on outcome measures from four domains: substance use, crime, HIV risk behavior, and employment.

The results of the intent-to-treat analysis favor the more modified TC_2 over the less modified TC_1 group. These modified TC differences mainly reflect the higher completion rate of the more modified TC_2 model. Nevertheless, positive outcomes are similar for those clients who completed either modified TC program. Moreover, the completers in both modified TC groups revealed better 12-month outcomes than the TAU group with high treatment intensity.

Among the MICA TC dropouts, time-in-treatment effects were obtained on several outcome variables at 12 months postbaseline, which, however, did not persist at time *F*. The lack of consistent time-in-treatment effects is contrary to the well-documented relationship between longer retention and posttreatment outcomes in the TC literature. However, the issue of retention and outcomes among MICA clients in modified TCs remains to be clarified. More detailed analyses of client predictors of dropout in the TC and TAU conditions are needed, as are other studies with larger samples of dropouts retrieved at long-term follow-up.

The improvement in outcome measures, while generally greater for the more

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modified TC, was substantial across all groups. Drug use and criminality domains revealed large and consistent changes in both modified TC groups and, to a lesser extent, in the TAU group. The magnitude of improvement detected in drug use and crime is similar to that reported for standard TCs serving non-MICA clients (43–45).

HIV risk behavior showed the least change in all groups. The low level of baseline scores and use of single-item measures may have contributed to the reduced size of the change on these measures of HIV risk behavior. As suggested in Ref. 46, risk abatement strategies appear to be less effective in altering HIV risk behaviors related to sex than those related to drug injection and needle sharing.

The consistent improvements in psychological symptoms for both modified TC groups were not reflected in the TAU group. These findings are in accord with those from studies showing that standard TC treatment reduced both psychopathological symptoms and substance abuse (47).

Employment, a measure of prosocial behavior, improved consistently for both modified TC groups and was markedly greater than for the TAU group, a finding that is concordant with TC outcome studies (43–45). It should be noted that the employment findings are enhanced, in part, by the agency policy of offering supported work stipends to some clients; therefore, the employment gains observed do not necessarily indicate client autonomy in the world of work. Nevertheless, the results emphasize the progress these clients are making and underscore the importance of a work focus within a treatment regimen.

Several considerations caution the interpretation of the comparative effectiveness of the modified TC. These relate to assumptions concerning the treatment goals of modified TC programs for the MICA population. The intent-to-treat group differences obtained in this study mainly reflect the contribution of the modified TC completers. On leaving the residential phase, most of the TC completers entered a supported housing program, and many continued to obtain social services and some form of drug treatment. Thus, research must evaluate the specific contribution of supported housing alone (versus supported housing plus aftercare programming) to the stability of the treatment gains. However, modified TC treatment has critical implicit goals relevant to the homeless and mental illness dimensions of this special population. These implicit goals are to sustain affiliation with a drug-free network; to enter and remain in supported housing; to manage mental illness and general health in suitable ways (such as taking psychiatric medications, utilizing health services, attending day treatment programs); and to be working (part time or full time) or preparing for useful work (school or skills training programs).

The time required to achieve these goals may vary. The planned 12 months of primary treatment followed by 6 to 12 months of treatment combined with supported housing are arbitrary, if not artificial, markers in the habilitation/rehabilitation process. However, treatment success is evident if clients are engaged continually in meeting these implicit goals. Although this multicomponent treatment approach is complex, recently published economic analyses of the present data further support its utility for the MICA population (29, 30; M. French, K. McCollister, S. Sacks, K. McKendrick, and G. De Leon, unpublished manuscript, 1999).

Methodological Considerations

Several methodological issues also influence the interpretation of the study's findings. First, sample sizes differed across the three groups. These differences limit extrapolation of bivariate findings in which both modified TC groups showed improvement on a greater number of variables than the TAU group. However, the conclusions concerning modified TC effectiveness are drawn from those multivariate analyses that demonstrate greater improvement on several variables in direct comparisons between the modified TC and TAU groups.

Second, the study examined sources of bias affecting internal and external validity, including baseline differences between modified TC and TAU retrieved cases and between retrieved and nonretrieved cases for both groups. In comparisons of retrieved and nonretrieved cases (not shown), no more significant differences than expected by chance were found on 26 key study variables; nevertheless, potential (minimal) bias may remain due to limitations in the measures included (i.e., specific variables and number of tests) and limitations of statistical power (approximately 95% for effects of medium size, but only 28% for small effects) (Ref. 48).

Third, the outcome findings in the present study rest on client self-report. A number of studies (49) in the drug treatment literature generally support the validity of self-reported data; however, the validity of self-reported data on homeless MICA clients has not yet been established. The assumption in the present design was that group differences in the validity of self-report would not be expected, although absolute validity levels based on external criteria such as urine toxicology, hair assays, and criminal record files are not known.

Fourth, employing the time *F* measure to assess longer term outcomes introduces some complexity in the interpretation of the findings. It lacks the quantita-

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tive precision of an equal follow-up point for all clients, such as in the 12-month analysis. Specifically, compared to the modified TC groups, TAU had fewer overall days from baseline to time *F*, but significantly more days at risk, reflecting their comparatively shorter episodes of drug treatment. Both "days to time *F*" and "days at risk" were covariates in the analyses, and neither contributed to outcome variance; nevertheless, studies are needed with similar longer term follow-up periods to equalize or minimize differences in actual days at risk.

Notwithstanding the above issues, the findings of the study demonstrate that, suitably modified, TC methods can be employed successfully with homeless MICAs. In particular, the differences between the two modified conditions suggest that greater flexibility to the special circumstances of the MICA client is associated with longer retention in treatment and better outcomes. For homeless MICA clients, however, the long-term stability of treatment gains depends on completion of primary residential treatment in the modified TC, access to supportive or permanent housing, and continued involvement in a TC-oriented aftercare program.

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02

Benefit-cost analysis of a modified TC for mentally ill chemical abusers

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02. Benefit-cost analysis of a modified TC for mentally ill chemical abusers

Abstract

This paper estimates and compares the economic benefits and costs of modified therapeutic community (modified TC) treatment for homeless mentally ill chemical abusers (MICAs) relative to a “treatment-as-usual” (TAU) comparison group. Data from the period 12 months pre-admission to the modified TC were compared to data from 12 months post-admission across three outcome categories: employment, criminal activity, and utilization of health care services. The economic cost of the average modified TC treatment episode was $20,361. The economic benefit generated by the average modified TC client was $305,273. The incremental economic benefit per modified TC client (relative to TAU) was $273,698, resulting in a net benefit per modified TC client of $253,337 and a benefit-cost ratio of 13:1. Adjusting for extreme outlier observations, the incremental economic benefit estimate was $105,618, net benefit was $85,257, and the benefit-cost ratio was 5.2. These results quantify the potential economic and social advantages of the modified TC approach and highlight the policy implications of modified TC programs for homeless MICAs. This study is the first comprehensive economic evaluation of TC treatment for homeless MICAs; future research can draw from the economic analysis methods outlined here to apply to larger samples, longer follow-up periods, and other treatment settings.

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Benefit–cost analysis of a modified therapeutic community for mentally ill chemical abusers

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Abstract

This paper estimates and compares the economic benefits and costs of modified therapeutic community (modified TC) treatment for homeless mentally ill chemical abusers (MICAs) relative to a 'treatment-as-usual' (TAU) comparison group. Data from the period 12 months pre-admission to the modified TC were compared to data from 12 months post-admission across three outcome categories: employment, criminal activity, and utilization of health care services. The economic cost of the average modified TC treatment episode was $20,361. The economic benefit generated by the average modified TC client was $305,273. The incremental economic benefit per modified TC client (relative to TAU) was $273,698, resulting in a net benefit per modified TC client of $253,337 and a benefit–cost ratio of 13:1. Adjusting for extreme outlier observations, the incremental economic benefit estimate was $105,618, net benefit was $85,257, and the benefit–cost ratio was 5.2. These results quantify the potential economic and social advantages of the modified TC approach and highlight the policy implications of modified TC programs for homeless MICAs. This study is the first comprehensive economic evaluation of TC treatment for homeless MICAs; future research can draw from the economic analysis methods outlined here to apply to larger samples, longer follow-up periods, and other treatment settings. © 2002 Elsevier Science Ltd. All rights reserved.

Keywords: Analysis; Economic evaluation; Therapeutic community; MICAs

1. Introduction

The co-occurrence of mental and substance abuse disorders has received increasing attention over the past decade from the drug treatment and mental health fields (see Drake, Mercer-McFadden, Mueser, McHugo, & Bond, 1999; Sacks, 2000 for reviews). Treatment of psychiatric problems and substance abuse is further complicated when the patient is homeless (Rahav et al., 1995). The social and personal costs associated with homeless mentally ill chemical abusers (MICAs)–such as those arising from criminal activity, lost productivity, and the need for emergency room care–need to be assessed in relation to the outcomes of interventions designed specifically for these patients.

As the drug treatment and mental health fields begin to bridge gaps in knowledge, cooperate and coordinate treatment efforts, standardize definitions and diagnoses, and address system concerns, effective approaches have emerged (Sacks, 2000). One promising approach to treating MICAs is the modified therapeutic community (modified TC). The modified TC is based on the theoretical framework of the generic TC model (De Leon, 1984, 1989, 1996, 2000; De Leon & Rosenthal, 1989; De Leon & Ziegenfuss, 1986).

The core principles and methods of the TC are especially relevant to the treatment of MICAs. These include: providing a highly structured daily regimen, fostering personal responsibility and self-help in addressing life's difficulties, and using peers as role models and guides. The modified TC program for MICAs involves three fundamental alterations: increased flexibility, decreased intensity, and greater individualization. Nevertheless, the central TC feature remains:

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the modified TC seeks to develop a culture where clients learn through self-help and affiliation with the community to foster change in themselves and others. A complete description of the modified TC for MICAs can be found in De Leon (1993), Sacks, Sacks, De Leon, Bernhardt, and Staines (1997), Sacks, De Leon, Bernhardt, and Sacks (1998), Sacks, Sacks, and De Leon (1999).

This paper extends the work by De Leon, Sacks, Staines, and McKendrick (2000), French, Sacks, De Leon, and McKendrick (1999) and McGeary, French, Sacks, McKendrick, and De Leon (2000), which evaluated a modified TC treatment intervention for homeless MICAs at three sites in Brooklyn, NY. De Leon et al. (2000) focused exclusively on the effectiveness of the modified TC program in treating MICA clients by examining behaviors relating to substance use, criminal activity, psychological functioning, HIV risk behavior, and employment. Results showed that the modified TC clients improved significantly across the five outcome domains, whereas the clients in a treatment-as-usual (TAU) comparison group showed improvement across only three of the domains (substance use, criminal activity, and psychological functioning). Moreover, the magnitude of the improvements in substance use, criminal activity, and employment was significantly greater for modified TC clients.

French et al. (1999) further examined the outcomes reported in De Leon et al. (2000) and estimated the costs of providing modified TC services. French and colleagues found that the average annual cost of treatment in the modified TC for an individual that consumed no additional health services ($28,802) was lower than the cost of services utilization for the average TAU subject ($29,638). McGeary et al. (2000) extended the original cost analysis by estimating the use and cost of other treatment and health services by modified TC program 'completers' and 'separaters' and comparing these results to the cost of treatment and other services for the TAU group. McGeary and colleagues demonstrated that the average separater within the modified TC generated $22,048 in other treatment and health services cost compared to only $1,986 for the average completer. In addition, a regression analysis estimated that each additional day in the modified TC was associated with a $71 saving in the cost of other treatment and health services utilization.

The primary objective of the current study was to examine whether the total economic benefit of modified TC treatment was greater than the total economic cost. Although the cost of modified TC treatment was estimated and reported in earlier studies (French et al., 1999; McGeary et al., 2000), the economic benefits have never been assessed and this paper is the first attempt to conduct a full economic evaluation of modified TC treatment (French, 2000). The incremental economic benefit of modified TC treatment was estimated relative to TAU, and this result was compared to the incremental economic cost of modified TC treatment. The research and clinical implications of this analysis are considerable due to the dearth of economic studies of TCs (or other treatment programs) for MICAs. In addition, the resulting estimates provide a direct measure (dollar comparisons) of investment and return in a social program, which will assist policy makers who formulate funding decisions for treatment programs. The application of economic evaluation methods to modified TCs contributes to a growing literature on rigorous economic analysis of substance abuse treatment (e.g. French et al., 2000; French, Salomé, & Carney, 2002; French, Salomé, Sindelar, & McLellan, 2002; McCollister et al., 2002).

2. Research design

The design of the modified TC effectiveness study is shown in Fig. 1. As shown in this diagram, the subjects were sequentially assigned to one of three treatment options: a modified TC of moderate intensity (modified TC_1), a modified TC of low intensity (modified TC_2), or a TAU comparison group. As explained below, earlier analyses of the modified TC treatment conditions found no significant group differences (in average weekly cost or outcome measures at baseline) across modified TC_1 and modified TC_2, which provided the rationale for the decision to merge the two modified TC conditions (French et al., 1999).

The subjects, who were referred from homeless shelters and psychiatric facilities, were sequentially assigned to the two modified TC conditions as treatment slots became available. When no slots were vacant, subjects were placed on a chronological list according to the date and time of their referral. The next opening in one of the two experimental treatment programs (i.e. modified TC_1 or modified TC_2) was then offered to the subject at the top of the list. Those subjects who had been placed elsewhere by the referral source prior to the availability of a treatment slot in modified TC_1 or modified TC_2 constituted the TAU group. Sequential assignment to the TAU condition began a year after the first admissions into the modified TC conditions; a delay that allowed the newly opened modified TC facilities to reach enrollment capacity.

The rationale for placing study participants in experimental conditions sequentially, rather than randomly, maximized design rigor and external validity within a representative field situation (Seligman, 1995; Staines, McKendrick, Perlis, Sacks, & De Leon, 1999). Program administrators, clinical workers, and subjects accepted sequential assignment, which was feasible because the demand for modified TC treatment exceeded the available openings.

As a naturally occurring field condition, TAU provided a comparison group of subjects receiving standard services, a circumstance of considerable relevance to policy makers, who are primarily interested in how to direct treatment resources efficiently. Several contemporary studies have used control groups resembling TAU, but identified by

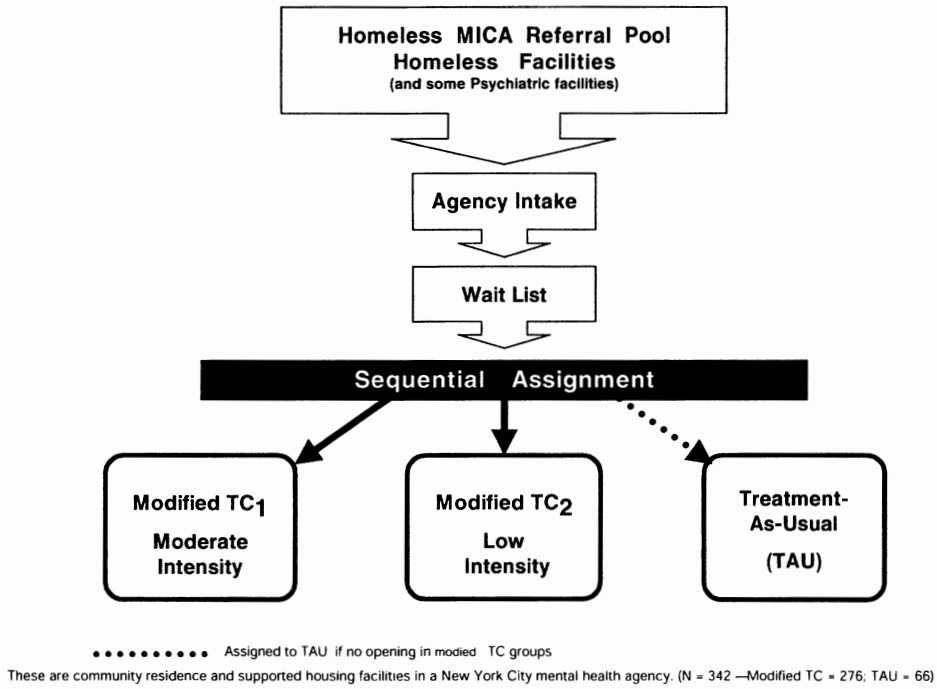

Fig. 1. Research design for the modified TC effectiveness study.

different nomenclature. For example, one study refers to 'other available community resources' (Rawson et al., 1995, p. 123), a second discusses '...testing a new regimen against often ill-defined conditions' (Boruch, 1997, p. 32), and a third places standard mental health services in the context of 'existing systems or nonsystems' (Bickman, Summerfelt, Firth, & Douglas, 1997, p. 235). Section 5 explains the potential sources of bias in this design.

2.1. Treatment conditions (modified TC_1, modified TC_2, and TAU)

Modified TC_1 is a stratified, structured, and active program based on mutual self-help. Staff members function as role models, rational authorities, and guides. The facility is 'homelike', reflects the program, and is managed by the peer work hierarchy. Treatment involves four stages: admission; primary treatment; live-in re-entry; and live-out re-entry. Goals, objectives, methods, and expected outcomes are established for each stage, and integrated with goals specific to each client through an individual treatment plan. Treatment stages correspond to stages within the recovery process and to level of care. The level of care is represented by the living situation, which progresses (as does the client's ability to sustain a drug-free independent lifestyle) from their circumstances prior to entering the program, through the residential treatment phase, to 'supported housing' (a more independent but still regularly supervised housing arrangement), to living in a self-managed apartment or house. Modified TC_1 involves four classes of interventions designed to facilitate this transition: community enhancement; therapeutic-educative; community and clinical management; and vocational. In sum, the modified TC_1 approach consists of three alterations from the standard TC model to accommodate MICA individuals: it is more flexible (with predictable boundaries); less intense (reduced duration of activities and less confrontation); and more individualized (greater sensitivity to individual responses and greater responsiveness to client needs).

Modified TC_2 continues the process of adapting the TC to the limitations of MICAs. Modified TC_2 is similar to modified TC_1 in program structure, stages, the array of interventions, and the reliance on peer self-help and community-as-method. Unlike modified TC_1, however, modified TC_2 allows greater freedom of movement (enabling clients to leave the residential facility during the early phases of treatment), offers many services outside the residential setting in continuing day-treatment programs, decreases peer responsibility, and increases direct staff assistance. Please refer to Sacks et al. (1996, 1997) for a full description of the modified TC.

'Treatment-as-usual' (TAU) is a term used to capture the variety of existing treatments (and some non-treatment alternatives) for homeless MICA clients when they are discharged from shelters or psychiatric facilities and referred to available program options. Subjects in the TAU group may be in other MICA-specific or general residential programs; may be in other supported housing programs with or without day treatment services; may be discharged with or without follow-up; may receive intensive case management or few services; and may continue at the referral site. Some drop out and wind up back on the streets.

Table 1
Variable means at baseline for the economic analysis sample and other study subjects (standard deviations in parentheses, *statistically significant difference in variable means across groups, $p < 0.05$ (Kruskal–Wallis rank-sum test for continuous variables and chi-squared test for dichotomous/continuous variables)

Baseline variable	Economic analysis sample ($N = 186$)	Other study subjects ($N = 156$)
Demographics		
Age (years)	36.08 (6.63)	34.47 (7.10)*
Male (%)	73	78
White (%)	11	12
Black (%)	69	71
Hispanic (%)	20	16
< 12 years education (%)	62	66
12 years education/GED only (%)	19	20
> 12 years education (%)	18	14
Substance use (lifetime)		
Frequency of alcohol intoxication[a]	5.46 (3.09)	5.63 (3.13)
Highest frequency of illegal drug use[a]	9.14 (1.72)	8.77 (2.00)*
Number different illegal drugs used	5.62 (3.54)	5.59 (3.60)
Criminal activity (lifetime: not drug use)		
Number crimes committed[b]	7.25 (2.36)	7.14 (2.38)
Number different crime types	4.77 (2.76)	4.55 (2.66)
HIV risk behavior (lifetime)		
Frequency of needle use[b]	1.47 (3.05)	1.58 (3.10)
Number of sex partners[c]	29.63 (31.85)	31.91 (34.00)
Psychological		
Beck depression total[d]	14.54 (10.24)	14.22 (9.94)
Manifest anxiety	10.79 (4.47)	10.55 (5.13)
SCL global score[e]	44.44 (11.15)	43.96 (10.85)
TSCS total positive	38.66 (9.86)	38.56 (10.28)
Prosocial behavior (last year)		
Any employment (%)	17	14

[a] Frequency scale: none (0), once (1), a few times (2), once a year (3), several times a year (4), once a month (5), once every two weeks (6), once a week (7), several times a week (8), every day (9), more than once a day (10).
[b] Frequency scale: none (0), once (1), 2–5 times (2), 6–10 times (3), 11–20 times (4), 21–30 times (5), 31–50 times (6), 51–99 times (7), 100–500 times (8), more than 500 times (9).
[c] Maximum number of sex partners = 95.
[d] General guidelines for cut-off scores with depressed patients: normal/asymptomatic (0–9), mild-moderate depression (10–18), moderate–severe depression (19–29), extremely severe depression (30–63).
[e] Derogatis (1994) defined an operational rule which states that the individual is considered a positive risk if the person has a Global Severity Index score on the non-patient norm greater than or equal to a standardized score of 63.

The services received by this group are fewer, less MICA-specific, not as well organized, and less related to a cohesive perspective and approach than the services in the modified TC conditions (De Leon et al., 2000).

Treatment received by the TAU group reflects the services available to disaffiliated, hard-to-serve homeless MICAs in large urban areas and delivered by an assortment of health and social agencies. The treatment needs of this group far exceed the available resources, and many clients 'fall through the cracks' of standard services. Some routinely enter and leave shelters and other programs; many use a variety of other health and social services (e.g. housing, treatment, medical and psychiatric care). The TAU group affords a unique opportunity to assess the typical service situation for homeless MICAs compared to more structured, enriched, and innovative treatment.

Clients for the study were referred to a Brooklyn based not-for-profit agency by social workers and case managers in homeless shelters and psychiatric hospitals in New York City. Interviews were conducted at five points: baseline, 6, 12, 18, and 24 months post-baseline. While the majority of subjects ($N = 281$, 82%) completed at least one of the follow-up interviews, only 218 subjects (64%) completed both the 6-month and 12-month follow-up interviews. The study cohort in this paper was derived from the 218 subjects that had both baseline and full 12-month follow-up data. The sample consisted of 186 clients (146 modified TC clients and 40 TAU clients) who completed both the 6-month and 12-month follow-up interviews and had no missing values for any of the variables used in the benefit calculations. This cohort is roughly equivalent to the sample analyzed in earlier work (French et al. 1999; McGeary et al., 2000).

To examine potential retrieval bias, the follow-up sample

for the economic analysis ($N = 186$) was compared to the remaining subjects ($N = 156$) who completed a baseline interview. Table 1 contains mean values at baseline and the results of the significance tests for the demographic and outcome variables used in the current and previous analyses. Significant differences ($p < 0.05$) between the two samples were present for only a small number of measures (i.e. age and one measure of substance use). Thus, this analysis suggests that the subsample of individuals that was used for the economic evaluation was not significantly different than the residual sample of subjects that was recruited for the effectiveness study.

2.2. Assessment instruments

The assessment instruments included the CTCR baseline protocol (De Leon, 1991) and a battery of standard psychological tests as described in De Leon et al. (2000). Collected information included background and demographic characteristics, use of alcohol and illicit drugs, illegal activities, arrests, incarcerations, HIV-risk behavior, history of drug and/or mental illness treatment, family and social relationships, and employment. Psychological status was examined via the Beck Depression Inventory (BDI), the Shortened Manifest Anxiety Scale (SMAS), the SCL 90-R Global Severity Index, and the Tennessee Self-Concept Sub-Scale.

Outcome data are derived from self-reported information, which may be less accurate than sources such as physical specimens or administrative records (French et al., 2002). However, numerous studies have demonstrated that self-reported data on drug use and other functional status measures can be quite reliable (Cherpital, Pares, Rodes, & Rosovsky, 1992; Drake, 1998; Falck, Siegal, Forney, & Wang, 1992; Harrison, 1995; Rouse et al., 1985; Weatherby et al., 1994; Zanis, McLellan, & Randall, 1994); and even if imperfect, there is no reason to assume the level of accuracy varied significantly between the modified TC and TAU groups.

2.3. Economic cost analysis

The costs involved in providing the modified TC were calculated using the Drug Abuse Treatment Cost Analysis Program (DATCAP) (French, 2001a,b; French & McGeary, 1997; French, Dunlap, Zarkin, McGeary, & McLellan, 1997; Salomé & French, 2002; www.DATCAP.com). The DATCAP estimates both the accounting costs and the economic (opportunity) costs of a program. The ability to differentiate between accounting and economic costs is valuable for representing the various perspectives involved in assessing a program's impact. For example, accounting costs mainly reflect direct expenditures and are important to the program's funding agency or financial supporters. Economic cost represents society's perspective as it considers the full value of all resources used in providing treatment, including resources that have been donated or subsidized (i.e. obtained at below-market value). The DATCAP has been used to evaluate a variety of treatment interventions such as methadone maintenance, outpatient drug free, long-term residential, short-term residential, prison-based treatment, and employee assistance programs (French & McGeary, 1997; French et al., 1997; Salomé & French, 2002).

The cost estimates obtained with the DATCAP were reported in 1994 dollars, the primary intervention year (French et al., 1999). The Chief Financial Officer and other executive and program staff provided most of the resource use and cost data for the analysis. In some instances, when no explicit prices were available, local sources were used to determine resource values (e.g. local real estate prices).

2.4. Economic benefit analysis

Estimating economic benefits from substance abuse interventions is a complex undertaking and few studies are available for methodological guidance. The present study employed various methods that were recently proposed by French and colleagues (French, 2000; French et al., 2000, 2002). As explained in De Leon et al. (2000), the modified TC effectiveness study measured 12 outcomes in 5 domains. Upon careful review of all outcome measures, it was determined that reductions in criminal activity and increased productivity (employment) were quantifiable in financial terms and would be used to partially describe the economic benefits of modified TC treatment. Additional information on the use of non-modified TC treatment and other services was collected in the follow-up interviews only. Although non-modified TC treatment and other services could be viewed as a cost of TAU, this information was incorporated into the benefit analysis as a third outcome category. A lower demand for these services by modified TC clients implies avoided costs for ancillary service utilization, which translates into greater economic benefits for that condition.

It was decided not to include changes in substance use as a separate outcome category. Extensive data on subjects' use of illicit drugs and alcohol were available, but the direct impact on society from substance use is unclear. From an economic perspective, one can question if consumption of alcohol and drugs per se truly imposes a cost on society apart from negative externalities or related consequences. Expenditures on alcohol and other drugs may actually produce some benefit to society by circulating money, employing members of society, and adding to the productive capacity of the country. Perhaps alcohol consumption should be viewed differently than other drug consumption, which would be contributing to the illegal economy. However, regardless of the legal distinction, substance abuse is undeniably damaging if one considers the negative consequences of misusing alcohol and other drugs. Such consequences commonly take the form of criminal acts, employment problems, and use of expensive healthcare

Table 2
Treatment outcomes and monetary conversion factors

Treatment outcome	Monetary conversion factor ($1994)	Treatment outcome	Monetary conversion factor ($1994)
Criminal activity (Act)[a]		*Treatment and other services*	
Alcohol offence	22.18	Other TC (day)[b]	69.70
Drug law violation	22.18	Emergency room (visit)[c]	111.0
Forgery/fraud	581.0	Hospital detox (day)[b]	759.0
Fencing	105.7	Short-term residential treatment (day)[d]	248.0
Gambling/running numbers	6.34	Non-residential treatment (visit)[b]	73.00
Prostitution/pimping	45.42	Outpatient treatment (visit)[b]	64.00
Burglary/GTA	2580	Individual psychotherapy (visit)[e]	69.38
Other theft	770.0	Methadone maintenance treatment (day)[b]	13.29
Robbery	23,122	Outpatient psychological treatment (visit)[b]	30.00
Violent assault	53,600	Inpatient psychological treatment (day)[b]	750.9
Other/miscellaneous	709.8		
Employment (hour)[f]			
Hours employed	4.25		

[a] Estimates obtained from Rajkumar and French (1997) and represent the total social cost of each crime.
[b] Obtained from French et al. (1999) and McGeary et al. (2000).
[c] Physician fee for the first hour of critical care, evaluation, and management of the unstable critically ill or unstable critically injured patient, requiring the constant attendance of a physician (American Medical Association, 1999).
[d] American Medical Association (1999).
[e] Fee for an office consultation with a new or established patient, which requires a detailed history, a detailed examination, and medical decision making of low complexity (American Medical Association, 1999).
[f] Equal to the minimum wage in New York in 1994.

services like emergency room care. The current analysis captured these negative externalities in separate domains (criminal activity, employment earnings, and use of non-modified TC treatment and other healthcare services). Thus, the analysis is probably justified in excluding substance use from the economic benefit calculations (French et al., 2002).

For the two primary outcome domains (criminal activity and employment), data were available to measure changes in client behavior from 12 months pre-admission (baseline) to 12 months post-admission. The outcomes were recorded in different units, such as the number of robberies committed and the number of days a client worked. To calculate economic benefits, these outcome units had to be converted into a common denomination, such as dollars. Monetary conversion factors (e.g. unit cost estimates) were applied to the respective outcomes, and the economic benefits of treatment were expressed as the dollar value of changes in these activities. For example, by examining a client's reduction in criminal activity and the costs avoided by changing this behavior, an estimate was obtained for the dollar benefit of treatment within this domain. Similarly, the increase in the number of hours a client worked during an average week was multiplied by the estimated rate of pay to gauge the average weekly benefit of employment.

2.5. Monetary conversion factors

Table 2 provides information on monetary conversion factors (adjusted to 1994 dollars-the benchmark year for the study) that correspond to the outcome measures used in the benefit–cost analysis. Although the present analysis did not discount the cost and benefit estimates due to the short follow-up period, discounting future dollars into current year equivalents should be standard practice in studies with data from multiple years (Gold et al., 1996). Specific details regarding the monetary conversion factors and the outcome valuation are discussed below.

2.5.1. Criminal activity

Existing studies on the economic cost of crime provided the monetary conversion factors for all variables in this outcome category (Miller, Cohen, & Wiersema, 1996; Rajkumar & French, 1997). These authors derived full cost estimates for the following crimes: alcohol offense, violent assault, robbery, burglary, auto theft, other theft, forgery and fraud, fencing, gambling, pimping and prostitution, and drug law violation. Although Table 2 only reports total cost estimates for individual crimes, disaggregated costs were estimated for each type of crime and were divided into three categories: crime victim costs, criminal justice system costs, and crime-career costs. Two criminal activity items from the questionnaire that are reported in Table 2 require special note. The category describing 'other theft' included purse snatching, pick pocketing, larceny, or shoplifting. The measure labeled 'other/miscellaneous' criminal activities included vagrancy, loitering, vandalism, and weapons offenses (possession). The cost

Table 3
Modified TC costs (1994 dollars)

Resource category	Accounting cost	% of total	Economic cost	% of total
Labor	$1,415,601	67.3	$1,415,601	65.5
Miscellaneous	327,131	15.5	327,131	15.1
Supplies	189,667	9.0	189,667	8.8
Contracted services	160,450	7.6	160,450	7.4
Buildings and facilities	0	0.0	51,077	2.4
Equipment	11,855	0.06	16,193	0.75
Total annualized cost	2,104,704		2,160,120	
Average annual cost (per client)	28,062		28,802	
Average weekly cost (per client)	540		554	
Average episode cost[a]	19,845 (9,986)[b]		20,361 (10,245)	

[a] The total episode cost for each modified TC client was calculated as the product of average weekly cost and total weeks in treatment. The average episode for modified TC clients was 257 days.
[b] Standard deviations.

estimate for other/miscellaneous is a weighted average of the costs of all criminal activities that are included in this category. Additional details on the calculation of crime cost estimates can be found in Rajkumar and French (1997) and Miller et al. (1996). French et al. (2000, 2001, 2002) discuss the application of crime cost estimates in the benefit formulas for substance abuse interventions.

2.5.2. Employment

The follow-up interview contained several questions related to a subject's employment status. For the economic analysis, the average of hours worked per week was multiplied by the rate of pay for the average MICA (assumed to be minimum wage, which was $4.25 in New York in 1994). To estimate average annual earnings, average weekly earnings were then multiplied by the number of weeks in the pre-admission and follow-up periods (52).

2.5.3. Non-modified TC treatment and other services

Other treatment and healthcare services used by TAU and modified TC clients was included as a third outcome category. It is important to note that these 'other services' actually defined TAU. A benefit of modified TC treatment was captured by the difference in the costs associated with the use of these additional services. Monetary conversion factors for these calculations were obtained from financial information available from the American Medical Association (for New York State) and published case studies reporting the costs associated with health care services (French et al., 1999; McGeary et al., 2000).

2.6. Benefit–cost analysis

Benefit–cost analysis is a powerful tool to evaluate health care programs such as substance abuse treatment (French, 2000; French et al., 2000, 2002). Because a benefit–cost analysis converts outcomes into a monetary equivalent, widespread comparisons across programs can be made and efficient resource allocations can be discussed. For this reason, benefit–cost analysis is considered to be 'broader in scope' than either cost–effectiveness analysis or cost–utility analysis (Drummond, O'Brien, Stoddart, & Torrance, 1997; Kenkel, 1997).

When conducting a benefit–cost analysis, both a net benefit measure [total benefit ($)–total cost ($)] and a benefit–cost ratio [total benefit ($)–total cost ($)] of treatment are used to assess a program's economic merits. If net benefit is positive (or the benefit–cost ratio is greater than 1), then total benefit exceeds total cost. In addition, the magnitude of these values is used to guide comparisons and choices among different programs.

3. Results

3.1. Economic costs

Table 3 provides the results of the economic cost analysis, originally reported in French et al. (1999). Taking into account all services, the estimated annual economic cost of the modified TC was $2,160,120 in 1994 dollars. The average cost per week of operating the modified TC was calculated by combining the annualized cost estimate obtained from the DATCAP and other relevant information (e.g. client case flows). Using the average daily census of 75 clients, the economic cost of providing continuous modified TC treatment to one individual was $28,802 per year, or $554 per week. The average weekly cost of treatment was then multiplied by the actual length of stay in the modified TC for each client to calculate a treatment cost estimate for every subject. Based on the average length of stay of 257 days for the sample used in this paper, the average economic cost of a treatment episode was $20,361 (SD = 10,245).

3.2. Economic benefits

Table 4 presents the results of the economic benefit analysis for the modified TC alone and relative to TAU. The table is divided into the three outcome categories:

Table 4
Baseline costs, follow-up costs, and economic benefits of the modified TC (1994 dollars) (*statistically significant, $p \leq 0.05$ (Kruskal–Wallis equality of populations rank-sum test); **statistically significant, $p \leq 0.01$ (Kruskal–Wallis equality of populations rank-sum test); N/A = not applicable)

Outcome category/group	Baseline		12 month follow-up		Economic benefits		
	Mean	SD	Mean	SD	Group[a]	Time[b]	Group × time[c]
Criminal activity							
Modified TC	356,938	2,496,06	44,942	219,836	−23,439*	311,997**	255,371
TAU	78,128	141,542	21,503	102,375		56,626**	
Employment							
Modified TC	310	1276	1010	1437	720**	700**	714**
TAU	304	829	290	674		−14	
Non-modified TC treatment and other health services							
Modified TC	N/A	N/A	7424	20,509	17,613**	N/A	17,613**
TAU	N/A	N/A	25,037	32,043		N/A	
Total benefit of modified TC					−5,106**	305,273**	273,698*
Total benefit of modified TC (winsorized 1% tails)					3,528**	149,851**	105,618*

[a] Difference in mean values between modified TC and TAU at follow-up.
[b] Difference in mean values from baseline to follow-up for each condition.
[c] Difference in mean values from baseline to follow-up for modified TC minus difference in mean values from baseline to follow-up for TAU (difference-in-difference estimate).

criminal activity, employment, and non-modified TC treatment and other healthcare services. Variable means and standard deviations pertain to baseline and follow-up values associated with the outcome measures for the two treatment groups. Reductions in these values from baseline to follow-up for criminal activity and healthcare services are desirable and indicate economic benefit. However, the employment outcome must be interpreted differently because these values reflect the amount of earnings from employment, with a greater value at follow-up signifying improvement or economic benefit.

3.2.1. Calculations

The economic benefit estimates were calculated in three different ways and the estimates are reported by outcome category and overall. It should be noted, however, that these estimates correspond to the regression coefficients from a 2-way (condition by time) repeated measures analysis of variance (ANOVA) routine. The first estimate (*Group* column in Table 4) calculated the mean difference in 12-month follow-up values for modified TC and TAU. Positive values reflect lower social costs at follow-up for modified TC clients (i.e. economic benefit of modified TC treatment). The second estimate (*Time* column in Table 4) calculated the mean difference in values at the 12-month follow-up and baseline for both modified TC and TAU. Positive values imply 'social cost savings' from reduced criminal activity and healthcare utilization or increased earnings from greater productivity. The final estimate (*Group* × *Time* column in Table 4) is a difference-in-difference calculation, which subtracted the mean *Time* estimate for TAU from the mean *Time* estimate for modified TC (positive values indicate that the modified TC clients are generating greater benefit than TAU over time).

One can surmise from the means and standard deviations in Table 4 that a few extreme outliers significantly influenced most of the variables. For example, the largest difference in baseline and follow-up costs among modified TC clients was approximately nine times higher than the next largest value. To address these distributional properties of the data, we made two modifications to the analysis. First, we employed non-parametric tests (e.g. Kruskal–Wallis rank sum test) rather than standard two sample *t*-tests because the former tests do not make restrictive assumptions (i.e. normality equal variances) about the sample distributions. Second, we reduced the influence of the most extreme outliers by winsorizing the 1% tails of all benefit measures. This served to compress the distributions and provide a comparison to the unadjusted statistics.

The last two rows of Table 4 report the total benefit estimates of modified TC treatment, both unadjusted and winsorized. The unadjusted *Group* estimate indicates that the TAU clients had slightly better results (in terms of lower social costs or greater monetary gains) than the modified TC group at the 12-month follow-up point, equal to \$5,106 ($p < 0.01$). However, this value is a poor measure of relative treatment benefit because it does not reflect changes from baseline across the two conditions. In addition, the winsorized *Group* estimate favors the modified TC condition, suggesting that the true value is probably small and close to zero.

The *Time* estimate reports the average change in monetized outcomes from baseline to the 12-month follow-up associated with changing behaviors across the three outcomes. The unadjusted total for this column shows that the economic benefit (baseline to follow-up) for the average client treated in the modified TC amounted to \$305,273 ($p < 0.01$), which included the value of reduced

crime, plus increased earnings, minus the cost of other treatment and health services. As expected, the winsorized *Time* estimate was smaller ($149,851), but remained positive and significant ($p < 0.01$).

3.2.2. Incremental benefit

For our purposes, the best measure of relative economic benefit is the *Group* × *Time* estimate, which reflects the incremental change in monetized outcomes (baseline to follow-up) for modified TC *relative* to TAU. This value reflects the differences in mean difference between the two treatment conditions. Based on this difference-in-difference calculation, the unadjusted total incremental benefit of the modified TC (relative to TAU) was $273,698 ($p < 0.05$). Again, the winsorized estimate ($105,618; $p < 0.05$) was smaller than the unadjusted estimate.

3.2.3. Variables contributing to economic benefit

It is instructive to examine the benefit estimates for each outcome category to determine the importance of various measures in the total benefit estimate. Upon inspection, criminal activity was the greatest contributor to the total economic benefit of treatment in both the modified TC and TAU conditions. This result is not surprising given the monetary conversion factors for each type of crime (Table 2). The social costs associated with such crimes as violent assault and robbery are extremely high, which means that even if a program showed modest reductions in these criminal activities, the economic benefit would be substantial. Incidentally, this result is consistent with several other economic evaluation studies, which found that avoided criminal activity represented the largest component of total economic benefit for substance abuse interventions (French et al., 2000, 2001, 2002). Modified TC participants also reported working more hours during the follow-up time period. Although the contribution from employment to overall economic benefit was relatively small, the ability of MICA patients to take on and perform work is an important treatment outcome.

The final outcome category is non-modified TC treatment and other service use. Accessing expensive healthcare services such as emergency room care, hospital detoxification, and inpatient psychological treatment, puts a drain on social resources. As indicated in Table 4, the total cost of treatment and other services per individual in the modified TC program was significantly less than the cost per individual in the TAU condition (a difference of $17,613; $p < 0.01$). As noted earlier, these differences corresponded to the follow-up period only because questions regarding other treatment and healthcare services were not asked at baseline.

3.2.4. Net benefit and benefit–cost ratio

Given the unadjusted estimate of $273,698 for the incremental benefit of treatment in the modified TC, one can immediately see that the economic benefit exceeded the economic cost by a substantial amount. Recall that the average economic cost (per client) of modified TC treatment was $20,361. Subtracting incremental economic cost from incremental economic benefit generated the following unadjusted value for the net benefit of the modified TC program:

Net benefit per modified TC client = $273,698—$20,361 = $253,337 ($p < 0.10$)

This indicates that, relative to the average TAU client, the average modified TC client generated a total of $253,337 in economic benefit over and above the cost of providing treatment. The winsorized net benefit estimate was $85,257 ($p < 0.10$).

The unadjusted benefit–cost ratio for the modified TC was obtained by dividing the incremental benefit by the economic cost as shown below:

Benefit–cost ratio for the modified TC = $273,698/$20,361 = $13.44 ($p < 0.10$)

The benefit cost ratio far exceeded one, which is another way to express how the benefits and the costs of a treatment program compare. This ratio suggests that the incremental economic benefit of modified TC treatment is more than 13 times greater than the incremental economic cost (i.e. $13.44 in benefit are generated per $1 of investment). Although smaller in magnitude than the unadjusted estimate, the winsorized benefit–cost ratio ($5.19) is still relatively large and greater than unity ($p < 0.10$).

4. Sensitivity analysis

A number of issues motivated a sensitivity analysis of the results presented in Section 3. Uncertainty due to variation in the data and uncertainty over the choice of modeling parameters are the two primary concerns for this type of analysis (Lord & Asante, 1999). The outcome category measuring changes in criminal activity is pertinent for highlighting these concerns. Criminal activity events exhibited considerable variation across observations, which had profound implications when combined with the monetary conversion factors. For example, the mean cost of criminal activity at baseline was much higher (though not statistically significant) for the modified TC condition compared to the TAU condition (Table 4). Furthermore, the results showed that the modified TC program had much greater success in reducing the social costs associated with these behaviors ($311,997 versus $56,626 for TAU). Within this domain, reductions in violent assaults generated the largest share of total benefit for the modified TC ($159,698), influenced primarily by a handful of subjects. Ignoring violent assault for comparison purposes, the modified TC

still produced a higher dollar benefit relative to TAU for the criminal activity domain ($152,299 versus $47,246).

Altering the parameter estimates (i.e. monetary conversion factors) will also test the sensitivity of the results. The monetary conversion factors employed by this study were carefully chosen and represent the best available information. However, using monetary conversion factors that were 25% higher or lower than the current values did not modify the qualitative findings or statistical significance of the benefit–cost estimates.

5. Discussion and conclusion

This study is the first to examine both the economic costs and benefits of treatment alternatives for MICAs. The results suggest in economic terms the advantages of the modified TC approach for homeless MICAs. In addition, the study establishes a methodological approach for monetizing changes in criminal behavior, health services utilization, and employment status. Finally, the inclusion of a non-intervention comparison group (TAU) employing sequential assignment represents a significant design advantage over many previous treatment evaluation studies.

The reader is cautioned to interpret these results carefully, however. For example, all the outcome data were based on self-reports (given during the interview process) where the participants were asked to recall their criminal activity, employment, and health services utilization over 6-month intervals. Although client self-report should ideally be accompanied by external corroboration, resource and design constraints prevented this option in the present study. Nevertheless, systematic bias across treatment conditions was unlikely.

Another methodological limitation was the small sample size (146 in the modified TC and 40 in the TAU). Small sample sizes can impede the ability to accurately predict changes across the variables considered and the statistical significance of the findings (Kraemer & Thiemann, 1987). Small sample sizes may have contributed to the marginally significant estimates ($p < 0.10$) for net benefit and benefit–cost ratio. Moreover, sample attrition at follow-up presented additional concern, even though no systematic bias was present in sample attrition across the study groups and only two measures were statistically significant at baseline between the analysis sample and the non-respondents at follow-up sample. Replication of these results using larger samples is encouraged to further examine the economic benefits of this treatment.

Furthermore, it is important to highlight that HIV risk behavior and psychological status were not included in the economic analysis. Assessing the benefits of such outcomes is important but considerably more involved than the other areas. The effectiveness results reported in De Leon et al. (2000) showed statistically significant improvements both in psychological functioning (as indicated by the SMAS and TSCS scores) as well as reductions in HIV-risk behavior for the modified TC group. Although these improvements were not explicitly included in the benefit–cost analysis, these changes would translate into both a higher net benefit value and a larger benefit–cost ratio for the modified TC program.

In conclusion, the results of the present study offer preliminary evidence of the economic and social advantages of the modified TC approach for treating MICAs. While the full cost of operating the modified TC was considerably higher than outpatient alternatives, the economic benefits of modified TC treatment far surpassed the benefits of TAU. Specifically, the economic cost was $20,361 for the average modified TC patient and the incremental benefit was $273,698, leading to a net benefit estimate of $253,337 and a benefit–cost ratio of $13.44. Most of these savings were derived from decreases in crime and lower use of expensive health services. Winsorizing to reduce the influence of extreme outliers altered the magnitude of these estimates, but the values remained relatively large and statistically significant, with an adjusted benefit cost ratio of 5.2.

More benefit–cost analyses should be performed on similar treatment programs with larger samples, longer follow-up, and possibly more outcome domains. Access to medical care records and related costs would further substantiate the results reported here. Nevertheless, this study provides the first quantitative information on the potential economic advantages of modified TC programs for MICA clients. Moreover, the economic evaluation methods presented here offer a foundation for future studies. The present findings suggest that public health organizations and government agencies should give serious consideration to modified TC programs for MICAs.

6. Lessons learned

Benefit–cost analyses of substance abuse interventions can be extremely difficult to conduct properly due to the ethical resistance to forming a no-treatment control group and the multiple clinical and social outcomes that are relevant for calculating economic benefits (French, 2000). As discussed in Section 5, the present study posed additional complications because the sample size was relatively small and uneven between groups, the data were entirely self-reported, and the follow-up period was short (1 year). All these factors can be modified and improved in future studies and these improvements would enhance both the economic and non-economic aspects of the research design.

The leading challenge to conducting this economic evaluation was the ex post limitations associated with the original research design and outcome measures. The original project was vanguard in nature, yet the research design was structured as a modest effectiveness study of the modified TC. At the urging of the funding agency and

several notable research advisors, the initial investigative team at NDRI decided to add an economic analysis component to the study well after subjects were recruited, assigned, and treated. Entering the study toward the latter stages of the follow-up data collection period did not pose any serious problems for the cost analysis because the DATCAP can compile this information retrospectively. However, the baseline and follow-up instruments were finalized and largely administered by this time. This constrained the number of outcomes we were able to include in the economic analysis because some important economic questions were not asked (e.g. quality of life), some questions were not asked at both baseline and follow-up (e.g. health services utilization), and other questions required creative assumptions (e.g. income from employment). Thus, the most significant lesson learned from this economic evaluation exercise is the importance of integrating all research components very early in the development of the research design. Coincidentally, the most significant lesson is also the easiest to understand and implement in future research evaluation studies.

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03

Enhanced outpatient treatment for co-occurring disorders: Main outcomes

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03. Enhanced outpatient treatment for co-occurring disorders: Main outcomes

Abstract

This study, which was conducted in an outpatient substance abuse treatment program, randomly assigned clients with mental health symptoms to either a control group, which received basic program services, or an experimental group, which was configured as a modified therapeutic community (TC) track, with the addition of modified TC features and three specific elements-psychoeducational seminar, trauma-informed addictions treatment, and case management. The experimental group had significantly better outcomes as compared with the control group on measures of psychiatric severity and on the key measure of housing stability; no difference was observed for substance use, crime, and employment. The findings must be qualified because (a) only 3 of 34 representative measures (<10%) showed significant differential treatment effects and (b) analysis revealed partial implementation of the enhancements. The study provides modest support for the effectiveness, on specific outcomes, of outpatient substance abuse treatment programs that add modified TC features and targeted interventions to strengthen their capacity to treat co-occurring disorders.

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Special article

Enhanced outpatient treatment for co-occurring disorders: Main outcomes

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Abstract

This study, which was conducted in an outpatient substance abuse treatment program, randomly assigned clients with mental health symptoms to either a control group, which received basic program services, or an experimental group, which was configured as a modified therapeutic community (TC) track, with the addition of modified TC features and three specific elements—psychoeducational seminar, trauma-informed addictions treatment, and case management. The experimental group had significantly better outcomes as compared with the control group on measures of psychiatric severity and on the key measure of housing stability; no difference was observed for substance use, crime, and employment. The findings must be qualified because (a) only 3 of 34 representative measures (<10%) showed significant differential treatment effects and (b) analysis revealed partial implementation of the enhancements. The study provides modest support for the effectiveness, on specific outcomes, of outpatient substance abuse treatment programs that add modified TC features and targeted interventions to strengthen their capacity to treat co-occurring disorders. © 2008 Elsevier Inc. All rights reserved.

Keywords: Co-occurring disorders; Substance abuse; Outpatient treatment; Modified therapeutic community; Targeted interventions

1. Introduction

Treatment for substance abuse occurs most frequently in outpatient settings and typically includes individual and group counseling with referral to appropriate community services. Recent studies have demonstrated the effectiveness of outpatient programs for substance-abusing populations (e.g., Hubbard, Craddock, Flynn, Anderson, & Etheridge, 1997; Schneider, Mittelmeier, & Gadish, 1996; Simpson & Curry, 1997); however, these programs are increasingly expected to serve persons with co-occurring disorders (COD), most of whom exhibit multiple health and social problems that complicate their service needs. The body of evidence from prior studies indicates that psychiatric disturbance makes effective treatment more difficult (e.g., Compton, Cottler, Jacobs, Ben-Abdallah, & Spitznagel, 2003; Mueser, Drake, & Miles, 2000; NASMHPD & NASADAD, 1998), underscoring the requirement to establish, document, and evaluate the effectiveness of outpatient addiction treatment models that incorporate components specifically designed to accommodate those clients who have COD.

The rationale for the study was derived partly from a previous study on a residential therapeutic community (TC)

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adapted for homeless clients with COD in a mental health setting (Sacks, De Leon, Bernhardt, & Sacks, 1997a; Sacks, Sacks, De Leon, Bernhardt, & Staines, 1997b). That earlier study, which used a sequential assignment design similar to random assignment (Staines, McKendrick, Perlis, Sacks, & De Leon, 1999), found significantly more positive outcomes on measures of drug use and employment for those who received treatment in the modified TC as compared with those who received treatment as customarily provided (De Leon, Sacks, Staines, & McKendrick, 1999, 2000). Another study on a similar program (Rahav et al., 1995), which was conducted in an addiction setting using random assignment, found better mental health outcomes (significantly greater reductions in symptoms of depression) for those who received modified TC treatment as compared with those who received standard TC services. The modified TC approach applied in community settings for the treatment of those with COD, as described by Sacks et al. (1997a, 1997b), gained additional support from economic analyses that calculated $6 worth of benefit for every dollar spent on modified TC treatment (French, McCollister, Sacks, McKendrick, & De Leon, 2002). A recent study on treatment effectiveness found lower reincarceration rates for those offenders with COD who participated in a modified TC program as compared with those in a comparison group that received standard mental health services (Sacks, Sacks, McKendrick, Banks, & Stommel, 2004). These studies demonstrated the effectiveness of modifying the TC approach and provided the current study with an empirical foundation to justify the incorporation of selected targeted elements into an outpatient substance abuse treatment program. A complete description of the modified TC for clients with COD, including treatment manuals and guides for implementation, can be found in other writings (e.g., De Leon, 1993; Sacks et al., 1997; Sacks, De Leon, Bernhardt, & Sacks, 1998; Sacks, Sacks, & De Leon, 1999).

The outpatient program selected for the study was well established in an agency that used the TC approach. To bolster treatment effectiveness for those with COD, the new program track, known as the Dual Assessment and Recovery Track (DART), incorporated modified TC features (i.e., community meetings) designed to strengthen identification with the community and added three elements considered as critical components of effective treatment. These three elements were a *psychoeducational seminar* to improve clients' understanding of mental illness (e.g., Jerrell & Ridgely, 1999; Sciacca, 1987–88, 1992), *trauma-informed addictions treatment* to help clients discuss issues of addiction and recovery as well as cope with past and present trauma (Harris & Fallot, 2001; Harris et al., 2001; Sacks & Sacks, 2005a), and *case management* to teach case management skills (Brown, Farrell, & Voskuhl, 1999; Brown, O'Grady, Battjes, & Farrell, 2004; Brown et al., 2001). Designed to meet particular needs of the COD population, the three interventions (a) increased clients' insight into and understanding of their mental disorder (psychoeducational seminar), (b) helped them cope with an underlying trauma (trauma-informed addictions treatment), and (c) expanded their capacity to negotiate with health and social service agencies on their own behalf (case management).

The rationale for selecting these specific elements relied on the following main factors: (a) each had been used previously by the investigators as a component of modified TC programming (e.g., De Leon et al., 2000; Sacks, De Leon, McKendrick, Brown, & Sacks, 2003; Sacks, Sacks, McKendrick, Pearson, & Banks, 2004b), although this planned delivery codified the interventions more thoroughly; (b) all had the potential to be integrated into existing outpatient programming and program staff in focus groups had expressed their enthusiasm in making these changes; and (c) each has been increasingly identified in the literature as a critical component of treatment (e.g., Center for Substance Abuse Treatment, 2000, 2005; Drake et al., 2001; Hien, Cohen, Litt, Miele, & Capstick, 2004; Jerrell & Ridgely, 1999; Morrissey, Ellis, et al., 2005a). The study sought to evaluate the effectiveness of the three components of the DART program as compared with that of the basic and unembellished outpatient treatment program and anticipated better outcomes on variables related to the treatment interventions.

2. Methods

2.1. Research design

The study used a randomized two-group design with repeated measures in key outcome domains. Admissions to the substance abuse day treatment program were screened for psychological symptoms with the use of selected scales from the Global Appraisal of Individual Needs (GAIN; Chestnut Health Systems, 2002–03), GAIN–Quick (GAIN-Q; Titus & Dennis, 2003), and GAIN–Initial (GAIN-I; Dennis, 1999) instruments. (More data on screening and the other measures are provided in Section 2.2.) Clients who screened positive for psychological symptoms related to COD were informed of the nature and purpose of the study as well as the attendant risks and benefits of their participation and were asked to volunteer to be research participants. Before the baseline interview, informed consent was obtained from all study participants with the use of forms and procedures that ensured confidentiality; participation was strictly voluntary and had no bearing on each individual's status with respect to treatment (i.e., participation or nonparticipation did not affect a person's access to services). The study, its forms, and the procedures were approved by an institutional review board. All research staff were trained in the protection of human participants in research, and the study obtained a certificate of confidentiality to provide additional protections. Once they provided their consent, clients were randomly assigned to either the experimental group, which

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Table 1
Comparison of treatment conditions

Characteristic	Standard (control)	Enhanced (experimental)
Rationale	Traditional outpatient service model	Effectiveness of modified TC and need for targeted intervention to address COD
Focus	Substance use	Psychoeducational seminar to understand mental illness relative to COD Trauma-informed addictions treatment: highly related to substance use and COD Case management (e.g., employment, housing, finances) for COD
Content	Individual and group counseling	Expand treatment elements for dual recovery of COD by adding modified TC community-enhancing elements and three critical components: Psychoeducational seminar to improve the client's understanding of mental illness and substance use using a curriculum developed for this DART component (Sacks & Sacks, 2005b) Trauma-informed addictions treatment for women and men directed to discuss issues of addiction and relapse prevention, abuse, and trauma; build coping skills; and support recovery (Harris et al., 2001; Sacks & Sacks, 2005a) Case management skills training for clients: uses a curriculum that has been successfully used in three Baltimore programs (Brown et al., 1999, 2001, 2004; Sacks & Sacks, 2005a)
Planned duration	12 weeks; 9 hours/week; 3 hours on each of 3 days a week	12 weeks; 9 hours/week; 3 hours on each of 3 days a week; each of the three elements organized into 12 sessions, one each week
Delivery	Standard clinical practice	Curriculum and manual driven (Sacks & Sacks, 2005a,b)
Treatment dose	Not available	Psychoeducational seminar: 84% attend group sessions; mean number of sessions = 5.48 Trauma-informed addictions treatment: 62% attend group sessions; mean number of sessions = 6.25 Case management: 62% attend individual sessions; mean number of sessions = 1.67
Outcomes	Substance use, crime, and employment	Substance use, crime, employment, psychiatric severity, trauma, and housing

received the DART enhancements (Sacks & Sacks, 2005a), or the control group, which received the basic outpatient program without enhancements.

2.2. Treatment conditions

Since its inception in 1968, Gaudenzia (Norristown, PA) has been providing addiction treatment services founded on TC principles and methods throughout Pennsylvania, including the outpatient substance abuse program at the "Outreach" facility in Philadelphia that was used in the study. Clients in the control group participated in the basic program, whereas those in the experimental group participated in the DART, which consisted of the basic program altered to incorporate certain modified TC features along with three critical components that were added to bolster treatment for clients with COD. Table 1 provides a summary of the similarities and differences in the services provided to the two groups.

2.2.1. Control condition: basic (standard) programming

As shown in Table 1, the control condition involved a traditional substance abuse day treatment program (without designated modified TC features) that included standard elements such as individual as well as group therapy and counseling that focused on substance use and relapse prevention. It was an intensive outpatient program that provided 9 hours of program activities per week (3 hours on each of 3 days) for 12 weeks. Program delivery used standard clinical practices in individual and group formats. Programming concentrated on substance use, crime, and employment outcomes; consequently, the study did not anticipate finding any difference between the groups on these domains. After the planned 12 weeks of intensive outpatient treatment, clients were expected to move to another less intensive outpatient program.

2.2.2. Experimental condition: enhanced programming (DART)

As shown in Table 1, the rationale for the DART enhanced programming was based on research supporting the effectiveness of modified TC approaches for clients with COD as well as on the need for outpatient programming to use limited interventions to target specific problem areas. The experimental group received DART enhanced treatment elements that consisted of psychoeducational seminar classes, trauma-informed addictions treatment groups, and case management sessions—three activities that had been included in earlier modified TC programs, albeit in less codified forms. Programming for the experimental group was configured as a modified TC track in which each of the components was derived from and retained features of a modified TC treatment, most notable of which are personal responsibility and peer self-help. Clients on this track were considered to be in the modified TC program; they attended activities as a group and participated in weekly community-enhancing activities (i.e., community meetings). Each community meeting gathered all experimental group clients together to discuss the business of the community, planned activities, schedules, and any issue that may have arisen since the last meeting. These meetings provided a specific time and forum during which to communicate information pertinent to all community members; they also allowed staff and other community members to observe and assess the appearance and attitudes of all those attending. Community

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meetings increase community awareness and reinforce through reaffirmation each participant's commitment to recovery and to the peer community.

The curriculum for the psychoeducational seminar was structured to improve clients' understanding of the symptoms of mental illness, the need for (and use of) medication, and the signs and symptoms of relapse (Sacks & Sacks, 2005b). Although each individual class was organized around specific features of the curriculum, the group discussion in each section was designed to cover content broadly from all aspects of the curriculum.

Trauma-informed addictions treatment explored multiple facets of addiction and relapse prevention, abuse, and trauma while simultaneously building coping skills and supporting recovery (Copeland & Harris, 2000; Harris & Fallot, 2001; Harris et al., 2001). The curriculum consisted of 14 modules covering selected topic areas that were discussed in a group format (Sacks & Sacks, 2005a).

Case management was a manual-based curriculum used to teach case management skills to clients (Brown et al., 1999, 2001, 2004; Sacks & Sacks, 2005a) and to foster their ability to serve as their own case manager, consistent with TC principles. The curriculum was designed to promote self-management of personal responsibilities (especially symptom management) as well as systems issues and to encourage mutual supports in solving problems. To date, the curriculum has been successfully used in three Baltimore programs (Brown et al., 1999, 2001, 2004).

DART programming was delivered as part of the intensive outpatient program and remained within the structure of 9 hours per week of program activities (3 hours on 3 days) for 12 weeks by replacing some standard individual and group activities with DART elements. Experimental group DART programming was perceived to be similar to control group programming in the areas of substance use, crime, and employment but to differ in the areas targeted by the three additional components, which related to psychiatric severity, trauma, and housing. Consequently, differential outcomes favoring DART were anticipated for the latter, but not for the former, set of outcome domains.

2.3. Treatment dose

Clinical curricula and manuals were used in the experimental group to promote fidelity to the treatment model, and Group Service Records (GSRs) as well as Individual Service Records (ISRs; Flanzer & Bell, 2005), which gathered information on group and individual sessions, respectively, were used to monitor the services actually received. The GSR data included the type of group (e.g., psychoeducational seminar or trauma-informed addictions treatment), attendees, no-shows, cancellations, and the number of minutes for which the group was in session. Information collected with the ISRs included the type of clinical services (e.g., assessment, crisis intervention, or counseling/therapy), case management services (e.g., vocational, financial, or housing), type of contact (e.g., face to face or telephone), who was involved in the contact (e.g., participant only or family member), and the number of minutes for which the group was in session.

The GSR/ISR data were then evaluated to assess the treatment dose for the three DART elements. For the psychoeducational seminar, GSR data on 100 clients in the experimental condition were collected over 63 weeks, from December 2001 to July 2003. Most clients (84%) assigned to the experimental group attended at least one psychoeducational class. The average number of seminar classes attended was 5.48 (SD = 3.92, range = 1–14), and the mean length of time spent in classes was 10.50 hours (SD = 7.76, range = 1.5–28). A delay in the implementation[1] of trauma-informed addictions treatment meant that GSR data were collected for 32 weeks, from September 2002 to July 2003. Of the 45 experimental group clients with attendance data, 62% attended at least one trauma-informed addictions treatment group, and the average number of groups attended was 6.25 (SD = 6.00, range = 1–27). The trauma-informed groups were scheduled for 2 hours each, which means the average length of time spent in these groups was 12.50 hours. For case management, ISR data were collected for 78 experimental group clients (62% of the total sample, 78/126), each of whom received individual case management sessions between November 2001 and February 2003. On average, clients received 1.67 individual sessions (SD = 0.95, range = 1–5), indicating that the case management intervention was not delivered in the form or intensity anticipated (Section 4.1).

2.4. Sample

Sources of referrals to Gaudenzia's Philadelphia "Outreach" outpatient program included county social service agencies, mental health and substance abuse agencies, and managed care organizations. All clients admitted to the outpatient program were candidates for the study. Eligibility criteria included being at least 18 years old, having a documented substance use disorder—established for county referrals by Pennsylvania's Client Placement Criteria for Adults (Pennsylvania Department of Health, 1999) or for managed care referrals by the Addiction Severity Index (McLellan et al., 1992)—and meeting criteria of emotional distress/mental illness—established on screening with the use of selected scales (emotional and mental health, behavioral health) from the GAIN-Q (Titus & Dennis, 2003) and GAIN-I (Dennis, 1999) instruments. A total of 55 participants did not meet the eligibility

[1] Implementation of this intervention encountered practical problems of staffing, scheduling, and available space, all of which were resolved satisfactorily by all concerned but not before time had been lost to data collection.

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criteria for emotional distress/mental illness, and 6 refused to participate.

The total sample included 240 participants (126 for the experimental group and 114 for the control group). Twelve-month postbaseline data on 198 participants were obtained (107 from the experimental group and 91 from the control group), which produced a retrieval rate of 83% (85% for the experimental group and 80% for the control group). Although extensive tracking procedures were used to reinterview all study participants (Scott, 2004; Scott & Dennis, 2000), some clients were lost for a myriad of reasons, including incarceration, moving out of state, and refusing to respond.

No difference was evident at baseline between retrieved and nonretrieved participants for major variables measuring housing, HIV risk, abuse history, psychiatric severity profiles and treatment, and social dysfunction (substance use and criminality). A few minor differences emerged in that retrieved participants were more likely to be married or previously married (37% vs. 19%) and to have fair or poor health (48% vs. 25%). Overall, the study had satisfactory retrieval rates and showed little evidence of retrieval bias.

2.5. Measures

The study collected data with the use of the GAIN instruments/components (Chestnut Health Systems, 2002–03), the Brief Symptom Inventory (BSI; Derogatis, 1993), the Beck Depression Inventory–Second Edition (BDI-II; Beck, Steer, & Brown, 1996), and the Trauma History Questionnaire (THQ; Green, 1996). All the instruments gathered self-reported information from participants during face-to-face interviews with a trained research assistant who recorded each response. All outcome data were analyzed as change scores (Score at 12-Month Follow-Up − Score at Baseline). To maximize the data, standard indices were used whenever available, and all relevant outcome measures not included in the indices were added to evaluate each domain.

2.5.1. Global Appraisal of Individual Needs

As noted in the description of eligibility criteria, selected scales of the GAIN-Q and GAIN-I were used to screen for psychological problems. Baseline and follow-up data were collected with two of the major variants of the GAIN (Chestnut Health Systems, 2002–03; Dennis, 1999, 2000): the GAIN-I version and the GAIN–Monitoring 90 Days (GAIN-M90) version (Dennis, 1999, 2000). The GAIN-I, used at baseline, is a detailed bio/psycho/social instrument, and the GAIN-M90, used at follow-up, focuses on measures of recency and behavioral counts for the past 90 days. Reliability assessments for the GAIN have Cronbach's α values of approximately 0.80 or higher for substance abuse and dependence, physical health and biomedical conditions, mental/emotional health and distress, recovery environment risks, sources of stress (including victimization), general social support, illegal activities, days in school, and vocational index (Dennis, 2000). Selected scales and items from the GAIN were used to assess client outcomes across several critical domains, including substance use, crime, employment, psychological/emotional health, trauma, and housing.

2.5.2. Beck Depression Inventory–Second Edition

The BDI-II (Beck et al., 1996) was used to detect the presence and intensity of depressive symptoms consistent with *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition* criteria for depressive disorders. Items in the BDI-II demonstrated high internal consistency (α = 0.92) within psychiatric outpatient and college student samples, excellent 1-week test/retest stability (r = 0.93) within a small sample of outpatients, and good construct validity (e.g., versus clinical ratings of depression [r = 0.71] and anxiety [r = 0.47]). The BDI-II total score was used to evaluate the psychiatric severity domain.

2.5.3. Brief Symptom Inventory

The BSI (Derogatis, 1993; Derogatis & Melisaratos, 1983) is a shorter variant of the Symptom Check List–90R that possesses almost identical psychometric characteristics. The BSI's 1-week test/retest reliability was 0.93 in a small sample of outpatients, and its values ranged from 0.71 to 0.85 for large samples of psychiatric outpatients and from 0.78 to 0.83 for male nonpatients. Test/retest reliability values (over 2 weeks) for these dimensions ranged from 0.68 to 0.91 in a small sample of nonpatients. The Global Severity Index of the BSI was used to evaluate the psychiatric severity domain.

2.5.4. Trauma History Questionnaire

The THQ (Green, 1996) added outcome measures on community and interpersonal violence, and provided measures of lifetime and recent exposure to general trauma as well as physical, emotional, and sexual abuse. Because the THQ is a history collection instrument and does not have a standard scoring system, data are typically combined to obtain incidence and a sum of events/items for each type of trauma exposure.

2.6. Analytical plan

The primary method of the analysis was an intent-to-treat comparison of clients randomized to the experimental and control treatment groups who were retrieved at the 12-month follow-up. This method captures the impact of the intervention on all entrants as a whole—not on subsamples of only those entrants who stayed in treatment for an extended period and who may not be typical of the client population (i.e., these individuals may be more highly motivated to do well in treatment). The analytical plan was organized into three levels of inquiry. First, a complete profile analysis was performed to understand the clientele of the outpatient setting. Profile analyses further assessed the

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Table 2
Profile comparison of retrieved participants from the two treatment conditions

Category	Total (N = 198)	Experimental group (enhanced treatment, n = 107	Control group (standard treatment, n = 91)	p
Sex (%)				
Male	43	41	46	.48
Ethnicity (%)				
African American	79	79	79	.30
Caucasian	13	10	15	
Hispanic	8	10	5.5	
Age [years, M (SD)]	37.60 (8.86)	37.50 (8.89)	37.71 (8.88)	.87
Marital status (%)				
Never married	63	69	56	.06
Parenting (%)				
With child <21 years	68	67	69	.77
Education [M (SD)]				
Years of schooling completed	11.12 (1.92)	10.93 (2.10)	11.34 (1.67)	.14
Physical health (%)				
LYR physical health fair/poor	48	54	41	.06
HIV risk (%)				
LT needle use	27	29	24	.45
Treatment (%)				
LT psychological treatment/medication	53	56	50	.35
LT psychological emergency department/inpatient	31	33	29	.53
LT drug/alcohol treatment	87	92.5	81	.02*
Substance use				
Age at first alcohol/drug use [years, M (SD)]	14.56 (5.36)	14.64 (4.98)	14.46 (5.80)	.81
GAIN Substance Problem Index[a] [M (SD)]	9.48 (3.38)	10.03 (3.23)	8.84 (3.45)	.02*
L90 any alcohol use to intoxication (%)	33	34	32	.80
L90 any cannabis use (%)	21	22	19	.52
L90 any other drug use (%)	42	43	42	.87
L90 days of alcohol use to intoxication [M (SD)]	6.10 (14.92)	7.63 (16.89)	4.30 (12.03)	.12
L90 days of cannabis use [M (SD)]	4.94 (15.73)	5.11 (16.81)	4.75 (14.44)	.88
L90 days of other drug use [M (SD)]	11.82 (21.40)	12.00 (21.72)	11.60 (21.14)	.90
Criminality				
LT criminal activity (%)	92	96	87	.02*
LT correctional involvement (%)	77	73	81	.16
GAIN Illegal Activity Index[b] [M (SD)]	0.13 (0.12)	0.13 (0.12)	0.12 (0.12)	.47
L90 any trouble with/broke law (%)	25.5	26	25	.82
L90 any incarceration (%)	7	5	9	.25
L90 days in trouble with/broke law [M (SD)]	3.29 (10.23)	3.52 (11.19)	3.00 (8.99)	.73
L90 days incarcerated [M (SD)]	1.82 (8.67)	1.68 (8.84)	1.98 (8.52)	.82
Employment				
LYR any employment (%)	39	33	47	.04*
L90 any work for pay (%)	20	13	29	.01**
L90 days in work for pay [M (SD)]	7.35 (17.52)	4.39 (12.99)	10.82 (21.23)	.01**
Psychiatric severity				
GAIN Emotional Problem Index[c] [M (SD)]	0.35 (0.18)	0.38 (0.16)	0.32 (0.19)	.02*
BSI Global Severity Index[d] [M (SD)]	63.54 (10.75)	64.49 (9.94)	62.45 (11.57)	.21
BDI total [M (SD)]	16.44 (11.35)	16.93 (11.33)	15.87 (11.41)	.52
L90 any psychological/emotional problem (%)	54.5	67	40	.00***
L90 any disturbance by memories (%)	75	81	68	.04*
L90 any trouble with attention/controlling behavior (%)	79	85	72.5	.03*
L90 days of psychological/emotional problem [M (SD)]	16.18 (25.06)	18.17 (24.67)	13.85 (25.44)	.23
L90 days of disturbance by memories [M (SD)]	19.50 (26.73)	19.04 (24.39)	20.04 (29.37)	.80
L90 days in trouble with attention/controlling behavior [M (SD)]	24.49 (26.65)	27.01 (26.52)	21.53 (26.65)	.15
Trauma/Abuse				
LT community violence (%)	100	100	100	–
LT interpersonal violence (%)	97.5	97	98	.79
Abuse before age 18 years (%)	58	63	52	.12
GAIN Traumatic Stress Index[e] [M (SD)]	6.34 (4.12)	6.82 (3.92)	5.77 (4.29)	.08
L6 any community violence (%)	62	65	57	.24
L6 any interpersonal violence (%)	27	26	29	.71
L6 number of community violence items [M (SD)]	1.40 (1.62)	1.40 (1.60)	1.40 (1.66)	.98
L6 number of interpersonal violence items [M (SD)]	0.89 (2.01)	0.85 (1.88)	0.95 (2.17)	.75

(*continued on next page*)

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Table 2 (*continued*)

Category	Total (N = 198)	Experimental group (enhanced treatment, n = 107	Control group (standard treatment, n = 91)	p
Housing				
L90 any time paid rent for housing (%)	61	56	66	.16
L90 any time in shelter/emergency housing (%)	14	15	13	.73
L90 any time in facility not free to come/go (%)	59	61	56	.51
L90 days paid rent for housing [M (SD)]	42.89 (41.62)	38.47 (41.52)	48.09 (41.37)	.11
L90 days in shelter/emergency housing [M (SD)]	5.12 (17.07)	4.69 (16.15)	5.62 (18.17)	.71
L90 days in facility not free to come/go [M (SD)]	34.47 (35.57)	36.05 (35.82)	32.62 (35.38)	.50

Note. LT indicates lifetime; LYR, last year before the interview; L6, last 6 months before the interview; L90, last 90 days before the interview.

[a] Higher scores indicate more recent and/or frequent substance use; scores between 10 and 16 fall into the acute range.

[b] Higher scores indicate more recent and/or frequent illegal activity; scores between 0.14 and 1.00 fall into the acute range.

[c] Higher scores indicate more recent and/or frequent psychological or emotional problems; scores between 0.14 and 1.00 fall into the acute range.

[d] Based on a reduced sample of 176 participants with complete BSI data (82 from the control group and 94 from the experimental group).

[e] Higher scores indicate more recent and/or frequent trauma/abuse; scores between 5 and 13 fall into the acute range.

* $p < .05$.

** $p < .01$.

*** $p < .001$.

equivalency of participants in the two treatment conditions and evaluated retrieval bias. Chi-square tests were used to test group differences for dichotomous and categorical data (e.g., sex and race), whereas grouped t tests were used for continuous measures (e.g., age).

The second level of the analysis assessed differential group change between the treatment groups on outcome measures in which differential treatment effects were not expected (e.g., substance use, criminal activity, and employment). The main statistical test used for differential group change was ordinary least squares regression with the control group as the reference group. The regression models consisted of a change score (Score at 12-Month Follow-Up − Score at Baseline) as the dependent variable, an independent variable for treatment condition, and standard covariates, including age, sex, race/ethnicity, education, marital status, and employment (De Leon et al., 1999; Sacks, Sacks, Banks et al., 2004a). The inclusion of covariates reduces variability, improves the fit of the model, and helps ensure that observed treatment effects are caused by the treatment condition rather than other characteristics.

The third level of the analysis was similar to the second level in terms of analytical techniques used but assessed differential change for psychiatric severity, trauma, and housing outcomes (i.e., those outcomes for which differential change was predicted). Regression models were designed to predict change from baseline to follow-up based on the same set of covariates.

2.6.1. Hypothesis

Programming designed to produce change was the same for both groups on the first set of outcomes, substance use, criminal activity, and employment; however, the modified TC features and three additional interventions that the experimental (i.e., DART) group received—psychoeducational seminar, trauma-informed addictions treatment, and case management—were designed to improve functioning in the second set of outcomes, psychiatric severity, trauma, and housing. The study predicted that clients in both groups would show significant improvement in criminal activity and employment (the first set of outcomes), for which differential treatment effects were not expected, and that the experimental group would show significantly greater improvement on the second set of outcomes, psychiatric severity, trauma, and housing, which measured social and emotional functioning.

3. Results

3.1. Profiles

As shown in Table 2, 57% of the research sample were female and 43% were male. Most participants were African Americans (79%) and were 38 years old (SD = 9) on average. Approximately two thirds (63%) of the sample had never been married, and the same proportion (68%) reported having at least one child younger than 21 years. On average, participants completed 11 years of schooling (SD = 2); well more than half (62%) had a high school or general equivalency diploma. Research participants reported having moderate to severe health problems; nearly half (48%) described their health as fair or poor. Considerable HIV risk behavior was reported; more than a quarter (27%) of the sample reported needle use (lifetime). Other profile characteristics are summarized in the paragraphs that follow.

Nearly all participants used illegal drugs (98%) and reported having received treatment for substance use (87%). Sixty percent of the sample reported crack/cocaine as the substance for which they needed treatment; alcohol (15%) and heroin/opiates (14%) were also commonly reported. The average age of the participants at their first substance use was 15 years (SD = 5). The GAIN Substance Problem

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Table 3
Regression of change scores for substance use, crime, and employment outcomes (12-Month Follow-Up Score − Baseline Score)

Past 90 days	Experimental group [n = 107, change (T3−T1)]	Control group [n = 91, change (T3−T1)]	Differential treatment effect[a] [unstandardized β (p)]
GAIN substance use[b]			
GAIN Substance Problem Index[c]	−1.31 (4.21)	−0.61 (3.88)	−0.66 (0.26)
Alcohol use to intoxication[c]	−0.10 (0.61)	−0.12 (0.54)	0.003 (0.97)
Cannabis[c]	−0.11 (0.46)	−0.07 (0.29)	−0.04 (0.44)
All other drugs[c]	−0.20 (0.61)	−0.23 (0.54)	0.02 (0.82)
Days of alcohol use to intoxication	−1.31 (22.76)	−1.40 (11.50)	−1.14 (0.68)
Days used marijuana[c]	−3.29 (17.70)	−0.98 (12.69)	−1.96 (0.38)
Days used other drugs[c]	−2.55 (30.24)	−5.89 (23.23)	2.09 (0.61)
GAIN crime[b]			
GAIN illegal activity[c]	−0.04 (0.16)	−0.01 (0.15)	−0.04 (0.09)
Trouble with/broke law[c]	−0.22 (0.46)	−0.17 (0.43)	−0.08 (0.22)
Spent time in jail	0.02 (0.31)	0.07 (0.47)	−0.04 (0.49)
Days in trouble with/broke law	−1.22 (17.76)	1.03 (17.19)	−3.04 (0.25)
Days incarcerated[c]	2.92 (20.56)	9.74 (29.90)	−5.88 (0.11)
GAIN employment[b]			
Any work for pay[c]	0.21 (0.61)	0.08 (0.64)	0.11 (0.21)
Days in work for pay[c]	14.31 (31.67)	8.22 (33.40)	6.30 (0.19)

Note. Data are expressed as M (SD). T1 indicates Time 1 (baseline); T3, Time 3 (12-month follow-up).
[a] Experimental condition = 1; control condition = 0.
[b] Standard covariates include sex, age, ethnicity, education, marital status, and employment last year.
[c] Pre/post test showed a significant change for pooled sample.

Index average indicated severe substance use. In the 90 days before baseline, one third (33%) of the sample had used alcohol to intoxication, one fifth (21%) had used cannabis, and 42% reported using a drug other than cannabis.

Almost all participants engaged in criminal activity (92%), and three of four participants (77%) had been involved with the criminal justice system. The GAIN Illegal Activity Index suggested moderate to severe criminality. In

Table 4
Regression of change scores for psychiatric severity, trauma, and housing outcomes (12-Month Follow-Up Score − Baseline Score)

Past 90 days	Experimental group [n = 107, change (T3−T1)]	Control group [n = 91, change (T3−T1)]	Differential treatment effect[a] [unstandardized β (p)]
Psychiatric severity[b]			
GAIN Emotional Problem Index[c]	−0.09 (0.19)	−0.04 (0.23)	−0.07 (0.04)[c]
BSI Global Severity Index[c,d]	−6.98 (11.59)	−4.46 (13.94)	−3.75 (0.06)
BDI[c]	−5.31 (11.22)	−3.41 (10.83)	−2.47 (0.12)
Psychological/emotional problem	−0.26 (0.57)	0.06 (0.71)	−0.33 (0.00)[c]
Disturbed memories[c]	−0.25 (0.58)	−0.17 (0.58)	−0.11 (0.21)
Trouble with attention/control[c]	−0.47 (0.56)	−0.36 (0.61)	−0.15 (0.08)
Days with psychological/emotional problem[c]	−6.65 (27.50)	1.19 (33.84)	−8.19 (0.07)
Days disturbed by memories[c]	−9.58 (24.72)	−7.90 (32.33)	−2.01 (0.64)
Days with trouble with attention/control[c]	−12.19 (35.32)	−6.15 (29.11)	−7.87 (0.11)
Trauma[b]			
GAIN Traumatic Stress Index[c]	−3.18 (4.49)	−2.69 (4.49)	−0.72 (0.28)
Any community violence[c]	−0.29 (0.64)	−0.21 (0.69)	−0.10 (0.31)
Any interpersonal violence[c]	−0.21 (0.47)	−0.21 (0.53)	−0.02 (0.77)
Number of community violence items[c]	−0.73 (1.77)	−0.67 (1.84)	−0.13 (0.62)
Number of interpersonal violence items[c]	−0.57 (1.95)	−0.64 (2.16)	−0.03 (0.93)
GAIN housing[b]			
Paid rent for housing[c]	0.29 (0.60)	0.11 (0.59)	0.16 (0.07)
Any time in shelter/emergency housing[c]	−0.11 (0.37)	−0.10 (0.34)	0.01 (0.93)
Any time in facility not free to come/go[c]	−0.40 (0.61)	−0.31 (0.65)	−0.08 (0.37)
Days paid rent for housing[c]	35.96 (51.27)	18.68 (56.31)	16.46 (0.04)[c]
Days in shelter/emergency housing	−1.33 (20.51)	−2.98 (17.69)	2.38 (0.41)
Days in facility not free to come/go[c]	−23.40 (44.74)	−14.67 (44.58)	−7.37 (0.27)

Note. Data are expressed as M (SD).
[a] Experimental condition = 1; control condition = 0.
[b] Standard covariates include sex, age, ethnicity, education, marital status, and employment last year.
[c] Pre/post test showed a significant change for pooled sample.
[d] Limited sample: 91 in the experimental group and 79 in the control group.

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the 90 days before baseline, one quarter (25.5%) of the sample had trouble with the law or broke the law and 7% had been incarcerated.

Approximately one third of the sample (39%) were employed in the year before the baseline interview; fewer (20%) were paid for work in the 90 days before the interview.

Standardized measures of psychiatric severity (BSI, BDI-II, and GAIN) indicated moderate to severe symptoms as compared with national norms; half of the sample (53%) reported receiving mental health treatment or medication, and one third (31%) had been treated for a mental health condition in an emergency department or an inpatient hospital. Most participants reported having a psychological or emotional problem (54.5%), being disturbed by memories of the past (75%), and having trouble paying attention or controlling their behavior (79%) in the 90 days before baseline.

All research participants had experienced community violence (100%), nearly all (97.5%) had experienced interpersonal trauma or abuse, and more than half (58%) had experienced abuse before they were 18 years old. Measures of more recent trauma revealed that 62% reported community violence and 27% reported interpersonal violence in the 6 months before the baseline interview. The mean GAIN Traumatic Stress Index was in the highest severity category, indicating a clinical level of stress related to trauma.

In the 90 days before entering outpatient treatment, more than half of the participants (61%) spent at least one night in a house or apartment for which they paid the rent. A total of 14% spent at least one night in a shelter or emergency housing facility, and more than half (59%) spent time in a residence where they were not free to come and go at will.

Overall, study participants with COD demonstrated an array of psychiatric, medical, substance use, family, and social problems; most were in need of substantial rehabilitation and habilitation (i.e., initial learning and acquisition of skills).

Although a randomized design minimizes the possibility of group differences, significant profile differences between the experimental and control group participants were apparent. Compared with participants in the control condition, those in the experimental condition were more likely to have received alcohol or drug treatment as well as report criminal activity but less likely to report employment. Participants in the experimental condition also scored higher on the GAIN indices for substance use and emotional problems (e.g., mental health measures). Measures that approached significance ($p < .10$) included marital status, physical health, and the GAIN Traumatic Stress Index. In addition, differences in marital status and physical health were identified between the retrieved and nonretrieved samples. To ensure internal validity, standard covariates were included in the regression model. Baseline differences in outcome measures were controlled because they were part of the change score used to test group differences at follow-up. Separate subgroup analyses were conducted to assess whether treatment effects were consistent at different levels of psychiatric and substance use severity.

3.2. Outcomes at the 12-month follow-up

As stated, the main goal of the study was to evaluate program effectiveness for client outcomes. The study predicted (a) significant improvement for both groups in outcomes for the domains of substance use, crime, and employment (all measured by the GAIN: the GAIN-I at baseline and the GAIN-M90 at follow-up) with no difference between the groups and (b) differential change between the two treatment groups, with significantly greater improvement for the experimental group, on mental health measures (BDI-II total, BSI Global Severity Index, GAIN mental and emotional health) and measures related to trauma and housing (THQ and GAIN).

3.2.1. Outcomes for predicted similar change: substance use, crime, and employment

Table 3 reports the results obtained for measures of substance use, crime, and employment from an intent-to-treat analysis of study entrants retrieved at 12 months. The table displays differential change and shows multivariate findings from regression analyses on change scores from baseline to the 12-month follow-up interview. For substance use, significant improvement from baseline to the 12-month follow-up was recorded on six of seven measures for clients randomized to the experimental and control treatment conditions, and, as hypothesized, differential change between the two treatment groups was not detected. For crime, significant improvement for the pooled sample emerged for two of the five outcomes with no difference detected between the groups. A significant increase was detected for the pooled sample on one crime measure: number of days spent in jail/prison. Finally, both measures of employment showed a significant improvement for the combined sample of experimental and control group participants. In general, the findings support the study hypothesis, although the finding on one measure of crime was in the opposite direction.

3.2.2. Outcomes for predicted differential change

Overall, in domains in which differential change was predicted, the pattern of findings produced significant effects in two of the three domains, as shown in Table 4. Participants in the experimental group reported significantly greater improvement on the GAIN Emotional Problem Index and on a measure of psychological symptoms: “any psychological or emotional problem.” Nonsignificant trends ($p < .10$) favoring the experimental group emerged for three outcome measures in the psychiatric severity domain: the BSI Global Severity Index; “any problems controlling attention/behavior”; and “the number of days experienced emotional/psychological problems.” Significant differential

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treatment effects were noted for one measure of housing stability from the GAIN Environment and Living Situation scale: "the number of days you lived in a place where you paid the rent." No difference was found between the groups on measures of trauma. Overall, these findings lend some support for the effectiveness of DART programming in producing modest positive outcomes in targeted areas.

3.3. Subgroup analyses

To expand the understanding of treatment effects for this outpatient population of clients with COD and, more specifically, to identify clients for whom the enhancements were more (or less) effective, analyses were conducted on three client subgroupings of interest: sex and two measures of severity relevant to clients with COD, psychiatric severity (≤60 on the BSI Global Severity Index vs. a BSI score ≥60[2]) and severity of substance use/abuse ("clinical" vs. "acute" on the GAIN Substance Problem Index). Results are from regression analyses that follow the models from the prior section with the addition of an interaction term between the subgroup indicator and treatment condition. As an example, for the sex subgroupings, only findings with a significant sex-by-treatment group interaction are reported. Implications for the detection of subgroup differences include triaging the most suitable clients for enhanced treatment and for improving treatment effectiveness for all types of clients. The detection of subgroup differences has the potential to identify those clients who are most likely to benefit from enhanced treatment and to indicate areas in which treatment might be altered to improve its effectiveness for all.

3.3.1. Sex

Treatment effects were similar for male and female clients in four of the six outcome domains, including all measures of substance use, employment, trauma, and housing. Most measures in the other two domains (psychiatric severity and crime) showed similar effects; however, the sex–treatment condition interaction was significant for four outcome measures. Of the nine measures of psychiatric severity, three indicated differential treatment effects by sex. Greater treatment effects were detected for male clients on one standardized measure of symptoms (BSI) and for one measure of "any psychological or emotional problem" (GAIN). The unstandardized β for men on the BSI was -7.31 ($p < .03$), as compared with that of 0.03 ($p < 1.0$) for women; similarly, the unstandardized β values on the GAIN measure of "any psychological or emotional problem" were -0.55 ($p < .001$) for men and -0.20 ($p < .10$) for women. Greater treatment effects were detected for women on the measure of "days disturbed by memories"; the unstandardized β was -11.68 ($p < .03$) for women, as compared with that of 11.54 ($p < .10$) for men. Of the five crime outcome measures, significant differences in treatment effects by sex were found for "number of days spent in jail or prison," with much larger differences between the experimental and control groups for men (unstandardized $\beta = -13.37$, $p < .10$) than for women (unstandardized $\beta = -0.09$, $p < .98$).

3.3.2. Psychiatric severity

Overall, for clients grouped based on their baseline BSI scores, treatment effects were similar in magnitude and direction for five of the six domains. These included two domains in which differential treatment effects were not hypothesized (substance use and employment) and all three domains in which differential treatment effects were expected (psychiatric severity, trauma, and housing). The interaction between treatment condition and psychiatric severity was significant for one of the five crime outcomes: "number of days spent in jail or prison" (GAIN); differences between the experimental and control groups were larger for clients with lower severity symptoms (a baseline BSI score ≤60; unstandardized $\beta = -19.08$, $p < .01$) as compared with clients with higher severity symptoms (BSI score >60; unstandardized $\beta = 2.54$, $p < .61$).

3.3.3. Severity of substance use

Subgroups based on severity of substance use at baseline recorded similar treatment effects on four of the six domains: substance use, crime, employment, and housing. Significant interactions were detected for two measures, one in the psychiatric severity domain and the other in trauma. Although both severity groups reported treatment effects favoring the experimental condition for most mental health measures, greater treatment effects emerged for the less severe substance use group on the GAIN measure of "any psychological or emotional problem," in which the unstandardized β was -0.66 ($p < .00$) for the less severe clinical group, as compared with the β value of -0.06 ($p < .63$) for the more severe acute group.

4. Discussion

Overall, the findings provide some support for the study predictions. At the outset, the pre/post change for measures without predicted differential treatment effects indicated significant improvement for the pooled sample on most outcomes at the 12-month follow-up. Participants in the experimental and control groups showed significant improvement on most outcomes in the domains of substance use, crime, and employment, and treatment conditions did not differ in the magnitude of the improvements. The more robust findings for substance use as compared with crime are understandable because the targeted interventions place greater emphasis on substance use than on crime. Analysis of crime measures revealed that both experimental and control

[2] The normative standardized average for the BSI Global Severity Index is 50 ($SD = 10$).

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group clients reported an overall increase in time spent in jail or prison. Although a clear reason for this observation was not apparent, it is probable that these clients had committed prior offenses, and the increase in time incarcerated might be attributed to the longer sentences assigned to repeat offenders. It is also possible that the additional incarceration represented time served for offenses committed before treatment entry. In any case, some strengthening of the intervention to address crime outcomes is indicated.

As predicted, the experimental group demonstrated significantly better outcomes on two measures of psychiatric severity (i.e., the GAIN Emotional Problem Index and "any psychological/emotional problem") and on one measure of housing stability (i.e., the GAIN "number of days s/he lived where s/he paid the rent," an indicator of whether a client is at risk for homelessness). Among women, although no significant difference between the experimental and control groups emerged on the GAIN Traumatic Stress Index, the experimental condition programming seemed to be slightly more effective. The effect size of 0.28 found for women (n = 112) is similar to that of 0.16 reported recently for a national meta-analysis of 2,026 women in nine studies (Morrissey, Ellis et al., 2005; Morrissey, Jackson et al., 2005). Taken together, these data suggest a small improvement in trauma treatment effectiveness for the women who received the DART enhancements.

A few interesting differences that emerged from subgroup analyses warrant additional discussion and exploration, although these findings should be viewed with considerable caution (Section 4.1). First, a differential effect favored men on certain psychiatric severity and crime variables, which may suggest a greater need for programming to address symptoms in female clients. Second, greater treatment effects emerged on the GAIN measure of "any psychological or emotional problem" for the group whose substance use was less severe. This finding indicates that the severity of substance use may be an important predictor of treatment outcomes on psychiatric severity variables and should be considered when developing or altering treatment interventions and protocols. Third, greater treatment effects emerged on "days spent in jail or prison" among the participants whose psychiatric symptoms were less severe. This finding indicates that psychiatric severity may be an important predictor of treatment outcomes on some crime variables and should be considered when developing or altering treatment interventions and protocols (Flynn & Brown, 2008).

4.1. Limitations

4.1.1. Robustness of the findings

The main study findings were differential outcomes favoring the experimental over control group participants on study measures related to psychiatric severity and housing found for a few specific variables (e.g., "the number of days experienced psychological/emotional problems" and "number of days s/he lived where s/he paid the rent") but not for the full array of outcomes within those domains. Although other variables in these domains show the same direction of effects, giving the experimental condition an advantage over the control condition, significance was not reached; consequently, the main effects are insufficient to draw definitive conclusions concerning the differential effectiveness of the experimental condition—no difference was observed on measures of substance use, crime, and employment. Nevertheless, the evidence and consistency found in the data are sufficient to suggest that the DART enhancements to outpatient programming represent an effective approach that warrants further investigation and that is worthy of consideration when program administrators are developing outpatient treatment models for clients with COD.

4.1.2. Subgroup analyses

Subgroup analyses were conducted to further the exploration of sex, psychiatric severity, and severity of substance use. The article discussed these analyses as offering some support for the prediction that the DART enhancements (experimental group) would produce better outcomes than the basic day treatment program (control group) and to suggest some interesting subgroup findings. These additional secondary analyses and associated discussion should be regarded as suggestive; the findings do not carry the same weight as the main study results because the degree of benefit from the strengths of the experimental design is diminished.

4.1.3. Treatment dose

Analysis of treatment dose for the experimental group indicated that treatment components were only partially delivered (84% attended psychoeducational seminars, 62% attended trauma-informed addictions treatment, and 62% received individual case management). The figures for the trauma-informed component represent later client entrants because the intervention could not be implemented for the entire data collection period. The delivery of case management not only was less than that proposed but also had been conveyed in individual, rather than group, sessions; consequently, this intervention should be regarded as minimally implemented and without having substantially imparted self-management skills training to clients. Furthermore, the treatment dose instruments measured attendance at sessions and did not gauge the extent to which the interventions, although curriculum and manual driven, were actually delivered as designed. Finally, treatment dose data were not available to describe attendance, service use, and length of stay for the control group. Nonetheless, it seems clear that the differences in programming between the experimental and control conditions were less than those designed and intended. Although this limitation can be seen to reflect typical responses to practical conditions and considerations in the provision of outpatient services as well

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as to represent a conservative bias in the study (i.e., one that does not favor the experimental condition), it is also true that this limitation permits only a partial test of the study conditions and hypothesis.

4.2. Summary and conclusions

In summary, the study findings indicate that the experimental group (those in a modified TC track receiving selected program enhancements) demonstrated significantly better outcomes as compared with the control group (those receiving basic outpatient substance abuse services) on measures of psychiatric severity (the GAIN Emotional Problem Index and on "any psychological/emotional problem," a measure of psychological symptoms) and on one measure of housing stability (from the GAIN scale on Environment and Living Situation, "number of days s/he lived where s/he paid the rent," an indicator of risk for homelessness); no difference was observed on measures of substance use, crime, and employment. Results from subgroup analyses of treatment effects for three subgroupings (sex, psychiatric severity, and severity of substance abuse) were mostly consistent in magnitude and direction, with differential treatment effects found for the total sample. The findings must be qualified because (a) only 3 of 34 representative measures (<10%) showed significant differential treatment effects and (b) treatment dose measures indicated partial implementation of the enhancements. Nevertheless, the study findings do provide some modest support that outpatient substance abuse treatment programs, when adapted to incorporate certain modified TC features and selected interventions to strengthen their capacity to serve clients with COD, can be effective for specific outcomes. Furthermore, these findings suggest that adding a restricted array of targeted and time-limited interventions can improve outpatient substance abuse treatment outcomes. Additional studies are warranted to validate these (and other) targeted enhancements to improve the capacity of outpatient substance abuse programs to serve clients with COD.

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04

Modified TC for MICA offenders: Crime outcomes

Sacks, S., Sacks, J.Y., McKendrick, K., Banks, S., & Stommel, J. (2004).

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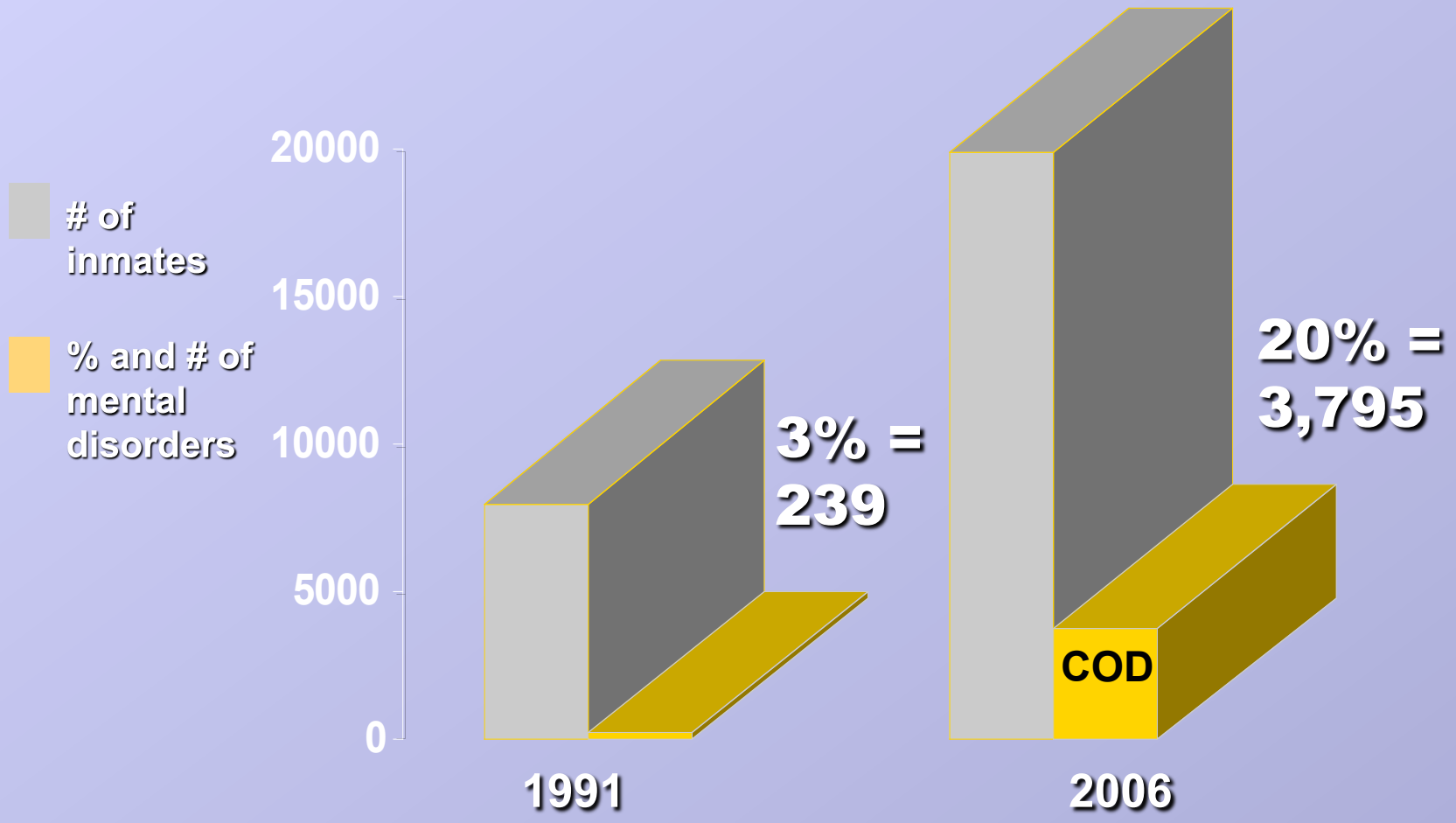
Illustrations: "Prevalence of Severely Mental Disorders Is Increasing in Prison"
"MICA Offender 12 Month Outcomes"
"Incremental program costs"

04. Modified TC for MICA offenders: Crime outcomes

Abstract

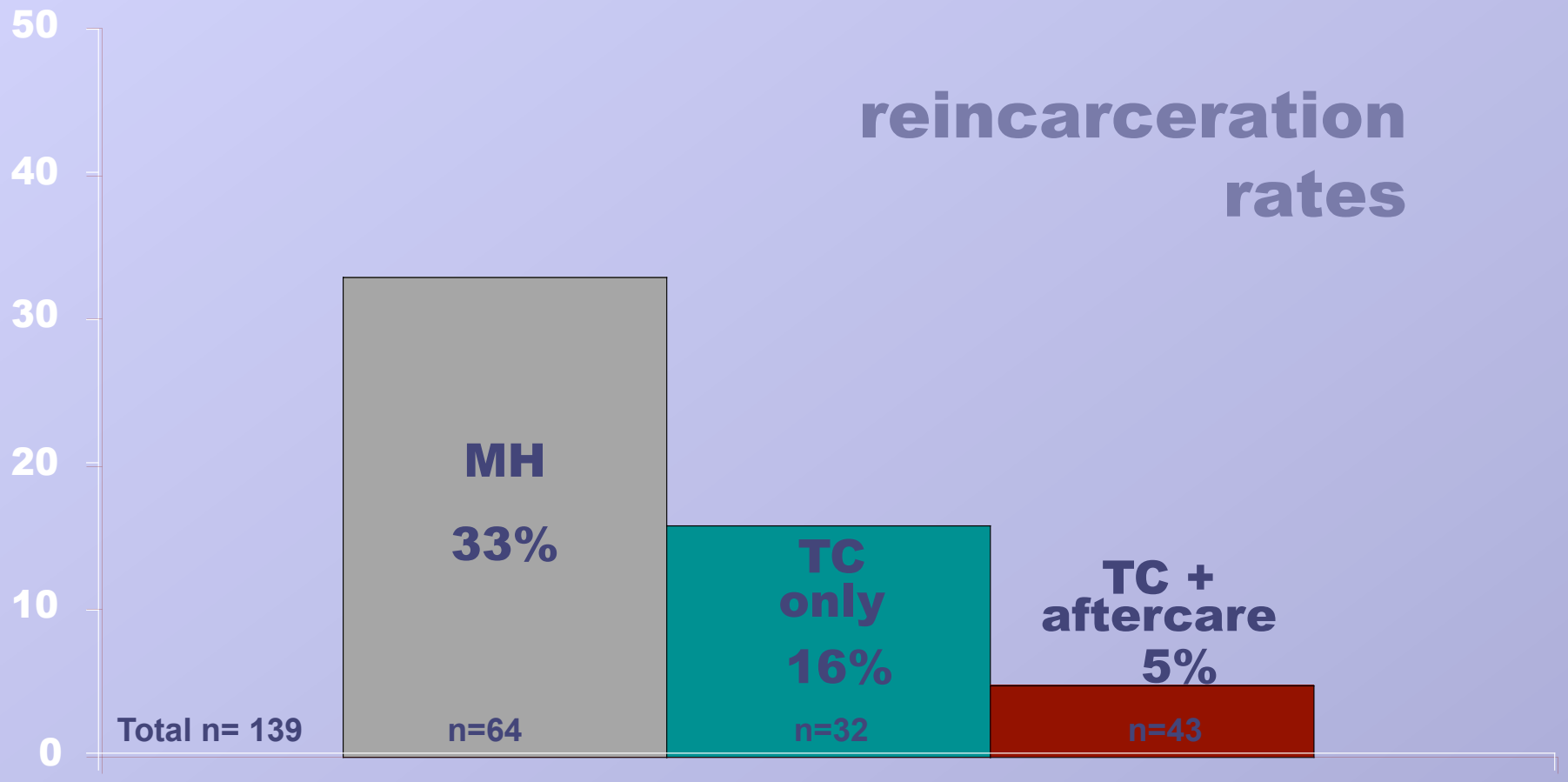
The study randomly assigned male inmates with co-occurring serious mental illness and chemical abuse (MICA) disorders to either modified therapeutic community (MTC) or mental health (MH) treatment programs. On their release from prison, MICA inmates who completed the prison MTC program could enter the MTC aftercare program. The results, obtained from an intent-to-treat analysis of all study entries, showed that inmates randomized into the MTC group had significantly lower rates of reincarceration compared with those in the MH group. The results also show that differences between the MTC + aftercare and comparison group across a variety of crime outcomes (i.e. any criminal activity, and alcohol or drug related criminal activity) are consistent and significant, and persist after an examination of various threats to validity (e.g. initial motivation, duration of treatment, exposure to risk). This study provides some support for the effectiveness of the prison TC only condition. The findings are encouraging and consonant with other studies of integrated prison and aftercare TC programs for substance abusing non-MICA offenders, although qualified by the possibility that selection bias (i.e. differences in motivation on entry into aftercare) may be operating. Nevertheless, given the available evidence and the need for effective programming for MICA offenders, program and policy makers should strongly consider developing integrated prison and aftercare modified TC programs for MICA offenders.

Prevalence of Serious Mental Disorders Is Increasing in Prisons



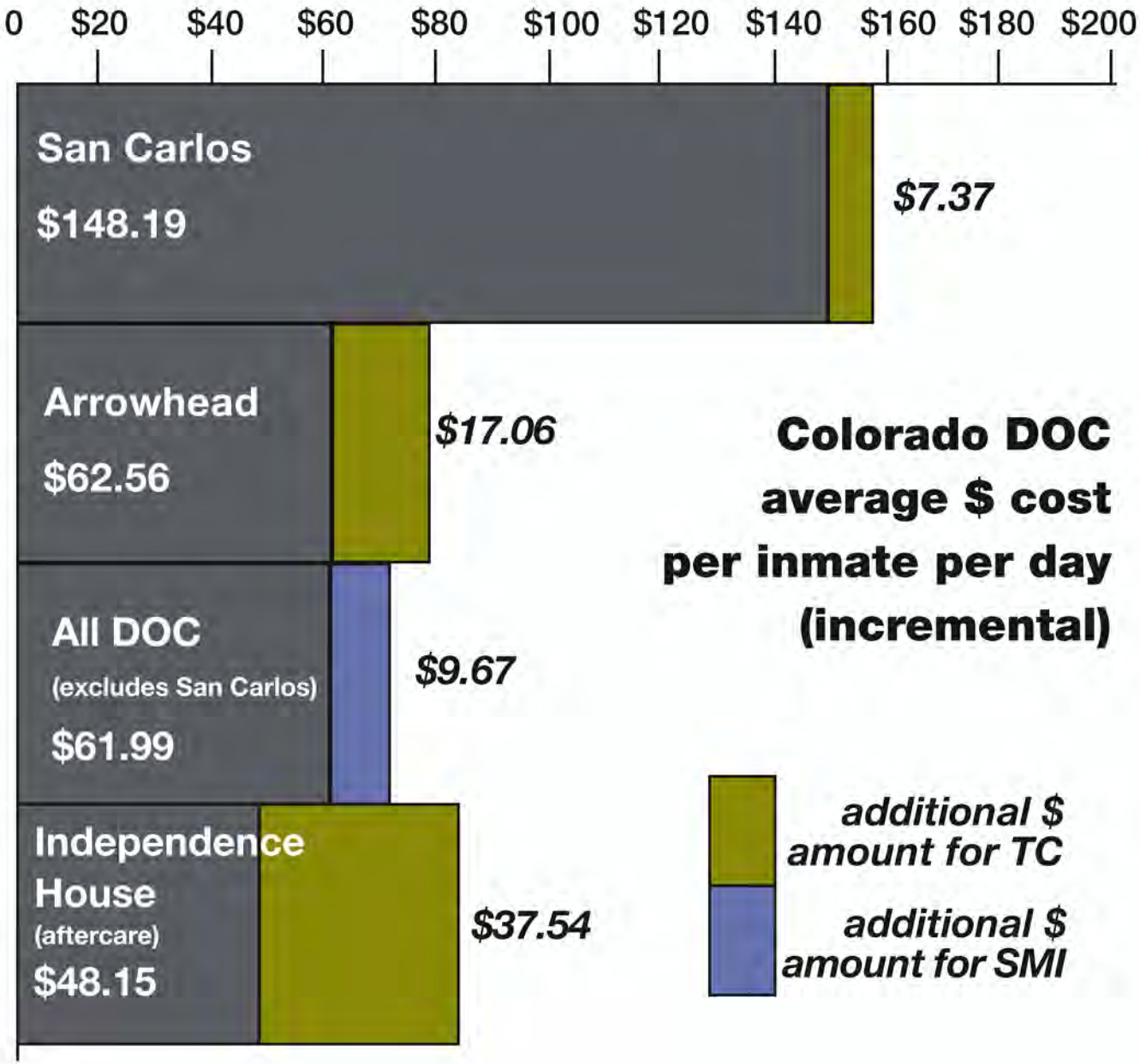
Source: Kleinsasser D. & Michaud, J.T. 2002.

MICA Offender 12 Month Outcomes



Source: Sacks, S., Sacks, J., et al. 2004

Incremental program costs



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Modified TC for MICA Offenders: Crime Outcomes

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The study randomly assigned male inmates with co-occurring serious mental illness and chemical abuse (MICA) disorders to either modified therapeutic community (MTC) or mental health (MH) treatment programs. On their release from prison, MICA inmates who completed the prison MTC program could enter the MTC aftercare program. The results, obtained from an intent-to-treat analysis of all study entries, showed that inmates randomized into the MTC group had significantly lower rates of reincarceration compared with those in the MH group. The results also show that differences between the MTC + aftercare and comparison group across a variety of crime outcomes (i.e. any criminal activity, and alcohol or drug related criminal activity) are consistent and significant, and persist after an examination of various threats to validity (e.g. initial motivation, duration of treatment, exposure to risk). This study provides some support for the effectiveness of the prison TC only condition. The findings are encouraging and consonant with other studies of integrated prison and aftercare TC programs for substance abusing non-MICA offenders, although qualified by the possibility that selection bias (i.e. differences in motivation on entry into aftercare) may be operating. Nevertheless, given the available evidence and the need for effective programming for MICA offenders, program and policy makers should strongly consider developing integrated prison and aftercare modified TC programs for MICA offenders. Copyright © 2004 John Wiley & Sons, Ltd.

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INTRODUCTION

Several related terms are used to signify the phenomenon of combined mental and substance use (both abuse and dependence) disorders. The broadest term—co-occurring disorders (COD)—refers to clients who have one or more mental disorder as well as one or more disorder relating to the use of alcohol and/or other drugs (Center for Substance Abuse Treatment, 2004). ''MICA,'' a related and popular term, is used to denote those persons who have both a *serious* mental disorder and a substance (including alcohol) use disorder, and stands for ''mentally ill chemical abuser.'' This paper focuses on MICA offenders, a group that presents considerable challenges to the criminal justice system. Such offenders have multiple and distinctive needs and frequently must be separated from the general population to facilitate delivery of effective programming; they require careful discharge preparation and planning because parole boards are often reluctant to authorize their release to the community.

The reported proportion of MICA offenders in jail and prison populations has ranged from 3 to 16% (Peters & Hills, 1993; Regier et al., 1990; Steadman, Fabisiak, Dvoskin, & Holohean, 1987; Teplin, 1990). A recent U.S. Department of Justice special report (Ditton, 1999) estimated that 283,800 offenders with mental illness were incarcerated across the country; 16% of State prison inmates, 7% of Federal inmates, and 16% of those in local jails cited either a mental condition or an overnight stay in a mental hospital during their lifetime. Offenders in this survey reported a high incidence of drug and alcohol abuse; one-third were alcohol dependent, while six in ten were under the influence of alcohol or drugs at the time of offense. About 16% of probationers, or an estimated 547,800 persons, reported a mental condition or an overnight stay in a mental hospital during their lifetime (Ditton, 1999). Clinical assessment data indicate that the incidence of mental disorders within the offender population continues to grow; the Colorado Department of Corrections (DOC) reported an increase from 4% in 1991 to 14% in 2001 (Kleinsasser & Michaud, 2002), with about three-quarters of these showing evidence of substance use disorders. In response, prison treatment efforts have been organized to meet the special needs of MICA inmates, although few outcome studies to date have examined the efficacy of different approaches for this group (Sacks & Pearson, 2003).

Long recognized as a major drug abuse treatment approach, particularly for the socially disaffiliated, the therapeutic community (TC) has an established record of effectiveness in reducing drug use and criminality, while increasing their employment (De Leon, 1984; Hubbard, Rachal, Craddock, & Cavanaugh, 1984; Hubbard, Craddock, Flynn, Anderson, & Etheridge, 1997; Simpson & Sells, 1982). Research findings have also demonstrated improved psychological status during treatment, with gains in self-esteem, ego strength, and social skills and reduced depression (De Leon & Jainchill, 1981–82; De Leon, Wexler, & Jainchill, 1982; Jainchill & De Leon, 1992; Sacks & De Leon, 1992). This evidence provided the logic for extending TC approaches to MICA clients in addiction and mental health settings, and in prisons (De Leon, Sacks, & Wexler, 2001). Programs tailored to the needs of MICA inmates were initiated in Alabama, Texas, California, and Colorado correctional institutions (Wexler, 1995), which exemplify one solution to the treatment of this difficult group.

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Concerns about the long-term effectiveness of prison substance abuse treatment led to the development of aftercare programs. Recent reports have consistently shown that the effects of prison TC treatment diminish over time, while the positive impact of prison TC plus aftercare remains substantial. At three years post-treatment, Wexler and colleagues (Wexler, De Leon, Thomas, Kressel, & Peters, 1999a; Wexler, Melnick, Lowe, & Peters, 1999b) found that only 27% of prison program completers who also completed community aftercare were returned to custody; in contrast, about three-fourths of the subjects in all other study groups were returned. Knight, Simpson, and Hiller (1999) and Inciardi and colleagues (e.g. Inciardi, Martin, Butzin, Hooper, & Harrison, 1997; Inciardi, Surratt, Martin, & Hooper, 2002) have reported similar findings. These long-term outcomes support the critical role of aftercare in maintaining positive treatment effects over time. Similarly, support has been found for the effectiveness of intensive prison treatment integrated with aftercare for those with more severe crime and drug histories and poorer education and employment backgrounds. Nevertheless, several authors have suggested that selection bias may be influencing these outcomes (Nemes, Wish, Wraight, & Messina, 2002; Pelissier et al., 1998; Pelissier et al., 2000; Pelissier et al., 2001; Wexler et al., 1999b), indicating a need for either better controlled studies or analytic strategies that take selection bias and other threats to validity into account.

The modified TC prison and aftercare programs (described fully by Sacks, Sacks, & Stommel, 2003b) examined in this paper evolved from three sources. First is the body of work produced by De Leon and colleagues, which provides a full description of the TC for the addictions, the conceptual framework, program model, and treatment interventions (De Leon, 1984, 1989, 1995, 1996, 2000; De Leon & Jainchill, 1981–82, 1992; De Leon, Skodol, & Rosenthal, 1973; De Leon et al., 1982). Second is the work reported by Wexler and other investigators (Field, 1985; Inciardi et al., 1997; Wexler, 1997; Wexler & Williams, 1986) that describes the application of the TC model in prison environments. Third is the work conducted by Sacks and colleagues that extends and modifies the TC's conceptual framework and treatment components to suit homeless MICA individuals (Sacks, De Leon, Bernhardt, & Sacks, 1997a; Sacks, Sacks, & De Leon, 1999) and MICA offenders (Sacks et al., 2003b), and which includes guides that describe the implementation of such programs (see, e.g., Sacks, De Leon, Bernhardt, & Sacks, 1998b; Sacks et al., 1999). These residential modified TCs produced significantly more positive outcomes for drug use and employment than treatment as customarily provided (De Leon, Sacks, Staines, & McKendrick, 1999, 2000), gains that were stabilized by the addition of TC-oriented supported housing (Sacks, De Leon, McKendrick, Brown, & Sacks, 2003a). Economic analyses from these studies revealed the total and average cost of providing modified TC treatment was similar to the cost of providing standard services (French, Sacks, De Leon, Staines, & McKendrick, 1999; McGeary, French, Sacks, McKendrick, & De Leon, 2000), and calculated six dollars of benefit for every dollar spent on modified TC treatment (French, McCollister, Sacks, McKendrick, & De Leon, 2002).

This paper, one of the first to report outcome data from a study of treatment for MICA offenders, evaluates the effectiveness of these modified TC prison and aftercare programs in comparison with a mental health services approach. The paper also presents a detailed method of addressing common threats to validity that occur in the conduct of this type of field research study. Clearly, the findings from

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this study have important implications for the treatment of MICA offenders in the criminal justice system.

METHODS

Research Design

Male MICA inmates were randomly assigned to one of two treatment groups, either modified therapeutic community (MTC) or mental health (MH). On their release from prison, MICA inmates who completed the prison MTC program could enter the MTC aftercare program; those who did so were designated "MTC + aftercare," while those who did not were designated "MTC only." This latter group, along with those in the MH group, was eligible to receive a variety of services in the community. Participation in Colorado DOC aftercare programs is never strictly voluntary. Agreeing to participate in *any* aftercare program can facilitate parole approval by the Community Corrections Board, but no other incentive was offered, and no distinctive incentive was attached to participation in the MTC aftercare program. Continued treatment was often both a preference of the offenders in the study and a requirement; State law mandates treatment as determined and designated by case managers from Colorado DOC Offender Services, who prepare discharge plans for every MICA inmate. The analytic plan, described below, provides the rationale for disaggregating the analysis into these three groups. It was hypothesized that the MTC only group would show significantly greater improvement than the MH group, and that the MTC + aftercare group would demonstrate even larger effects on a variety of crime measures. Data were collected from subjects at baseline (on entry into the prison treatment programs) and at 12 months post prison release to compare the groups on crime outcomes in the first year outside prison.

Treatment Conditions

Prison MTC Program, Personal Reflections (Residential)

Personal Reflections, a modified TC residential treatment program, uses a cognitive–behavioral curriculum within a foundation of TC principles to change attitudes and lifestyles in three critical areas: substance abuse, mental illness, and criminal thinking and behavior. The program includes psycho-educational classes, cognitive–behavioral protocols, medication, and therapeutic interventions. Psycho-educational classes help MICA inmates to recognize their addiction and pattern of drug use, to understand their diagnosis and the nature of their mental disorders, and to develop emotional and behavioral coping skills for both their substance abuse and mental health problems. The cognitive–behavioral elements help the inmate to examine how he uses his interpretation (or misinterpretation) of events to influence his feelings and justify his criminal behavior, and provide him with tools that enable him to recognize and modify distorted perceptions and inappropriate responses. Mental health status is monitored daily; the type and dosage of medication is evaluated weekly. The therapeutic interventions include core groups to discuss personal issues

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and modified encounter groups to address maladaptive behaviors and foster personal responsibility, with the peer group providing feedback and support. Planned program duration is 12 months, but varies depending on the offender's progress in treatment, the time required for approval to be placed in a community corrections facility, and the space available in the designated program facility. In general, once an inmate enters treatment he will remain within the program until his release. The typical inmate attends formal program activities 5 days per week for 4–5 hours each day; the remainder of the day is spent working within the prison. (See Sacks et al., 2003b, for a complete program description.)

Post-Prison MTC Program, Independence House (Aftercare)

Independence House, the TC-oriented aftercare program, is a 20-bed program that occupies 5 apartments of a 15-apartment (60-bed) Community Corrections facility; the other 10 apartments are for non-MICA offenders. The program helps released inmates to continue to examine and alter their criminal thinking and behavior, to master community living and integration with mainstream society, to gain employment, and to foster connection with the larger recovery community, while maintaining their affiliation with the TC community. Activities revolve around basic skills (including meal preparation, banking, use of community resources such as libraries), relapse prevention/triple trouble recovery (substance abuse, mental illness, and criminality), medication and symptom self-management, and emotional and behavioral coping. Mental health counseling, medication, and psychiatric services are provided by a local mental health center; medication type and dosage are evaluated weekly. These services remain accessible once residency in the community has been established, and provide the continuity of care that is essential to the success of the MICA individual. Three aftercare TC staff, trained in both mental health and substance abuse, direct program activities seven days a week from 8 AM to 8 PM. The average resident attends formal program activities from 3 to 7 days per week for 3–5 hours each day during his 6-month tenure, progressing through program stages, gradually assuming greater independence as he demonstrates greater responsibility. Supervision remains high during this period as offenders meet bi-weekly with their community corrections officers. (See Sacks et al., 2003b, for a complete program description.)

Mental Health (MH) Program

The prison MH program provides intensified psychiatric services consisting of medication, weekly individual therapy and counseling, and specialized groups. Mental health status is monitored daily, the type and dosage of medication are evaluated weekly, and a cluster of discrete mental health and substance abuse interventions are employed. The mental health interventions include a mandated cognitive–behavioral core curriculum (the thought process, assertiveness training, problem solving, distorted thinking, stress management, personal responsibility), anger management therapy and education, domestic violence, parenting, and weekly drug/alcohol therapy. Substance abuse services consist of a 72 hour

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cognitive–behavioral core curriculum that focuses on substance abuse education and relapse prevention.

The aftercare MH program includes a variety of mental health services provided by a community-based agency (Mental Health Corporation of Denver) in an outpatient setting, including psychiatric assessment, medication and medication monitoring, crisis intervention, and various group and individual counseling and therapy interventions. The agency offers additional services to ease the transition to community living, including case management directed toward employment and housing. The typical parolee attends these services twice per week for a total of 4 hours.

The MTC and MH programs are alike in their dual focus on mental and substance use disorders, in their use of medication, and in their application of cognitive–behavioral elements to address criminal thinking. The two approaches differ mainly in the MTC's use of the community as the healing agent (i.e. community as method) and reliance on mutual peer self-help—the quintessential features of TC programs (De Leon, 2000). No convergence of MTC elements into the MH program was evident, despite the physical proximity of the two programs at the San Carlos facility. The investigators confirmed the differential service provisions within the two units through an inspection of program service logs and formal service utilization forms that the prison requires and maintains. This separation can be attributed to three factors: each program is conducted in a distinct, self-contained unit; assigned staff are dedicated to only one program; and each program's design and schedule contain distinctive service elements.

Sample

On entering the Colorado DOC, all inmates complete a standardized state assessment to determine eligibility for services. All determinations of eligibility for special services use a combination of past treatment records diagnosis, the score from the Brief Psychiatric Rating Scale (BPRS; Ventura, Green, Shaner, & Liberman, 1993), and the judgment of the mental health professional. Offenders who are eligible for services are required by the state to participate in specialized treatment programs (available at facilities throughout the state), and to be monitored regularly. Inmates having the most serious mental disorders are assigned to the San Carlos Correctional Facility in Pueblo, which was constructed in 1995 specifically for male offenders with psychiatric disorders; those who had co-occurring substance use disorders were placed in an eligibility pool for random assignment to one of the two study conditions, MTC (experimental) or MH (control). Inmates from the eligibility pool who chose to participate entered the study 12–18 months before their parole release date; only those who represented a clear danger to themselves or others were excluded. Two hundred and thirty-six male MICA inmates were randomly assigned to either the MTC group ($N = 142$) or the MH group ($N = 94$); unequal sample sizes emerged because the MTC and MH programs had different capacities and flow rates. Fifty-one inmates who participated in both MTC and MH treatment groups were designated as "Crossovers,"[1] and were

[1]The facility permitted only movement from the MTC to the MH group, with one exception.

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removed from the main analyses, bringing the total sample size to 185 (92 MTC and 93 MH subjects); results that include crossovers are presented in the section on threats to validity. The overall retrieval rate of 75% produced a follow-up sample of 139, consisting of 75/92 (82%) MTC, and 64/93 (69%) MH. Of the 92 MTC clients, 46 (50%) entered MTC aftercare (MTC + aftercare) and 46 (50%) did not (MTC only). Retrieval rates were 43/46 (94%) for MTC + aftercare, and 32/46 (70%) for MTC only, a difference no doubt due to the fact that treatment contact was maintained longer for the MTC + aftercare group. Among retrieved offenders, completion rates were 86, 91, and 69% for the MTC only, MTC + aftercare, and MH treatment groups, respectively; both program completers and dropouts were included in the intent-to-treat analysis. Differential retrieval rates in relation to treatment outcomes are discussed in the section describing threats to validity.

Measures

This paper presents results for six crime variables considered to be crucial to understanding treatment effectiveness within a corrections population. The measures were drawn from a self-report instrument—the Center for Therapeutic Community (1992) *CTCR Baseline Interview Protocol*—and from DOC records, and were selected for comprehensiveness and non-redundancy. All measures refer to activity or status during the first 12 months post prison release. The two main outcome measures, reincarceration and criminal activity (representing 17 illegal activities), were restricted to new crimes only; parole or technical violations were omitted because the close surveillance conditions of parole result in disproportionately high detection rates for such offenses (Taxman, 2002). Criminal activity was further explored by separating offenses that were related to alcohol or drug use from those that were not. The number of days until reincarceration and number of days until first criminal activity were investigated as censored data; i.e., these are measures only for those who demonstrate the event. Arrest data were not included since all arrests that were not parole or technical violations resulted in incarceration.

Analytic Plan

The analytic plan compared inmates randomized into MTC (experimental) and MH (control) groups, with the crossover cases excluded (and analyzed subsequently as part of threats to validity). Upon finding significant differences between the two treatment groups, the MTC group was then disaggregated into those who participated in both prison MTC and aftercare programs (MTC + aftercare) and those who completed only the prison MTC (MTC only); these two groups were then compared with the MH group. The research hypotheses stated that inmates who entered MTC would show greater improvement at 12 months post-prison compared with inmates who entered MH, and that the treatment impact for prison MTC + aftercare would be even more substantial. *Profile comparisons* were made of the MTC + aftercare *versus* MTC only, as well as the MTC *versus* MH treatment groups. The covariates selected either were significantly different (Table 1) in baseline comparisons of the two groups (i.e. age, employment), or had been used

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historically as controls for similar populations (i.e. age at first incarceration, number of residences). Chi-square tests were used on all dichotomous or categorical data (e.g. employment status), while continuous data (e.g. age) were tested using grouped *t*-tests.

Logistic regression was used to test for differential group change on all dichotomous outcome measures (e.g. any criminal activity), using the MH group as the reference group. The regression models consisted of the 12 month post-prison outcome (dependent variable), variables for treatment condition (independent variables; MTC, then MTC + aftercare and MTC only), and five covariates (the outcome variable at baseline, age, age at first incarceration, employment during the year prior to baseline interview, and number of residences during the year prior to the baseline interview).

Kaplan–Meier survival analyses were performed to compare the rate of reincarceration and the rate of onset of criminal activity on two sub-samples of inmates, those who were reincarcerated and, separately, those who reported criminal activity at 12 months post prison release. Survival curves were calculated and compared by treatment subgroups (MTC + aftercare, MTC only, and MH).

Group differences were detected only for sexual offender status. Data for this measure were problematic because the MTC + aftercare group had no sex offenders at 12 months post-prison. To assess the effect of sex offender status, regression analyses were conducted on a sub-sample of inmates who were not sex offenders at baseline. Findings from this sub-analysis are discussed as threats to validity.

Profiles

Overall

Table 1 presents profile information on the Colorado MICA inmates (from the study and on whom follow-up data are available) including demographic measures, social risk factors, diagnostic and psychological measures, and history of substance use and criminality. Inmates in this sample were predominately Caucasian, in their mid-30s, and had an average of ten and a half years of school. Over 60% of the sample had never married or co-habitated, and the same proportion had children. In the year prior to incarceration, the typical inmate had four residences and some form of employment. The sample reported levels of motivation/readiness for treatment that were below average for a treatment-seeking substance abusing population (mean motivation/readiness score of 33; median score of 35). Data from the *Diagnostic Interview Schedule* (DIS; Robins, Helzer, Cottler, & Goldring, 1989) at baseline revealed diagnoses of a lifetime Axis I mental disorder for 78%, of an antisocial personality disorder for 37%, and of a substance use disorder for 90% of participants. Nearly three-quarters (72%) had used psychotropic medication in their lifetime, while fewer than half (43%) were taking psychotropic medications in the 6 month period prior to incarceration. The *Beck Depression Inventory* (BDI; Beck, Steer, & Brown, 1996; Beck, Steer, & Garbin, 1988) revealed mild to moderate current symptomotology.

Profiles for substance use and criminal history show early onset for both types of behavior; inmates had an average age of 11 years (SD = 4) at first criminal activity,

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13.5 years (SD = 5) at first alcohol use, 14 years (SD = 5) at first drug use, and 19 (SD = 8) at first incarceration. The primary drug was reported by approximately one-third of the sample as alcohol, one-third as marijuana, and one-fifth as crack/cocaine; nearly half of the sample had injected drugs. The relationship between substance use and criminality was demonstrated by the fact that over half of the sample cited drug use as the reason for their criminal activity in the year prior to incarceration. Finally, two in ten inmates were sex offenders and half had committed a violent offense in the year prior to incarceration. On average, inmates had been incarcerated for 56 months (SD = 61).

Group Comparisons

MH versus MTC. Inmates randomized into the MTC and MH treatment conditions were similar on most demographic measures and other client characteristics. Of the 26 measures reported in Table 1, significant differences between the two treatment conditions emerged on four measures. Compared with the MTC group, inmates randomized into the MH treatment group were younger, were more likely to be unemployed in the year prior to incarceration, had used alcohol at an earlier age, and were less likely to report drugs as the main reason for criminal activity in the year prior to incarceration.

MTC + Aftercare versus MTC Only. Few demographic or other differences emerged between MTC inmates who entered aftercare and those who did not enter aftercare. Group differences were found for three of the 26 measures reported, including one demographic measure and two measures of criminality. Compared with MTC clients who entered aftercare, inmates in the MTC only group were more likely to be employed in the year prior to incarceration (which may account in part for why they did not enter aftercare), had spent significantly less time incarcerated, and were more likely to be sex offenders.

Crime Outcomes at 12-Month Post Prison Release

Table 2 reports the data bearing on the study hypotheses. The main outcomes section, which reports the results obtained from an intent-to-treat analysis of all study entries, indicates that inmates randomized into the experimental MTC group had significantly lower reincarceration rates than their counterparts in the control MH group (total MTC = 9% and MH = 33%, $p < 0.01$). The pattern that emerged for the other outcome measures supports the hypothesis in direction but does not reach significance. The results are most striking when disaggregating the MTC group and comparing the MTC + aftercare to the MH group. The MTC + aftercare group showed significantly lower reincarceration rates (5 versus 33%, $p < 0.02$), rates of criminal activity (42 versus 67%, $p < 0.05$), and rates of criminal activity related to alcohol and drug use (30 versus 58%, $p < 0.03$).

Although differential change between the MTC only group and the MH group was not statistically significant, the pattern of change supported the hypothesis, with proportionally fewer inmates in the MTC only group reporting reincarceration or

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Table 1. Demographic and other background characteristics

	Total study		Randomized study									
			MTC total		Prison MTC + aftercare		Prison MTC only		MH		MTC total vs. MH	MTC + aftercare vs. MTC only
	($n = 139$)		($n = 75$)		($n = 43$)		($n = 32$)		($n = 64$)			
Demographics	% or mean	(std)	% or mean	(std)	% or mean	(std)	% or mean	(std)	% or mean	(std)	*P*	*P*
Ethnicity												
Caucasian	49		52		51		53		45		0.44	0.54
African American/Black	30		31		33		28		30			
Hispanic	16.5		12		14		9		22			
Other	4		5		2		9		3			
Age	34.29	(8.82)	35.81	(8.49)	35.99	(8.33)	35.56	(8.83)	32.51	(8.92)	0.03*	0.83
Never married	61		60		58		62.5		62.5		0.77	0.71
Any children	63		67		70		62.5		59		0.38	0.51
Years of school completed	10.63	(1.83)	10.77	(1.94)	10.58	(1.87)	11.03	(2.04)	10.45	(1.69)	0.31	0.33
Social risk factors												
Unemployed last year	37		29		39.5		16		47		0.04*	0.03*
No. places lived last year	3.50	(8.53)	2.23	(1.32)	2.42	(1.53)	1.97	(0.93)	4.98	(12.38)	0.06	0.15
Motivation—Readiness†	33.40	(15.58)	35.85	(16.23)	33.86	(17.23)	39.06	(14.36)	30.30	(14.32)	0.11	0.30
Diagnostics & psychological measures												
Axis I or Axis II disorder††	96		96		97		94		97		0.79	0.40
Axis I mental illness	78		81		81		81		75		0.37	0.99
Axis I serious mental illness†††	63		68		67		69		56		0.16	0.91
Axis II ASP	37		32		39.5		22		44		0.16	0.11
Axis I substance abuse	90		89		91		87.5		91		0.81	0.66
Psych. medication—lifetime	72		72		67		78		72		0.99	0.31
Psych. medication—last 6 mos	43		48		49		47		37.5		0.22	0.87
BDI total score††††	15.82	(11.83)	15.39	(10.13)	16.00	(10.93)	14.48	(8.97)	16.38	(13.79)	0.68	0.59
Substance use												
Age first alcohol use	13.54	(4.58)	14.27	(4.90)	14.33	(5.47)	14.19	(4.05)	12.66	(4.03)	0.05*	0.91
Age first illegal drug use	14.36	(5.13)	14.85	(5.83)	14.98	(6.16)	14.68	(5.44)	13.80	(4.16)	0.23	0.83
Injected drugs (lifetime)	43		49		56		41		36		0.12	0.20

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Primary drug (lifetime)											0.99	0.72
Alcohol	32		31		26		37.5		33			
Marijuana	34.5		33		33		34		36			
Crack/cocaine	21		21		26		16		20			
Drugs reason for crime last year	58		65		74		53		48		0.05*	0.06
Criminality												
Sex offender	23		18		0		42		28		0.15	0.00***
Age first illegal activity	10.77	(4.01)	11.29	(4.21)	10.88	(3.44)	11.84	(5.08)	10.16	(3.69)	0.10	0.34
Age first incarcerated	19.10	(8.36)	19.63	(7.89)	18.28	(6.77)	21.44	(8.97)	18.48	(8.91)	0.43	0.09
Number of months incarcerated	56.02	(60.70)	57.67	(66.80)	73.37	(77.07)	36.56	(42.45)	54.09	(53.13)	0.74	0.02*
Violent offense last year	50		43		42		44		58		0.08	0.87

†CMR based on a reduced sample: 29 MTC + aftercare, 18 MTC Only, and 37 MH.
††This and all other psychiatric DIS diagnoses are lifetime measures.
†††Serious mental health includes major depression (51% MTC + aftercare, 56% MTC only, and 53% MH), mania (21% MTC + aftercare, 22% MTC only, and 22% MH), and schizophrenia (28% MTC + aftercare, 31% MTC only, and 22% MH).
††††BDI based on a reduced sample: 34 MTC + aftercare, 23 MTC only, and 45 MH.
*$p < 0.05$, **$p < 0.01$, ***$p < 0.001$.

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criminal activity. The study does provide a basis for understanding the effectiveness of the MTC only group, because the study hypothesis and the intent-to-treat analytic plan include both the MTC only and the MTC + aftercare components as the predictive source of the expected outcomes. In other words, it is plausible to attribute differences between the overall MTC group and the MH group to the MTC only *and* the MTC + aftercare elements, since both groups received prison MTC treatment.

The relative contribution of each component to the total difference between the overall MTC group and the MH group can be estimated by comparing the differential incarceration rates between the groups. These comparisons suggest that the MTC only condition makes at least an equal, and perhaps a slightly larger, contribution to the differential effect between the overall MTC and MH groups:

- MTC only contribution = 17% (MH rate 33% − MTC only rate 16%)
- MTC aftercare contribution = 11% (MTC only rate 16% − MTC + aftercare rate 5%).

To increase the statistical power to detect group differences, the study augmented the relatively small MTC only group ($n = 32$) with data from the retrieved MTC + aftercare group ($n = 43$) limited to the equivalent contributory effect (16%) of the MTC only group; the rationale for combining these data was that all offenders in the MTC + aftercare group received at least as much of the prison treatment as the MTC Only group.

The *Other Outcomes* section of Table 2 expands the analysis by reporting the average number of days until reincarceration and days until criminal activity for

Table 2. Outcomes at 12 months post-prison for four treatment groups

	MTC total ($n = 75$)	MTC + aftercare ($n = 43$)	MTC only ($n = 32$)	MH ($n = 64$)	Multivariate† MH (0)		
Main outcomes	%	%	%	%	MTC total odds (p)	MTC + aftercare odds (p)	MTC only odds (p)
Reincarceration	9	5	16	33	0.26 (0.01**)	0.13 (0.02*)	0.42 (0.16)
Criminal activity	47	42	53	67	0.55 (0.13)	0.43 (0.05*)	0.82 (0.70)
Alcohol/drug offense	36	30	44	58	0.51 (0.09)	0.36 (0.03*)	0.87 (0.79)
Other type offense	27	21	34	37.5	0.79 (0.58)	0.53 (0.22)	1.35 (0.58)
Other outcomes	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)			
Number of days until incarceration††	137.57 (98.37)	169.50 (60.10)	124.80 (113.56)	108.43 (87.80)	—	—	—
Number of days until first crime†††	75.34 (83.52)	67.11 (67.99)	84.06 (98.76)	66.19 (85.33)	—	—	—

†Covariates include: baseline score, age, age at first incarceration, employment last year, and number of residences last year. Odds ratio based on MH = 0 and MTC + aftercare = 1. An odds ratio less than one indicates a greater likelihood for activity by the MH group.
††Based on reduced sample of inmates re incarcerated: 2 MTC + aftercare, 5 MTC only, and 21 MH.
†††Based on reduced sample of inmates who committed a crime: 18 MTC + aftercare, 17 MTC only, and 43 MH.
*$p < 0.05$, **$p < 0.01$.

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inmates who reported these activities one year after their release from prison. Log rank tests from the survival curves indicated no statistically significant differences between the groups, which may be a consequence of the limited sample sizes. The pattern for incarceration showed that MH clients were incarcerated earliest (108 days), followed by MTC only (125 days) and MTC + aftercare (170 days).

DISCUSSION

Profiles

Social Dysfunction

The multi-dimensional deficits of MICA offenders shown in Table 1 are similar to those reported by the investigators for homeless MICA samples (Sacks et al., 1998a). These deficits include problems of residential stability, psychiatric symptoms, substance abuse, and impaired functioning, all of which require comprehensive, multi-faceted treatment of relatively long duration. Treatment approaches must address educational, vocational, and other deficiencies, as well as socially dysfunctional behavior. In particular, the MICA offender's long and substantial criminal history indicates that treatment protocols to address his substance abuse and mental health problems must integrate interventions to modify his criminal thinking and behavior.

Mental Disorder Diagnosis

This study documents rates of mental disorder in MICA offenders that compare to those reported for a sample of homeless MICAs in treatment (Sacks et al., 1998a), and that include high rates of Axis I mental disorder diagnosis (Axis I mental illness in 78% of both MICA populations). These profile data confirm that the study is reaching the target population (offenders with co-occurring serious mental and substance use disorders) and verifies their MICA status as established by the Colorado DOC assessment protocol. The study sample also reported lower rates of motivation/readiness than other substance abuse treatment samples, indicating that, as with other MICA populations, treatment interventions must incorporate strategies and activities that encourage offenders to engage in the treatment process.

Main Crime Outcomes

The findings on measures of criminal behavior provide support for the benefits of modified TC treatment for MICA offenders, particularly when prison and aftercare MTC treatment are combined. Compared with the MH group, the overall MTC group showed significantly lower rates of reincarceration (controlling for age, age of first incarceration, employment in last year, and number of residences in the last year), and the MTC + aftercare group showed significantly better outcomes across a variety of crime measures, including rates of both incarceration and criminal

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activity. Differences among the groups on other outcomes revealed a consistent pattern, with the MTC group showing lower rates than the MH group, although these differences did not reach statistical significance.

The direction and magnitude of effects are similar to those of other studies of non-MICA prisoners receiving TC and other treatment for substance abuse. Significant reductions in recidivism (or other crime outcomes) have been obtained; reductions were larger and sustained for longer periods of time when institutional care was integrated with aftercare programs. Examples are TC work-release (Butzin, Martin, & Inciardi, 2002; Inciardi et al., 2002; Martin, Butzin, Saum, & Inciardi, 1999) or other community-based treatment, such as post-prison TC (Griffith, Hiller, Knight, & Simpson, 1999; Hiller, Knight, & Simpson, 1999; Knight, Simpson, Chatham, & Camacho, 1997; Wexler et al., 1999a) or cognitive–behavioral programs (Johnson & Hunter, 1992; Kownacki, 1995; Peters & Hills, 1993; Ross et al., 1988; Ross & Ross, 1995).

The positive findings reported in the literature have encouraged the criminal justice field to link prison treatment to community-based aftercare programs for offenders subsequent to their release (National Institute of Justice, 2003; Pearson & Lipton, 1999); however, such findings have been challenged for their vulnerability to selection bias (National Research Council, 2001). According to the self-selection hypotheses, the studies are flawed as more responsive and motivated clients may be disproportionately electing to enter aftercare programs; the observed effects, therefore, cannot be clearly attributed to treatment as distinct from the clients' desire or motivation for treatment.

Recent studies have contributed empirical findings to inform this debate; for example, Pelissier and colleagues found that admissions to aftercare had higher risk profiles than non-aftercare admissions, making reincarceration more likely without the treatment intervention (Pelissier et al., 1998, 2001). Butzin et al. (2002) analyzed the relative impact of prison, transitional, and aftercare components upon criminal recidivism and relapse to drug use, demonstrating the relative benefit of participation in each component, over and above the effects of differences in demographics and histories of criminal behavior and illicit substance abuse. Wexler and his colleagues (1999a, 1999b) have shown significant reductions in recidivism for prison TC alone at 12 and 24 months (but attenuated at 36 months). The present study contributes to this literature by providing early indications of the effectiveness of MTC treatment for persons with co-occurring disorders, and identifies the contribution of the MTC + aftercare group as well as the likely contribution of the MTC only condition.

Analysis of Threats to Validity

The purpose of this section is first, to examine potential threats to validity using available data from the study, and second, to begin the development of a common methodology and practice for the analysis of outcome data in criminal justice studies with similar design issues.

Empirical tests were performed to illuminate influences causing or contributing to observed differences. Several potential threats to validity were examined following the Cook–Campbell (1979) formulations, including threats from differences in

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those receiving treatment (see *Sample Differences*), differences in the treatment other than those under study (see *Duration of Treatment*), and differences in opportunity for negative outcomes (see *Exposure to Risk*). The issues of confounds (the crossover cases) and retrieval bias are also examined. Threat selection was based on observed differences in the data and known issues in the field, and was designed to obtain a broader understanding of the study findings and limitations. Analyses proceeded one by one (instead of in an integrated, multivariate way) according to the size of the data set and differences indicated by the type of analyses. From a variety of available methods, specific analytic strategies were chosen for their particular relevance to the individual issue at hand.

Sample Differences

Sex Offenders. Leukefeld, Tims, and Farrabee (2002) have cited the special consideration due to COD offenders and to sex offenders. The latter group tends to be under-reported since fear of reprisals from other inmates makes offenders reluctant to admit to sexual crimes. Further disincentives to disclosure come from the implications for post-prison care arising from both restrictions on residency and reluctance of parole boards to release sex offenders to the community (Leukefeld et al., 2002, pp. 135; University of California, San Diego, 1999). This study examines the intersection of the two groups, and uses a subgroup analysis to explore the degree to which sex offenders might have influenced the study findings.

As shown in Table 3, when sex offenders, who are not represented in the MTC + aftercare group, are removed from the analysis, the crime outcomes favoring the MTC + aftercare group persist; if anything, the advantage of the combined prison and aftercare MTC programs is more pronounced when sex offenders are omitted. For example, the odds ratios for comparisons of the MTC + aftercare group and the MH group on incarceration rates was 0.13 ($p < 0.01$) for the full sample

Table 3. Analysis of threats to validity†

	Main finding	Sex offender status	Motivation	Retrieval bias	Time In program
	Non-adjusted score	Analysis of non-sex offenders	Analysis of inmates with motivation equal to or greater than the median	Non-retrieved MH assumed not to be reincarcerated at 12 months post prison	Treatment impact estimated to include 11 months of additional treatment for MH
Main outcomes	Odds (p)	Odds (p)	Odds (p)	Odds (p)	Odds (p)
Reincarcerated	0.13 (0.01**)	0.09 (0.01**)	0.20 (0.002**)	0.21 (0.05*)	0.35 (0.05*)
Criminal activity	0.43 (0.05*)	0.35 (0.02*)	0.18 (0.003**)	—	0.57 (ns)

†Covariates include: baseline score, age, age at first incarceration, employment last year, and number of residences last year. Odds ratio based on MH = 0 and MTC + aftercare = 1. An odds ratio less than one indicates a greater likelihood for activity by the MH group.
Sensitivity analyses for non-sex offenders and inmates with motivation-readiness scores greater than the median were weighted to reflect sample sizes for the full population.
*$p < 0.05$, **$p < 0.01$.

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and 0.09 ($p < 0.01$) for the sub-sample of inmates who were not sex offenders. Specifically, the likelihood of incarceration for the MTC + aftercare group versus the MH group fell from 13% for the full sample to 9% for inmates who were not sex offenders. In view of these results, the disproportionately lower number of sex offenders in the MTC + aftercare group cannot be responsible for the differences between the groups. Subsequently, a separate analysis of sex offenders is planned in this study, and is indicated for other studies, both to determine the relative impact of this subgroup on study findings and to improve treatment effectiveness for these especially difficult and disreputable MICA offenders.

Motivation for Substance Abuse Treatment. Although the finding that motivation did not predict outcome variables is consistent with prior research, the failure of motivation to predict entry into aftercare is not (see, e.g., De Leon et al., 2000; Melnick, De Leon, Thomas, Kressel, & Wexler, 2001). This inconsistency may be attributable to a number of factors, beginning with motivation scores that were generally low, even in relation to community MICA or non-MICA offender TC admissions (Melnick, 1999), and that may, in fact, have been too far below the threshold to influence entry into aftercare. For instance, the MICA offenders who entered the MTC aftercare program may not have perceived their substance use as a primary problem; rather, their choice may have been based on access to mental health treatment or simply having a place to stay. This interpretation is consistent with additional analyses that found higher mean motivation scores for inmates who reported that their involvement with drugs was the main reason for their criminal activity during the year prior to incarceration, as compared with those inmates who attributed their incarceration to other factors (mean scores of 36 and 30, respectively, $p < 0.001$). Finally, the higher motivation scores for the MTC only group as compared with the MTC + aftercare group could not be attributed to the exclusion of sex offenders from aftercare because motivation scores for sex offenders did not differ from those of non-sex offenders (mean score 38 and 32 respectively; $p < 0.14$). Similarly, the proportion of sex offenders and non-sex offenders who cited drug use as the main reason for illegal activity was comparable (55 and 59% respectively; $p < 0.65$).

Duration of Treatment

The groups differed significantly in the amount of time spent in formal treatment. As planned, the duration of treatment for the MTC + aftercare group was considerably longer than that of the other groups; e.g. 11 months of additional treatment as compared with the MH group. Considering both prison and post-prison, on average, formal treatment for offenders in the MTC + aftercare group was 22 months (SD = 12), that for the MTC only group was 15 months (SD = 8), and that for the MH group was 11 months (SD = 9). The two MTC groups did not differ statistically in duration of prison treatment. The analysis examined the role of time in program, which has been positively associated with treatment outcomes (see, e.g., Simpson, Joe, & Brown, 1997; Wexler, Falkin, Lipton, & Rosenblum, 1992) and type of treatment. Time in program was a significant predictor of positive

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change; the longer an offender remained in treatment the greater the improvement reported at 12 months post-prison. Logistic regression identified months in treatment as significant ($p < 0.01$) in predicting both reincarceration and criminal activity at 12 months post-prison. The odds ratio (Neter, Wasserman, & Kutner, 1990) for reincarceration was 0.91; that is, the likelihood of reincarceration was reduced by 91% for each month in treatment. Similarly, the odds ratio for criminal activity was 0.95, meaning that the likelihood of inmates engaging in criminal activity was reduced by 95% for each month in treatment.

The odds ratios resulting from the logistic regressions above were used to assess the reduction in outcomes resulting from additional treatment. If an inmate had two additional months of treatment, the impact of treatment on reincarceration would be 0.91×0.91 or 0.83; in other words, the likelihood of an inmate with two additional months of treatment to be reincarcerated would be reduced by 17%. If an inmate had five months of additional treatment one would expect an odds ratio, or treatment impact, of $(0.91)^5$, or 0.62 (a 38% reduction in the likelihood of reincarceration). These estimated effects for time in program were allocated to the MH group. Since the MTC + aftercare group received 11 more months of treatment than the MH group, one would expect an odds ratio of 0.35 (0.91^{11}, or the odds ratio expected given 11 additional months of treatment, with each month reducing the likelihood of reincarceration by 0.91). As shown in Table 3, the observed odds ratio for the unadjusted data is 0.13, and the expected and observed odds ratios are both statistically significant ($p < 0.05$). However, if time in program, rather than type of treatment, were the prevailing factor, the expected and observed odds ratios would be similar. Since the observed odds ratio is smaller (more significant) than what would be expected if time in program were made equal in the two groups, the treatment effect might be attributed to type of treatment. In other words, time in program does have a large impact on treatment outcomes, but did not account for all of the treatment effects that were found. Similar findings emerged for criminal activity with an expected odds ratio of 0.57 (ns) and an observed odds ratio of 0.43 ($p < 0.05$).

Even after statistically adding 11 months treatment to the MH group, effect sizes remain large and significant between the MTC + aftercare and the MH groups on incarceration. Thus, the significant differences between the groups cannot be attributed to sheer differences between the groups in the amount of treatment, but probably also reflect differences in the type of treatment (that is, to the integration of prison and aftercare MTC treatment).

Exposure to Risk

Figure 1 examines the "exposure-to-risk" issue by means of Kaplan–Meier survival curves among study subjects who reported criminal activity during the follow-up period. Curves for the MTC + aftercare, MTC only, and MH treatment conditions are displayed. The curves are negatively accelerated, wherein the first criminal activity occurs for the majority of recidivists within the first 2 months post-prison, and for almost all recidivists within 6 months. Log rank tests indicated no statistically significant differences between the groups. If the differential exposure to risk were exerting an influence, one would expect the MTC only and MH groups

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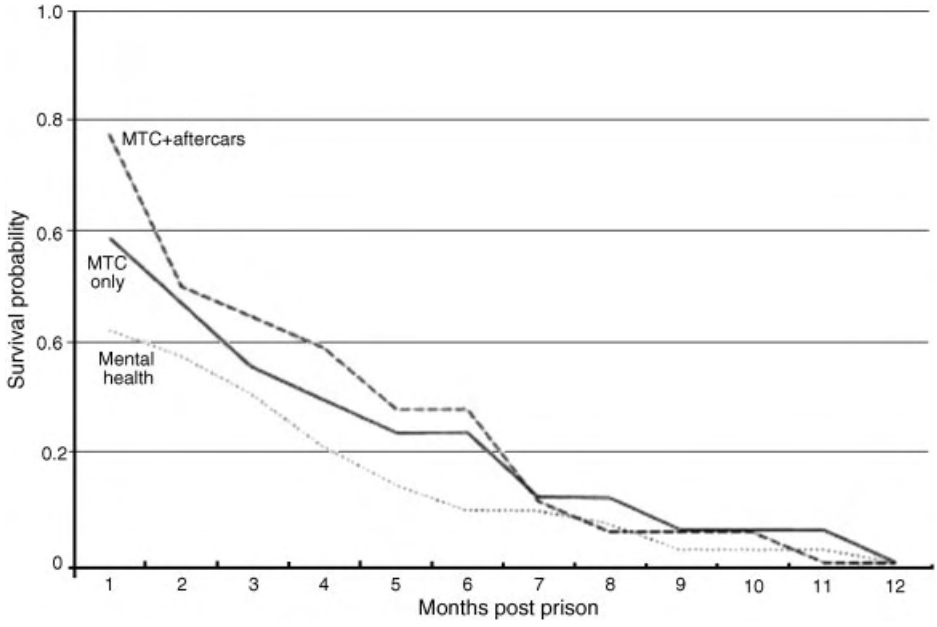

Figure 1. Months unit criminal activity.

to be most similar, since inmates in these groups are considered to be at risk during the post-prison period. A skewed pattern where activities occur later in follow-up for the MTC + aftercare group would also be expected. However, no significant differences between the three treatment groups across the follow-up period were found, and the survival curves of days until criminal activity show activity early and at all points in the 12 month follow-up period for all groups. Further inspection reveals that the survival curves for the MTC + aftercare group and the MTC only group are most similar, indicating that type of treatment had more influence than exposure to risk.

Although the groups do not appear different overall, statistical differences were found in Month 1 ($p < 0.03$). Since the analysis is limited to inmates who engage in criminal activity, the sample size is small, which may limit the power to detect differences between the groups. Nonetheless, the investigators find little reason to conclude that the observed differences between the groups were based on differential exposure to risk. The extent of possible contribution could be assessed in future studies by the construction and use of an "exposure-to-risk scale," which would be related to treatment outcome. Longer-term follow-up is also indicated (e.g. 3 years post prison discharge), as has been used in other studies (Knight et al., 1999; Martin et al., 1999; Wexler et al., 1999b), to examine the contribution of exposure to risk.

Confounds and Retrieval Bias

Confounds (Crossovers). A number of study participants moved from one study condition to the other (in all but one case, the transfer was from the MTC to the MH

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condition). The usual reason for the crossover was that the MTC program had been completed well before the inmate was due for release; at times, an inmate would request that he be moved to the other program and, on occasion, non-compliance prompted the switch. The analytic approach meets formal intent-to-treat standards when the crossover cases are included, and findings for regression analyses that included crossovers did not differ from those presented above (which excluded the crossover cases). Compared with the MH group, all inmates randomized into the MTC groups showed significantly lower rates of reincarceration, while those in the MTC + aftercare group showed significantly better outcomes across a variety of crime measures (incarceration and criminal activity, especially alcohol and drug related offenses).

Retrieval Bias. ''Data imputation'' refers to a broad class of acceptable techniques that replace missing data (Neter et al., 1990). One of these techniques replaces missing data for cases not retrieved at 12 months post-prison with values that will most likely discount the study hypothesis, thereby creating extreme contamination of the data; significant differences that persist in spite of such contamination are validated. This technique was used to examine the possible effects of bias resulting from the lower retrieval rate for the MH group as compared with the MTC + aftercare group (64/93 or 69% versus 43/46 or 94%). Assuming that the 29 inmates from the MH group who were not retrieved had not been reincarcerated (in order to bias against the hypothesis), the rate of reincarceration would drop from 33 to 23% (compared with 9% of the MTC + aftercare group). As shown in Table 3, the odds ratio resulting from logistic regression including the ''contaminated'' data remains significant ($p < 0.05$), indicating that the MTC + aftercare group did better than the MH group even with extreme contamination.

Other Study Limitations

Although this report was strictly structured to address crime-related outcomes, the outcome of most interest to policymakers in the criminal justice system, it would be advantageous to know a broader range of outcomes, including alcohol and drug use and mental health functioning. The investigators will report these analyses in future papers, using the data set from this study.

Other Treatment

Data were collected on a ''convenience sample'' of 165 MICA inmates to evaluate standardized services for MICA offenders in Colorado, and to provide information for additional observational comparisons. This group received typical services (psychiatric medication, mental counseling, and substance abuse education counseling) as needed. The group was selected using matching criteria, which included their level of security and substance abuse treatment needs (based on a Colorado DOC classification system), age, and ethnicity; level of psychiatric severity, a

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criterion for entry into the study experimental conditions, could not be matched. The results indicated that the rates for reincarceration and criminal activity for this Standard Services group (SS) were nearly identical with the rates of the MH group, and consequently higher than either the MTC only or MTC + aftercare groups (data not shown). A consistent pattern of greater improvement, however, did emerge for the MH group (which was more severely impaired psychiatrically) compared with the SS group. Other aftercare strategies for MICA offenders receiving mental health and standard services in prison need to be developed and tested, such as *Assertive Community Treatment* and *Intensive Case Management* (Drake et al., 1998a; Drake, Mercer-McFadden, Meuser, McHugo, & Bond, 1998b; Meisler, Blankertz, Santos, & McKay, 1997; Meuser, Bond, Drake, & Resnick, 1998; Stein & Santos, 1998; Wingerson & Ries, 1999).

Implications for policy and planning

The Need for Integrated Prison-Plus-Aftercare Treatment

The modified TC for MICAs is one approach that has been well articulated and that has documented effectiveness in other studies of MICA clients in the community (De Leon et al., 1999, 2000; Sacks, 2000; Sacks, Sacks, De Leon, Bernhardt, & Staines, 1997b; Sacks et al., 1997a, 1998a, 1998b, 1999, 2003a); the findings from this study support the extension and modification of this approach for MICA offenders. This study provides initial evidence that combining prison and aftercare modified TC treatment improves crime outcomes, which confirms the benefits that accrue from such integrated programs. These results should encourage criminal justice program developers and policy makers to consider developing modified TC aftercare programs in conjunction with prison modified TC treatment.

The Need for Treatment of Long Duration

The study reported in this paper is consistent with others in the literature that point to the need for relatively long treatment duration. For example, in a series of studies on homeless MICA individuals, Sacks and colleagues demonstrated that residential modified TCs of 12 months duration produced significantly greater positive outcomes for substance use and employment than treatment as customarily provided (De Leon et al., 2000). Preliminary evidence shows that TC-oriented supported housing of six months duration stabilizes the gains from the residential program (Sacks et al., 2003a). In a review of mental health center based research, Drake and colleagues (1998b) concluded that comprehensive, integrated treatment, ''especially when delivered for 18 months or longer, resulted in significant reductions of substance abuse and, in some cases, in substantial rates of remission, as well as reductions in hospital use and/or improvements in other outcomes'' (Drake et al., 1998b, p. 601). Previously cited evidence concluded that programs for offenders with substance abuse histories should involve relatively long treatment durations and provide continuous prison and post-prison components. The optimum overall length of treatment and length of the specific components remains to be examined.

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The Costs of Treatment

Of considerable interest to program and policy planners is the economic analysis of program costs and economic benefits. The daily per inmate cost of the modified TC program (*Personal Reflections*) for MICA offenders at the San Carlos Correctional Facility is $155.56, which consists of $148.19 cost for incarceration, and $7.37 for MTC treatment; this translates to an incremental treatment cost of 4.97% of the total cost of incarceration. Of note, the costs of the MICA services are actually somewhat lower than the incremental (or additional) cost of delivering MICA-related services in the general prison population (Sacks et al., 2003b, unpublished manuscript). In the previous study of homeless MICA clients, modified TC treatment produced $6 in benefit for every dollar spent (French et al., 2002), while the cost of modified TC treatment was no more than that of less effective treatment delivered through customarily available services (French et al., 1999; McGeary et al., 2000).

SUMMARY

The present study provides early indications of the effectiveness of a modified TC program, especially when combined with an aftercare modified TC program, in reducing criminal outcomes. Differences between the MTC + aftercare and comparison groups across a variety of crime outcomes (i.e. incarceration, any criminal activity, and alcohol or drug related criminal activity) are consistent and significant. These differences persist after an examination of threats to validity that considered sex-offender status, initial motivation, duration of treatment, exposure to risk, and retrieval bias. Nevertheless, caution is urged in the interpretation of these findings since the study did not measure or control potential bias in selection on entry into the aftercare program (especially motivation); it is quite possible that the most motivated clients advanced into aftercare (though, if true, then the TC only condition would have a corresponding conservative bias). Despite this caveat, the findings of this study are encouraging and consonant with many other studies of integrated prison and aftercare TC treatment for homeless MICAs in community based programs and for substance abusing non-MICA offenders. In fact, this study provides some support for the effectiveness of the prison MTC only condition. Given the available evidence and the need for effective programming for MICA offenders, program and policy makers should strongly consider developing integrated prison and aftercare modified TC programs for MICA offenders. The investigators will report other related outcomes, including alcohol and drug use and mental health functioning, in future papers.

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05

Randomized trial of a Re-entry Modified Therapeutic Community for offenders with co-occurring disorders: Crime outcomes

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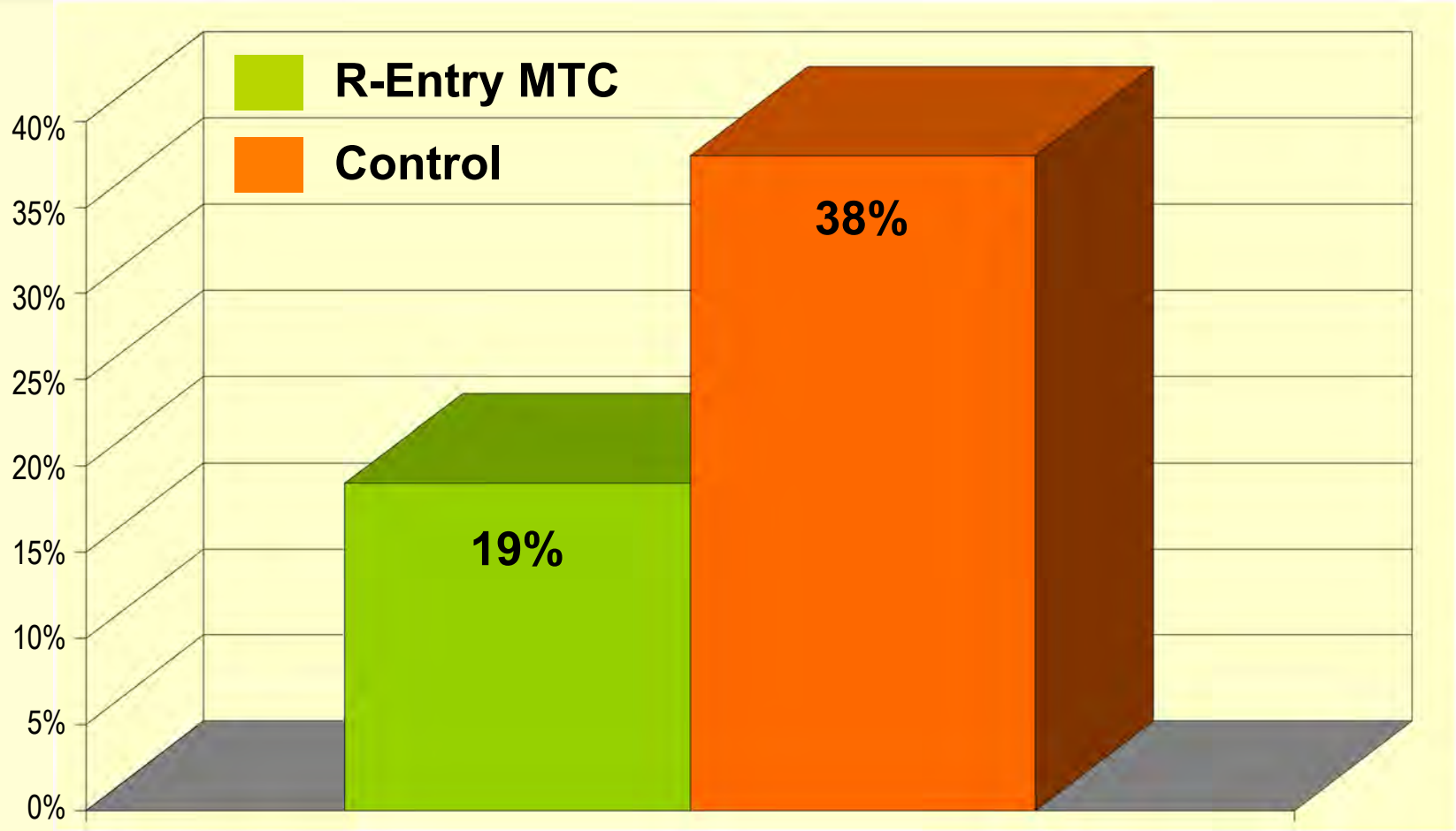
Illustration: "Reincarceration Re-Entry MTC vs Control at 12-months post prison release"

05. Randomized trial of a Re-entry Modified Therapeutic Community for offenders with co-occurring disorders: Crime outcomes

Abstract

This article describes a randomized study to determine the effectiveness of a Re-entry Modified Therapeutic Community (RMTC) for offenders with co-occurring substance use and mental disorders (“co-occurring disorders” or “COD”). Men with COD, approved for Community Corrections placement post-release, were recruited from 9 Colorado prisons, and stratified according to the type of treatment received while incarcerated (i.e., a prison MTC program or standard care). When released, each offender was randomly assigned either to the Experimental (E) RMTC condition (n=71) or to the Control (C) Parole Supervision and Case Management condition (PSCM; n=56). An intent-to-treat analysis 12 months post-prison release showed that the E-RMTC participants were significantly less likely to be reincarcerated (19% vs. 38%), with the greatest reduction in recidivism found for participants who received MTC treatment in both settings. These findings support the RMTC as a stand-alone intervention, and provide initial evidence for integrated MTC programs in prison and in aftercare for offenders with COD.

Re-Entry Modified TC in Community Corrections: Reincarcerated at 12 months Post-Prison Release



n=122; p<0.043*

Reincarcerated (all offenses)

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Randomized trial of a reentry modified therapeutic community for offenders with co-occurring disorders: Crime outcomes

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Abstract

This article describes a randomized study to determine the effectiveness of a reentry modified therapeutic community (RMTC) for offenders with co-occurring substance use and mental disorders (co-occurring disorders or COD). Men with COD, approved for community corrections placement postrelease, were recruited from nine Colorado prisons and stratified according to the type of treatment received while incarcerated (i.e., a prison modified therapeutic community [MTC] program or standard care). When released, each offender was randomly assigned either to the experimental RMTC (E-RMTC) condition (n = 71) or to the control parole supervision and case management (PSCM) condition (n = 56). An intent-to-treat analysis 12 months postprison release showed that the E-RMTC participants were significantly less likely to be reincarcerated (19% vs. 38%), with the greatest reduction in recidivism found for participants who received MTC treatment in both settings. These findings support the RMTC as a stand-alone intervention and provide initial evidence for integrated MTC programs in prison and in aftercare for offenders with COD. © 2012 Elsevier Inc. All rights reserved.

Keywords: Modified therapeutic community; Co-occurring disorders; Mental health disorder; Substance use disorder; Community corrections; Offenders

1. Introduction

1.1. Co-occurring disorders

In 2006, 5.6 million adults (2.5%) met *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition* (*DSM-IV*) criteria for a co-occurring mental health problem and substance use diagnosis (Substance Abuse and Mental Health Services Administration [SAMHSA], 2007). The prevalence of co-occurring mental health and drug disorders is much higher in the offender population, where 42% of inmates in State prisons and 49% in local jails are dually diagnosed (James & Glaze, 2006). Studies have shown that psychiatric disorders are common (50%–75%) among offenders participating in substance abuse treatment (Lurigio & Swartz, 2000; Swartz, 2006). Sacks et al. (2007a, 2007b) found that 80% of State prison inmates entering substance abuse treatment had some form of mental health disorder, 39% of which were considered to be severe.

Offenders with co-occurring mental health and substance use disorders (co-occurring disorders or COD) pose a serious problem for criminal justice and, in recent years, have received increased attention from prison administrators and treatment professionals. Because many of these offenders lack the skills needed to make a successful transition from prison to the community, their eventual release from custody will create a demand for postprison reentry strategies. An inmate with COD who is paroled or discharged to the

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community must not only obtain housing, employment, and basic health care but also identify, access, and coordinate mental health and substance abuse services (Wexler & Sullivan, 2002). Although discharge planning is one of the most needed services, it is infrequently available in criminal justice settings (Osher, Steadman, & Barr, 2003). Deficiencies in discharge planning include weak linkages to treatment services (Maden, Rutter, McClintock, Friendship, & Gunn, 1999; Teplin, Abram, & McClelland, 1997). Moreover, aftercare services for offenders returning to the community are typically inadequate (Earthrowl, O'Grady, & Birmingham, 2003; Smith, Baxter, & Humphreys, 2003).

1.2. Therapeutic community research

In the 1960s, the therapeutic community (TC) for substance abuse emerged in the United States as a self-help alternative to conventional treatments. The core principles and methods of the TC include the following: a focus on the "whole person," providing a highly structured daily regimen; fostering personal responsibility and self-help in managing life difficulties; using peers as role models and guides with the peer community acting as the healing agent within a strategy of "community-as-method" (the community provides both the context for and mechanism of change); regarding change as a gradual, developmental process and moving clients through progressive treatment stages; stressing work and self-reliance through the development of vocational and independent living skills; and promoting prosocial values within healthy social networks to sustain recovery (see *The Therapeutic Community: Theory, Model & Method* of De Leon, 2000).

The community-based residential TC has an established record of success in reducing drug use and criminality while increasing employment (e.g., De Leon, 1984; Hubbard, Rachal, Craddock, & Cavanaugh, 1984; Simpson & Sells 1982). The prison TC, a comprehensive substance abuse treatment program adapted to the requirements of correctional settings, has demonstrated significantly greater reductions in recidivism to drugs and to crime as compared with a control group (Hser, Anglin, & Powers, 1993; Wexler, Falkin, & Lipton, 1990). Lipton et al. (2003) conducted a meta-analysis of 15 evaluation research studies of therapeutic communities in correctional settings in which recidivism was the outcome variable. They used a correlation effect size in their meta-analysis and found that the weighted average effect was approximately $r = .12$. This corresponds to a Cohen's d effect size of 0.24, and the 95% confidence interval excluded the "no effect" point. The authors concluded that their results showed significant positive effects at reducing recidivism. Furthermore, larger reductions in recidivism, sustained for longer periods, have been found when a prison TC was integrated with TC aftercare programs, exemplified by TC work release (Inciardi, Surratt, Martin, & Hooper, 2002) and postprison community-based TC (Knight, Simpson, Chatham, & Camacho, 1997; Wexler, De Leon, Thomas, Kressel, & Peters, 1999; Wexler, Melnick, Lowe, & Peters, 1999).

1.3. Modified therapeutic communities

The demonstrated improvement in psychological well-being during standard TC treatment (De Leon & Jainchill, 1981; De Leon, Wexler, & Jainchill, 1982; Jainchill & De Leon, 1992) and subsequent to TC treatment (Biase, Sullivan, & Wheeler, 1986) constituted the basis for modifying the TC to respond to the concerns of individuals with co-occurring mental disorders (Sacks, Sacks, & De Leon, 1999).

Sacks and colleagues first modified the TC conceptual framework and treatment components to meet the needs of *homeless individuals* with COD (Sacks, De Leon, Bernhard, & Sacks, 1997a, 1998; Sacks, Sacks, De Leon, Bernhard, & Staines, 1997b; Sacks et al., 1999). The modified TC model retains—but reshapes—most of the central elements, structure, and processes of the traditional TC, so as to accommodate the many needs that accompany COD, particularly psychiatric symptoms, cognitive impairments, and level of functioning. The modified TC for COD alters interventions and activities to produce more flexibility, less intensity, and more individualization. Specifically, the modified TC is more adaptable and responsive to developmental needs, with reduced time spent in any given activity, less confrontation, increased emphasis on orientation and instruction, fewer sanctions, more explicit affirmation for achievements, and increased sensitivity to individual differences, all of which maximizes opportunities for social learning. Still, the modified TC, like all TC programs, encourages a culture wherein self-help advances learning and promotes change, both in oneself and in others. In a series of studies, the investigators found that the modified therapeutic community (MTC) produced significantly more positive outcomes for drug use and employment compared with treatment as customarily provided (De Leon, Sacks, Staines, & McKendrick, 1999; 2000) and was more cost-effective (French, McCollister, Sacks, McKendrick, & De Leon, 2002; French, Sacks, De Leon, Staines, & McKendrick, 1999; McGeary, French, Sacks, McKendrick, & De Leon, 2000).

In subsequent work, Sacks, Sacks, and Stommel (2003) continued their study and adaptation of the MTC to be suitable for *offenders* with co-occurring mental and substance use disorders. The additional alterations incorporated a cognitive–behavioral curriculum that emphasized criminal thinking and behavior, along with psycho-educational classes to foster recognition and understanding of the interrelationship of substance use, mental illness, and criminality (triple recovery). These specific components, in conjunction with the overall TC focus on whole person change, along with the promotion of prosocial values within healthy social networks, were the basis for the expectation that criminal behavior would be reduced.

The study of this adaptation of the MTC randomly assigned male inmates with COD either to the MTC program (the experimental condition) or to a mental health (MH) treatment program (the standard treatment control condition) in prison. Upon their release, inmates who completed the prison MTC program could enter the MTC aftercare program. Results showed that inmates randomized into the MTC group had significantly lower rates of reincarceration compared with those in the MH group. The reincarceration rates were as follows: MH only = 33%, MTC-prison only = 17%, and MTC-prison + MTC aftercare = 5% (Sacks, Sacks, McKendrick, Banks, & Stommel, 2004).

1.4. Objective

The study described in this article extended the previous work by focusing on reentry treatment and by making use of a randomized design to examine the success of MTC treatment as a reentry strategy.[1] The study tests the hypothesis that the reentry MTC (RMTC) program will significantly reduce rates of recidivism when compared with the parole supervision case management (PSCM) approach that is currently being used for offenders returning to the community on their release from prison.

2. Materials and methods

2.1. Trial design

The study recruited subjects with COD who had been approved for (and had accepted) placement in a community corrections facility on their release from one of nine Colorado prisons. This was an open-label trial (i.e., the two conditions were known to both participants and researchers, and each participant knew to which treatment he had been assigned) with a stratified random assignment design. That is, prior to randomization, subjects were stratified according to the type of treatment they received during incarceration (i.e., a prison MTC program with integrated MH and substance abuse services, or standard prison services, which included substance abuse and MH services). When released from prison, subjects were then individually assigned (using a list of random numbers) in equal proportions to the experimental condition, RMTC (E-RMTC), or to the control condition, PSCM (C-PSCM). The two study conditions were housed in separate facilities, each of which offered a defined number of treatment slots to study participants. Specifically, the facility housing the E-RMTC group had 40 treatment slots available, whereas the facility housing the C-PSCM group had only 20 available slots. To adapt to these differences in capacity, the random assignment ratio was altered from 50:50 to 60:40 (experimental/control) shortly after the study began.

This article focuses on crime outcomes at 12 months postentry into the study. It was hypothesized that the E-RMTC condition (compared with the C-PSCM condition) would show significantly less new criminality (self-report and reincarceration records). Official records of reincarceration were obtained from the Colorado Department of Corrections (CO-DOC) online database for inclusion in analyses.

2.2. Participants

Male offenders were eligible for the study, provided they (a) had been diagnosed with co-occurring mental and substance use disorders; (b) participated in one of two prison substance abuse treatment programs within the CO-DOC (both completers and noncompleters), either an MTC or standard services (substance abuse education and counseling); (c) were approved by the Community Correction Board for placement in a community corrections facility; and (d) were accepted by the provider agency for placement in a community corrections facility. *COD*, as the term is applied in the CO-DOC, consisted of the following *DSM-IV* diagnostic categories for mental disorders: bipolar mood disorders, major depressive disorder, depressive disorders not otherwise specified, dysthymia, paranoid/delusional disorders, schizophrenic disorders, schizophreniform disorder, schizoaffective disorder, psychotic disorder not otherwise specified, substance induced psychotic disorder, brief reactive psychosis, dissociative identity disorder (multiple personality), cluster A personality disorders (schizoid, schizotypal, and paranoid), and posttraumatic stress disorder. The CO-DOC staff determined the offender's diagnostic status using a clinical evaluation for mental disorders (interview with a MH professional and record review for previous diagnosis and history of psychiatric hospitalization and medication).

Substance abuse disorder and level of criminality were determined using the CO-DOC *Standardized Offender Assessment* (CO-DOC, 2004), which was administered at the Denver Reception and Diagnostic Center on prison entry. Eligibility for substance abuse and MH services was determined using a combination of past treatment records, diagnosis, the score from the Brief Psychiatric Rating Scale (Ventura, Green, Shaner, & Liberman, 1993), and the judgment of an MH professional.

The sample, recruited from nine CO-DOC prison facilities as subjects prepared for release to community corrections, was stratified according to the type of treatment received during their incarceration (i.e., prison MTC treatment or standard prison substance abuse and MH

[1] Women were not included in this study because it was intended as a follow-up to the prior study of prison MTC treatment (described in the preceding paragraph), which included only male offenders with co-occurring disorders to ensure adequate power for the study aims (Sacks et al., 2003; 2004). A separate study, conducted about the same time, examined prison TC treatment for female offenders with substance use disorders, most of whom also had mental disorders (Sacks et al., 2008; Sacks et al., 2009). Furthermore, had women been included in this study, power would have been insufficient to detect Gender × Treatment interaction effects and gender-specific estimates of treatment efficacy.

services). Each study subject completed an informed consent protocol, wherein the candidate, together with a researcher, read and reviewed descriptive material about the study. On ensuring that the participant understood the study and his role as a study subject, the researcher obtained the subject's signature on a consent form to affirm that his participation in the study was voluntary. Prior to commencing study activities, approval was received from the Institutional Review Board (IRB) of the applicant agency (National Development & Research Institutes, Inc. [NDRI]); subsequent reviews were conducted annually throughout the term of the study. A detailed Data & Safety Monitoring Plan was completed for the project, approved by the National Institute on Drug Abuse (NIDA) project officer and the NDRI IRB, and a Data & Safety Monitoring Board (DSMB) as constituted; the DSMB met annually throughout the term of the study.

2.3. Treatment conditions

Background. The Division of Adult Parole and Community Corrections supervised placement in separate community corrections facilities for all study participants. Through their community parole officers, participants in both study conditions, E-RMTC and C-PSCM, received medication monitoring, treatment services and case assistance, coordination with the legal system, and linkage to recovery self-help (Alcoholics Anonymous/Narcotics Anonymous), in addition to the treatment services described below. Parole officers remanded noncompliant participants into custody, regardless of their study treatment condition. Whereas members of the investigative team were involved in developing, implementing, and refining the RMTC program, research staff was not involved with delivery of the interventions in either treatment condition; the contact between research staff members and study participants was strictly limited to the administration of informed consent and interview protocols.

2.3.1. Experimental RMTC

The program was structured so that residents attended formal program activities from 3 to 7 days per week for 3 to 5 hours each day during a planned 6-month tenure. Residents progressed through program stages, gradually earning greater independence as they demonstrated greater responsibility. Upper-level residents (those with at least 4 months in the program) shepherded new members into the program and provided counsel, guidance, and coaching. As residents progressed, they spent more time working in the community and saving money for independent living (a requirement of community corrections).

Similar to all TC programs, the E-RMTC sought to develop a subculture where clients learned through self-help and affiliation with the recovery community to foster change in themselves and others. New components were added to meet the needs of offenders with COD: to address criminal thinking and behavior; to recognize and respond to the interrelationship of substance abuse, mental illness, and criminality (triple recovery); and to use strategies for symptom management. Weekly group psycho-educational classes were added to address the interrelationship between mental disorders and substance abuse. Program staff guided other weekly group and individual counseling in relapse prevention/triple recovery, symptom self-management, emotional and behavioral coping, and basic skills training (e.g., budgeting, use of community resources). The group intervention format predominated, but each participant received individual counseling and case assistance from counseling staff at least weekly, or more frequently, if needed. Daily medication monitoring and weekly psychiatric services were provided on-site, and MH counseling was available through affiliation with a local MH center—these services provided the continuity of care essential to the success of an individual with COD. The reentry program also assisted with housing placement and encouraged employment or volunteer work, so that each resident maximized independent functioning.

2.3.2. Control PSCM

In general, parole supervision (PS) and case management (CM) are the standard services provided to Colorado offenders who are making the transition from prison to the community. The C-PSCM approach, with its focus on counseling and support, although meeting State standards, was neither as intense nor as comprehensive as the E-RMTC program. Parolees in the control condition were released to a community corrections facility where they lived during this transitional period. These individuals would leave the facility during the day to go to work, participate in treatment, and report to their parole officers. C-PSCM services were provided through a network of community-based treatment facilities throughout Colorado. The intervention consisted primarily of designated CM services, including outreach and engagement activities, brokering community-based services, and direct provision of some support and counseling services. That is, the clinical supervisor conducted a weekly on-site group in relapse prevention, and case managers provided daily medication monitoring; whereas community MH clinics supplied psychiatric and MH counseling services, with local substance abuse treatment agencies delivering individual and group substance abuse services. In cooperation with the assigned community parole officer[s], the designated case manager assisted participants in selecting community-based substance abuse and MH services, then facilitated access to these services and monitored their progress. During their planned 6-month tenure, the average resident attended on-site group relapse prevention counseling once per week, off-site individual and/or group substance abuse counseling weekly at a community-based treatment program, psychiatric assessment monthly at a community clinic, and community-based MH counseling at a frequency that the

MH clinic prescribed. Unlike the RMTC, criminal thinking and behavior were not specifically addressed.

2.4. Outcome measures

The primary outcome of interest for this study was reincarceration. To determine more broadly the treatment effectiveness as related to criminality, this article presents results for three additional variables crucial for assessing criminal activity in a corrections sample: self-reported criminal activity, number of days until reincarceration, and number of days until criminal activity. All measures refer to status or activity during the first 12 months after prison release. Measures of reincarceration were restricted to new offenses obtained from official DOC records. Parole and technical violations were not included because these types of violations occur much more frequently and would inflate the incidence of recidivism when, in fact, most do not result in a conviction or incarceration. Measures for criminal activity were collected using the CIRP Interview Protocol, which collected self-reported information on 21 different illegal activities. The Interview Protocol includes standardized instruments such as the Center for Therapeutic Community Research (CTCR) Baseline Interview (CTCR, 1992; Sacks, 1997; Sacks, Sacks, Harle, & De Leon, 1999); the Beck Depression Inventory, Second Edition (BDI-II; Beck, Steer, & Brown, 1996); the PSTD [Posttraumatic Stress Disorder] Symptom Scale—Interview version (PSS-I; Foa, Riggs, Dancu, & Rothbaum, 1993; Foa & Tolin, 2000); and the Brief Symptom Inventory (Derogatis, 1993).

Outcomes derived from official CO-DOC data were available for the complete sample (N = 127), whereas self-reported outcomes were based on retrieval of subjects at the 12-month follow-up interviews. Overall, data collection was completed at 12 months for 87% (110/127) of the sample, 89% (63/71) for E-RMTC, and 84% (47/56) for C-PSCM. Retrieval bias between the two treatment groups was not apparent.

2.5. Analytic plan

Inmates randomized into the E-RMTC and C-PSCM conditions were compared at 12 months postprison release on measures of reincarceration and criminal activity. The major aim of the study was to test the hypothesis that the E-RMTC condition would have significantly less new criminality compared with the C-PSCM condition. Offenders in the two treatment conditions were compared on a list of covariates, specified in advance, to achieve a better understanding of the population and to detect any baseline differences between groups (see Table 1). Chi-square tests were used to compare groups on categorical variables (e.g., employment), and independent samples t tests were used for continuous variables (e.g., age). Measures indicating significant differences between the two groups were included as covariates in subsequent analyses (i.e., high school diploma/general equivalency diploma [GED], number of arrests, IV drug use). Ethnicity was also included as a covariate due to its historical use for assessing similar populations. Treatment type during prison was included to examine potential group differences depending on the treatment that had been received during their incarceration.

Logistic regression was used to compare rates of reincarceration and, separately, criminal activity for the two study conditions. The control condition (PSCM) was scored as the reference group. Each logistic regression model predicted the 12-month postprison outcome (dependent variable) using treatment condition (independent variable) and five covariates (ethnicity, high school diploma/GED, number of arrests, IV drug use, and treatment during prison). An additional covariate, "criminal activity in the 12 months prior to involvement with the criminal justice system," was included in the comparison of criminal activity postprison release. Cox regression was used to compare groups on the occurrence and timing of reincarceration and criminal activity during the 12-month postrelease period and included the same covariates as the logistic regression models.

The same statistical approach used to examine the effect of RMTC on crime outcomes was repeated to explore the effect of prior prison MTC treatment on crime outcomes. For this analysis, participation in the prison MTC was included in the statistical models as the independent variable, and treatment type upon release (i.e., RMTC or PSCM) was included as a control along with high school diploma/GED, number of arrests, IV drug use, and ethnicity. For this secondary analysis, it should be noted that study participants were only recruited from, but not randomized into, the prison treatment condition (MTC or standard substance abuse and MH services).

3. Results

3.1. Profiles

3.1.1. Overall

Table 1 presents profile information (demographic and background characteristics) to describe inmates paroled to CO-DOC Community Corrections. Most of the inmates who participated in the study were Caucasian (56%) with a high school diploma or GED (88%) and in their late 30s (M = 38.2, SD = 9.9). More than half had been employed in the 6 months prior to incarceration (55%); the same proportion had been homeless in their lifetime (55%). Almost half of the inmates (46%) had never been married. Nearly two thirds (63%) of the inmates in the sample had lived with someone other than their parent or guardian. Inmates also reported high rates of parental substance abuse (75%), parental MH problems (46%), and parental incarceration (42%).

Measures of current psychological symptomatology indicated a clinical level of psychological distress (BDI-II Global Severity Index [GSI], M = 61.8, SD = 13.3), mild to moderate depressive symptoms (BDI-II, M = 15.0, SD = 10.3), and mild

Table 1
Demographic and other background characteristics

Domain/measure	E-RMTC(n = 71)	C-PSCM (n = 56)	Total (n = 127)	χ^2/t test, p
Demographics				
Age	39.5 (9.5)	36.5 (10.2)	38.2 (9.9)	.083
Race/ethnicity				.780
Black	13	7	10	
White	55	57	56	
Hispanic	17	18	17	
Other/mixed	15	18	17	
High school diploma/GED	82	96	88	.011 *
L6 employment	54	57	55	.684
Never married	38	55	46	.052
LT homeless	55	55	55	.962
Family/background				
Ever live with nonparent	59	68	63	.313
Parental substance abuse	78	73	75	.540
Parental mental problem	47	46	46	.851
Parent in prison/jail	42	41	42	.893
MH				
GSI	61.7 (13.7)	61.8 (12.9)	61.8 (13.3)	.967
BDI	14.2 (10.2)	16.0 (10.4)	15.0 (10.3)	.324
PSS	12.8 (11.1)	14.4 (12.5)	13.5 (11.7)	.440
LT MH treatment	80	77	79	.633
LT inpatient treatment	40	40	40	1.000
LT prescribed medication	97	93	95	.254
Trauma				
LT community trauma	100	98	99	.258
LT physical trauma/abuse	99	98	98	.865
LT sexual trauma/abuse	35	27	32	.310
Before age 14 years	89	86	87	.611
L6 any trauma/abuse	78	82	80	.517
Substance use				
Age first drug use	13.7 (4.6)	14.0 (4.0)	13.8 (4.4)	.693
LT crack/cocaine	87	82	85	.416
LT opiates	48	54	50	.525
LT methamphetamines/amphetamines	69	68	69	.889
Criminality				
Age first illegal activity	9.8 (3.9)	10.8 (3.3)	10.2 (3.6)	.123
Age first arrest	16.2 (5.5)	18.2 (8.4)	17.1 (7.0)	.099
LT no. of arrests	20.3 (16.9)	13.1 (12.8)	17.(15.9)	.017 *
LT property offense	99	94	96	.099
LT violent offense	78	64	72	.102
LT weapon offense	59	46	54	.153
LT sex offense	13	5	9	.162
HIV risk				
L6 intravenous drug use	37	18	28	.020 *
L6 no. of sex partners	4.3 (15.0)	4.0 (7.4)	4.2 (12.2)	.919

Note. Values are expressed as percentage or mean (standard deviation). LT = lifetime; L6 = last 6 months prior to involvement with the criminal justice system.
* $p < .05$.

to moderate posttraumatic stress symptoms (PSS-I, M = 13.5, SD = 11.7). Most inmates had received MH treatment (79%) and/or had been prescribed psychopharmacological medication (95%). Forty percent had received inpatient MH treatment. Almost one third (32%) of the respondents had experienced sexual trauma/abuse in their life.

Profiles demonstrate an early onset for both drug use (M = 13.8 years, SD = 4.4) and criminal activity (M = 10.2 years, SD = 3.6). Most of the inmates reported lifetime use of cocaine (85%) or methamphetamines/amphetamines (69%), and half (50%) reported use of opiates. Not surprising for this population, all inmates had committed a drug-related offense, and most had committed a variety of property and violent offenses.

The sample indicated high risk for HIV/AIDS. More than a quarter (28%) of inmates reported intravenous drug use in the 6 months prior to incarceration. The average number of sex partners reported in the same period was 4.2 (SD = 12.2).

3.1.2. Group comparisons

Inmates in both groups were similar on most demographic and other characteristics. Significant differences emerged on only three measures in Table 1. Inmates assigned to E-RMTC were less likely to have a high school

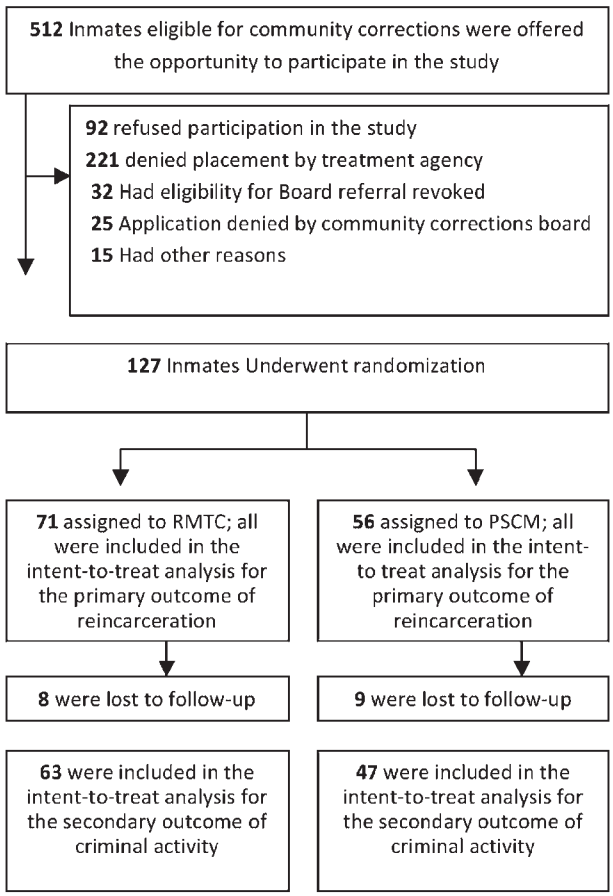

Fig. 1. Study participant flowchart.

diploma or GED, reported more lifetime arrests, and were more likely to inject drugs in the 6 months prior to incarceration. These measures were included as covariates in subsequent analyses.

3.2. Crime outcomes at 12 months postprison release

As indicated in Fig. 1 below, 512 inmates deemed to be eligible for community corrections placement were offered the opportunity to participate in the study. Ninety-two inmates refused participation; 221 were denied placement in a community-based drug treatment facility, which is prerequisite to submit an application to the Community Corrections Board; 32 had their eligibility revoked subsequent to study consent (e.g., due to noncompliance); 25 had their application denied by the Community Corrections Board; and 15 were not placed for other reasons. Ultimately, 127 of these inmates were randomly assigned to two treatment conditions upon release: the E-RMTC program (n = 71) or the C-PSCM condition (n = 56).

As part of an intent-to-treat analysis, data are available on the primary outcome—reincarceration—for all 127 inmates who were randomly assigned into the study. With respect to the self-reported secondary outcomes—criminal activity and days until criminal activity—17 subjects were lost to follow-up (8 from the E-RMTC for a retrieved sample of 63, and 9 from the C-PSCM for a retrieved sample of 47).

3.2.1. Primary hypothesis: The effect of RMTC aftercare treatment

Table 2 examines the comparative effectiveness of participation in an RMTC program on the study's primary outcome, reincarceration, as well as its effect on three secondary crime outcomes, including the number of days until reincarceration, involvement in self-reported criminal activity, and number of days until self-reported criminal activity. With regard to the study's primary outcome, results from an intent-to-treat analysis indicated that the rate of reincarceration for the E-RMTC group was about half that found for the C-PSCM group (19% vs. 38%; $p < .05$) in the year after release (controlling for ethnicity, high school diploma/GED, number of lifetime arrests, IV drug use during 6 months prior to incarceration, and type of treatment received while incarcerated).

With regard to the study's secondary outcomes, the Cox regression analysis showed that the E-RMTC condition reduced the hazard of reincarceration relative to the C-PSCM group (hazard ratio [HR] = 0.492; $p < .05$), indicating that, over time, those in the E-RMTC were less likely to be reincarcerated than those in the C-PSCM group ($p < .05$). Among those reincarcerated, days until reincarceration were similar in the E-RMTC and C-PSCM groups, suggesting the reduced hazard was mainly due to differences in the proportion reincarcerated rather than the timing of reincarceration. Comparisons of self-reported involvement in criminal activity also provide support for the benefits of the E-RMTC. Compared with those assigned to the C-PSCM condition, the rate of criminal activity in the E-RMTC was reduced by a third (E-RMTC 39% vs. C-PSCM 62%; $p < .04$). This difference is attributed primarily to the greater involvement in alcohol- and drug-related offenses for those in the C-PSCM condition, as no significant differences were evident for self-reported involvement in theft offenses, weapons possession, or violent offenses. When both the occurrence and timing of criminal activity were considered in Cox regression, the two treatment groups were not significantly different.

Although these results control for the type of treatment received in prison, separate analyses examined the interaction between type of treatment received while incarcerated and after release. This interaction term was not significant for the crime outcomes in Table 2; in other words, no evidence emerged to indicate that the effectiveness of the RMTC was dependent on prior MTC treatment in prison.

3.2.2. Secondary hypothesis: The effect of prison MTC treatment

Table 3 examines the comparative effectiveness of participation in a prison MTC program on the study's primary outcome, reincarceration, and its effect on three additional secondary crime outcomes including the number

Table 2
Crime outcomes at 12 months postprison release: Aftercare MTC

			E-RMTC vs. C-PSCM	
	E-RMTC (n = 71)	C-PSCM (n = 56)	Multivariate regression [a]	
Outcomes	%	%	OR (95% CI)	p
Primary outcome				
Reincarcerated	19	38	0.387 (0.155–0.970)	.043 *
Other outcomes [b]				
Criminal activity [c]	39	62	0.394 (0.166–0.937)	.035 *
Alcohol/drug offense	37	58	0.420 (0.177–1.000)	.050 *
Other offense	16	16	0.954 (0.324–2.805)	.932
	M	*M*	HR (95% CI)	p
No. of days until reincarceration	160.8	168.0	0.492 (0.244–0.991)	.047 *
No. of days until criminal activity	124.6	114.2	0.753 (0.467–1.215)	.246

[a] Model E-RMTC = 1, covariates include the following: ethnicity (White/non-White), high school diploma/GED, number of arrests (lifetime), intravenous drug use (last 6 months), and prison treatment group. An OR less than 1 indicates a greater likelihood for reincarceration/activity of those in the C-PSCM group.

[b] Mean number of days based on a reduced sample of subjects reincarcerated (E-RMTC = 18, C-PSCM = 20) or who committed a crime (E-RMTC = 23, C-PSCM = 22). Summaries of time-to-event among those experiencing the event do not take into account participants whose event times were censored at 12 months postprison release and thus will not consistently match the Cox regression result, which does account for censoring.

[c] Criminal activity based on subjects with complete follow-up data (3, 6, and12 months: E-RMTC = 63, C-PSCM = 47).

* $p < .05$.

of days until reincarceration, involvement in self-reported criminal activity, and number of days until self-reported criminal activity. Results indicate that the rate of reincarceration for the prison MTC group was less than half that found for inmates who received standard prison treatment services (19% vs. 41%; $p < .05$) in the year following release from prison (controlling for ethnicity, high school diploma/GED, number of lifetime arrests, IV drug use during 6 months prior to incarceration, and type of treatment received in prison).

With regard to the study's secondary outcomes, a Cox regression analysis showed that the prison MTC condition reduced the hazard of reincarceration relative to the standard care group (HR = 0.431; $p < .05$), indicating that those who had received MTC treatment in prison remained in the community significantly longer than those from the prison standard care group ($p < .05$). Furthermore, for those who wound up back in prison, the reincarceration event happened, on average, 44 days later among participants in the prison MTC treatment program.

Table 3
Crime outcomes at 12 months postprison release: Prison MTC

			Prison MTC vs. standard care	
	Prison MTC (n = 77)	Standard care (n = 50)	Multivariate regression [a]	
Main outcomes	%	%	OR (95% CI)	p
Reincarcerated	19	41	0.340 (0.138–0.840)	.019 *
Criminal activity [b]	49	49	1.001 (0.439–2.284)	.998
Alcohol/drug offense	46	47	0.961 (0.422–2.186)	.924
Other offense	13	21	0.573 (0.194–1.693)	.314
Other outcomes [c]	*M*	*M*	HR (95% CI)	p
No. of days until reincarceration	191.2	143.8	0.431 (0.224–0.828)	.012 *
No. of days until criminal activity	150.9	91.4	0.659 (0.405–1.070)	.091

[a] Model prison MTC = 1, covariates include the following: ethnicity (White/non-White), high school diploma/GED, number of arrests (lifetime), intravenous drug use (last 6 months), and reentry treatment group. An OR less than 1 indicates a greater likelihood for reincarceration/activity by the prison standard care group.

[b] Criminal activity based on subjects with complete follow-up data (3, 6, and 12 months: prison MTC = 67, prison standard care = 43).

[c] Mean number of days based on a reduced sample of subjects reincarcerated (prison MTC = 18, prison standard care = 20) or who committed a crime (prison MTC = 24, prison standard care = 21). Summaries of time-to-event among those experiencing the event do not take into account participants whose event times were censored at 12 months postprison release and thus will not consistently match the Cox regression result, which does account for censoring.

* $p < .05$.

Significant differences were not evident between groups on self-reported involvement in crime.

As reported above, the interaction between type of treatment in prison and after release was not significant for any of the crime outcomes; no evidence emerged to indicate that the effectiveness of MTC while in prison is dependent on receiving RMTC treatment postprison.

4. Discussion

4.1. Primary outcome

4.1.1. The stand-alone effect of aftercare MTC

This study constitutes the first randomized experimental test of a new and promising intervention, the MTC model as a reentry protocol for use with offenders with co-occurring mental and substance use disorders. The findings from this study support the potential of the RMTC model in community corrections to reduce rates of reincarceration and criminal activity for male offenders with COD released from prison. Compared with the C-PSCM condition, those in the E-RMTC group showed significantly lower rates of reincarceration and of crime and remained in the community significantly longer. Although reincarceration may have precipitated treatment termination for some participants, further analysis (not shown) revealed a positive relationship between reincarceration outcomes and length of stay in RMTC treatment (i.e., the reincarceration rate for those who remained in treatment <90 days = 52% and those who remained >90 days = 15%), an association that is often reported in the literature (e.g., De Leon, 1984; Hubbard et al., 1989) and considered to provide further evidence of the connection between the E-RMTC intervention and reincarceration outcomes. The positive outcomes produced by RMTC treatment were independent of the prison treatment received. In other words, results from this study show that the benefits of participation in the RMTC program would be the same regardless of the treatment received while incarcerated, whether MTC treatment or standard substance abuse and MH services.

4.2. Secondary outcome

4.2.1. The stand-alone effect of prison MTC

An examination of the independent effect of prison MTC treatment provides support for the potential of this approach to reduce rates of reincarceration and criminal activity for male offenders with COD released from prison to the community. Compared with inmates receiving the standard substance abuse treatment services and MH care in prison, those participating in the prison MTC showed significantly lower rates of reincarceration. The positive outcomes produced by prison MTC treatment were independent of the type of treatment received postrelease. That is, the benefits of participation in the prison MTC program would be the same regardless of whether participants received RMTC or PSCM services on their return to the community. Still, these results must be viewed with caution, as participants had not been randomly assigned to a treatment condition (MTC or standard services) while incarcerated.

4.2.2. MTC in prison or in reentry?

Results show that although participation in the RMTC program produced significant reductions in recidivism, the same was also true for those who had participated in the prison MTC intervention. That is, in reducing rates of recidivism 1-year postprison release, the effects of the two MTC interventions appear to be of a similar magnitude. Results do not provide any evidence that the success of MTC treatment in one setting is dependent upon receiving MTC treatment in the other setting. This would suggest that the correctional staff have the flexibility to choose the intervention that is most feasible to implement without sacrificing any of the associated benefits regarding reduced rates of reincarceration.

Results do suggest that reentry and prison MTC treatment produced some differential effects (other than rates of reincarceration). First, although participation in the E-RMTC condition significantly reduced involvement in criminal activity (primarily alcohol- and drug-related offenses), this was not true with respect to participation in the prison MTC program. This suggests that, although participation in the prison MTC did not lead to less overall involvement in criminal activity, the severity of offenses was reduced such that reincarceration was less likely. Conversely, the effectiveness of the E-RMTC in reducing criminal activity could be attributable to the proximity of the RMTC intervention to the follow-up period relative to that of the prison MTC. Second, results for both MTC interventions showed that the MTC condition reduced the hazard of reincarceration relative to the comparison groups; however, for those who were reincarcerated, the event occurrence was substantially delayed only for the prison MTC group.

4.2.2.1. The need for integrated prison-plus-aftercare treatment. A number of prior studies have shown an added benefit of providing linkage to aftercare following prison treatment (Knight et al., 1997; Martin, Butzin, Saum, & Inciardi, 1999; Prendergast, Hall, Wexler, Melnick, & Cao, 2004; Wexler et al., 1990; Wexler, De Leon, et al., 1999; Wexler, Melnick, et al., 1999). That is, the effects of prison TC treatment have been substantial, especially when considering the added positive impact of aftercare. Similarly, a previous study by Sacks et al. (2003, 2004) randomly assigned inmates to a prison MTC program and demonstrated its comparative effectiveness in reducing rates of recidivism; further reductions were evident for those who had been randomly assigned to prison MTC and who then volunteered (i.e., random assignment was not part of the design) to participate in MTC aftercare treatment upon release. These

outcomes support the critical role of aftercare in maintaining positive treatment effects over time.

Similarly, this study provides an opportunity to examine the combined effect of prison and reentry MTC treatment despite the fact that random assignment was only possible for the latter intervention. Results from this study demonstrate additive effects of receiving MTC treatment both while incarcerated and during community reentry. That is, those who participated in MTC treatment programs both in prison and upon release demonstrated the lowest rates of reincarceration (i.e., 13%). Thus, findings from this study indicate that although the effect of both MTC interventions in reducing rates of reincarceration appear to be of a similar magnitude, even better outcomes were realized for those subjects who participated in both MTC interventions.

4.3. Limitations

The purpose of this section is to raise issues to be considered when interpreting findings from this study and which should inform the direction of future research conducted in this area. Three main issues for consideration are outlined below.

4.3.1. The effect of "time in treatment"

Numerous studies have demonstrated that greater time in treatment leads to better treatment outcomes. To account for this important factor, study groups were compared on the duration of treatment received to examine the specific impact of time in treatment on reincarceration. Results from this study show time in treatment to be an important factor in reducing reincarceration rates; however, it was difficult to disentangle the effects attributable to the type of treatment when taking time in treatment into account.

4.3.1.1. E-RMTC participants were in treatment for significantly longer. The initial expectation was that both interventions would last approximately 6 months; however, treatment for offenders in RMTC lasted an average of 10.34 ($SD = 7$) months compared with 5.79 ($SD = 3$) months for the control group ($p < .001$). The RMTC operates as a flexible clinical treatment model that allows for longer duration of stay when considered to be beneficial to the client. The control intervention is a supervision and CM model that brokers treatment and thus tends to be more proscribed in a way that corresponds more consistently with the period of PS.

4.3.1.2. More time in treatment is associated with better crime outcomes. With the knowledge that E-RMTC participants spent significantly more months in treatment, the effect of time in treatment on reincarceration was examined more closely. Results from a logistic regression identified months-in-treatment as a significant predictor of reincarceration 12 months postprison release (odds ratio [OR] = 0.69; $p < .001$). The OR from this logistic regression was used to assess the reduction in the odds of reincarceration resulting from additional treatment. That is, with 4.55 months of additional treatment, one would expect an OR, or treatment impact, of 0.187 [$(0.69)^{4.55}$] or an 81% reduction in the odds of reincarceration over that 5-month period. These estimated effects for time-in-program were allocated to the C condition. Because the OR with more time allocated to the C condition is smaller (0.187) than that found for the original analysis (0.340), the type of treatment effect could be attributed to more time in treatment.

This type of sensitivity analysis is limited in several important respects. First, months-in-treatment is a conservative estimate of dosage that does not take into account the varying intensity with which these interventions are often delivered. Equating groups on the overall number of months in treatment would not balance overall treatment dosage. For example, differences would likely remain in the number of direct clinical hours considering the RMTC model is an intensive program, consisting of both residential MTC interventions and community-based services, compared with the control group where treatment services are received primarily in outpatient settings of varying intensity (e.g., from once a week to five times per week). A more precise measure of treatment dosage (such as clinical hours) was not available because the study was not designed to address this factor. Second, adding the effect of time in treatment statistically is not the same as actually providing additional treatment over that period to study the effect.

4.3.1.3. Benefit of time in treatment is similar for both groups. The same logistic regression that identified months-in-treatment as significant in predicting reincarceration at 12 months postprison release also examined the interaction between time in treatment and type of treatment to explore whether the time-in-treatment effect was conditional on type of treatment. Results from this logistic regression demonstrate that the interaction term is not significant ($p = .41$), which means that the benefit of time in treatment is similar for both groups. Specifically, whether a member of the E-RMTC or the C-PSCM group, more months spent in treatment was associated with lower rates of reincarceration. This is consistent with other studies that point to the need for relatively long treatment duration.

4.3.1.4. Implications for the effect of "type of treatment". With respect to reincarceration, the main crime outcome, disentangling the effects of type of treatment (i.e., assignment to E-RMTC or C-PSCM) from time in treatment (i.e., total months of treatment received) was difficult. It is unclear if the E-RMTC was more effective due only to a longer duration of treatment than the control condition or if the control intervention would be equally effective if the treatment period were to be extended. The results presented for this particular study suggest that the RMTC model significantly reduces rates of reincarceration compared with the control PSCM intervention. Inherent in this outcome is the fact that the RMTC is more intensive and in no way was intended to be implemented in a comparable fashion to the

control condition. This is a critical first step toward establishing the RMTC model as a viable and effective option for offenders with COD transitioning from prison to the community. Other factors (e.g., cost-effectiveness) could ultimately determine its maximum potential.

4.3.2. Exposure to risk

As part of their discharge plan and to fulfill their treatment mandate, subjects in both treatment conditions were assigned to a community corrections residential facility upon their release from prison. Although these are community corrections facilities, residents are permitted to leave the grounds. In fact, as was discussed earlier, many subjects were required to leave the premises to obtain a variety of other community services. Nonetheless, because these interventions differed with respect to the average length of stay in the programs and the intensity with which they were delivered, it is important to explore whether a differential exposure to risk could partially explain group differences in the observed crime outcomes. To accomplish this, survival curves among offenders who were reincarcerated or reported criminal activity were obtained to examine exposure to risk. Results from this survival analysis (not shown) demonstrated that subjects from both groups who were reincarcerated or who self-reported involvement in criminal activity do so approximately the same length of time from their release from prison. This would suggest that subjects in both groups are considered to be equally at risk during the postprison period. Because the analysis was limited to inmates who were reincarcerated or self-reported criminal activity, the sample size was small, which could limit the power to detect differences between the groups. Still, the investigators found little reason to conclude that the differences observed between groups were a consequence of differential exposure to risk. Further research is needed to clarify our understanding of the relative contributions of type of treatment (i.e. RMTC vs. standard care) versus time in treatment and how these two factors interact to influence exposure to risk. For example, if future research were to include a longer follow-up period, participants in each group would accrue considerably more time after completion of both treatment and PS, which will produce a correspondingly longer exposure-to-risk period for both groups, thereby minimizing any potential short term disparities.

4.3.3. Exploring the effects of prison MTC treatment

Results focused on the independent effect of prison treatment in this study must be viewed with caution since inmates were not randomly assigned to a prison treatment condition. This would be necessary to control for potential selection biases that may be inherent in the process of determining prison treatment placement. Despite this limitation, in being the first to randomly assign offenders to participate in an RMTC intervention upon release, this study adds to the literature that has explored the effectiveness (relative and combined) of prison and aftercare treatment. This study of prison MTC + aftercare MTC certainly suggests a pattern consistent with previous studies citing the combined effectiveness of prison TC + aftercare and provides some initial evidence that combining prison and aftercare MTC treatment improves crime outcomes for offenders with COD.

4.4. Suggestions for future research

Results from this study suggest three key considerations for future research. First, although significant differences were evident between study groups, the overall sample size was modest, so that any future research could be strengthened by including more subjects to permit more precise estimates of the effect. Second, although a couple of the investigative team's prior studies have now explored the relative effects of prison MTC and aftercare MTC treatment, neither of these studies was designed as an experimental test of both components. In other words, to estimate the true relative effects of MTC treatment both in prison and in aftercare, a well designed study is required that would randomly assign subjects to a combination of treatments, creating an experiment that would compare four groups: (a) control-control, (b) control-experimental, (c) experimental-control, and (d) experimental-experimental. This type of complex study design would remove any inherent selection bias with respect to the process of placing inmates in prison MTC treatment or those who volunteer for aftercare. Third, given that most experimental studies compare interventions differing in design and intensity and, in the case of this study, in which both prison and aftercare MTC alone were demonstrated to be effective, the final determination of effectiveness will likely depend on a cost–benefit analysis. An estimate of the costs associated with each intervention in achieving the desired outcome would greatly assist criminal justice policy makers in determining how best to allocate their scarce treatment resources.

5. Summary

Results from this study suggest that the RMTC as implemented is significantly more effective at reducing rates of reincarceration and criminality compared with the PSCM intervention as typically employed in Colorado for offenders with COD transitioning from prison to community corrections. The results also suggest that PSCM conducted for a longer period might be equally effective. Most important, results from this study provide initial evidence that the RMTC can be effective as a stand-alone treatment (i.e., independent of the type of treatment an individual receives while incarcerated) in reducing rates of recidivism. A secondary examination of the impact of prison MTC treatment shows it to be equally effective as the RMTC program. This study also provides some initial evidence that combining prison and aftercare MTC treatment yields the best possible outcomes with respect to reincarceration rates,

which is consistent with previous research that has demonstrated the combined effectiveness of TC + aftercare and MTC + MTC aftercare treatment for offenders. These secondary results are merely suggestive because the study is not fully powered to test this interaction effect.

Criminal justice policy makers should consider developing MTC aftercare programs in conjunction with prison MTC treatment whenever possible. If circumstances do not allow for the implementation of both, this study shows that RMTC treatment can effectively reduce reincarceration rates. Furthermore, prior research on the prison MTC and preliminary evidence from this study suggest that prison MTC treatment is an effective alternative to the RMTC. Again, results for the prison MTC reported in this article must be viewed with caution because the inability to randomly assign an inmate to a treatment condition allows for potential selection biases to operate that could have been inherent in the process of determining treatment placement in prison. Overall, study results provide criminal justice administrators with several effective options to consider, taking into account available resources (e.g., cost, staffing), potential barriers to implementation, and other systemic issues that might make one of these approaches more feasible to implement than another.

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06

Modified therapeutic community for co-occurring disorders: Single investigator meta-analysis

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06. Modified therapeutic community for co-occurring disorders: Single investigator meta-analysis

Abstract

This paper presents the results of a meta-analysis for a single investigator examining the effectiveness of the modified therapeutic community (MTC) for clients with co-occurring substance use and mental disorders (COD). The flexibility and utility of meta-analytic tools are described, although their application in this context is atypical. The analysis includes 4 comparisons from 3 studies (retrieved N = 569) for various groups of clients with COD (homeless persons, offenders, and outpatients) in substance abuse treatment, comparing clients assigned either to an MTC or a control condition of standard services. An additional study is included in a series of sensitivity tests. The overall findings increase the research base of support for the MTC program for clients with COD, as results of the meta-analysis indicate significant MTC treatment effects for 5 of the 6 outcome domains across the 4 comparisons. Limitations of the approach are discussed. Independent replications, clinical trials, multiple outcome domains, and additional meta-analyses should be emphasized in future research. Given the need for research-based approaches, program and policy planners should consider the MTC when designing programs for co-occurring disorders.

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Modified Therapeutic Community for Co-Occurring Disorders: Single Investigator Meta Analysis

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ABSTRACT. This paper presents the results of a meta-analysis for a single investigator examining the effectiveness of the modified therapeutic community (MTC) for clients with co-occurring substance use and mental disorders (COD). The flexibility and utility of meta-analytic tools are described, although their application in this context is atypical. The analysis includes 4 comparisons from 3 studies (retrieved $N = 569$) for various groups of clients with COD (homeless persons, offenders, and outpatients) in substance abuse treatment, comparing clients assigned either to an MTC or a control condition of standard services. An additional study is included in a series of sensitivity tests. The overall findings

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increase the research base of support for the MTC program for clients with COD, as results of the meta-analysis indicate significant MTC treatment effects for 5 of the 6 outcome domains across the 4 comparisons. Limitations of the approach are discussed. Independent replications, clinical trials, multiple outcome domains, and additional meta-analyses should be emphasized in future research. Given the need for research-based approaches, program and policy planners should consider the MTC when designing programs for co-occurring disorders.

KEYWORDS. Co-occurring disorders, meta-analysis, modified therapeutic community, severe mental illness, substance abuse

BACKGROUND

The modified therapeutic community (MTC)[1] treatment model, based on the theoretical framework of the standard TC model (e.g., 1), was adapted in the early 1990s for those with co-occurring substance use and mental disorders (2–5). Core principles of the TC that remain pertinent to the treatment of co-occurring disorders include providing a highly structured daily regimen; emphasizing personal responsibility and self-help; using peers as role models and the peer community as the healing agent within a strategy of community-as-method (the community provides both the context for and mechanism of change); a perception of change as a gradual, developmental process, with clients moving through treatment stages; work and self-reliance are stressed, along with the development of vocational and independent living skills; and prosocial values are promoted within healthy social networks to sustain recovery. Within this framework 3 key alterations are needed in response to the individual needs and impairments of the client with co-occurring disorders: *more flexibility*, *less intensity*, and *more individualization*. (For a more complete description of the MTC for clients with co-occurring disorders, including treatment manuals and guides to implementation, see 2–5.)

GOALS

This paper presents a meta-analysis of data from 3 studies examining the effectiveness of MTC treatment for clients with co-occurring disorders. Data from a fourth study are included in a separate sensitivity analysis. Because co-occurring disorders are associated with multiple problems requiring multifaced interventions, measures from 6 outcome domains were assessed (substance abuse, mental health, crime, human immunodeficiency virus [HIV] risk, employment, and housing). Meta-analysis was used to determine the consistency of effect sizes across studies and, if consistent, to pool effect sizes for concise, quantitative estimates of MTC treatment effectiveness. As an analytic tool, meta-analysis is flexible and has been put to novel uses, including integrating findings in a multi-site study (6) and generating new hypotheses (7). While meta-analysis is frequently used to synthesize just a few studies (e.g., 8), it has not, to the authors' knowledge, been used elsewhere to synthesize the work of a single investigator; such innovative use could, perhaps, illuminate critical choices of future design and methods more directly than a qualitative, narrative review.

The paper begins with descriptions of the 4 studies conducted in a variety of settings and with differing populations of clients with co-occurring disorders (e.g., homeless, offenders, outpatients in substance abuse treatment, and those with HIV/AIDS [acquired immunodeficiency syndrome]). Next, the paper describes the meta-analytic techniques used to bring together the results of 3 of these studies (homeless, offenders, and outpatients) in 4 comparisons. Various sensitivity analyses, which include the fourth study (HIV/AIDS), are also described for their utility in determining whether conclusions are dependent on a small percentage of all effect sizes and in reducing the appearance of bias. The paper concludes with a discussion of the findings and proposes an agenda for future research.

DESCRIPTIVE SYNTHESIS OF 4 STUDIES

The 3 studies included in the meta-analysis represent 3 different MTC settings and co-occurring disorders populations: Study 1—Homeless: homeless persons in the New York City region ($n = 232$); Study 2—Offender: male offenders in the Colorado criminal justice system ($n = 139$); and Study 3—Outpatient: an outpatient setting in Philadelphia ($n = 198$). A fourth study (Study 4, HIV/AIDS), a residential program for people with HIV/AIDS, was included in the analysis as part of the sensitivity testing. Each study compared an MTC program to a control group; Study 1 investigated 2 experimental conditions (i.e., "MTC-Moderate," a fully developed MTC model; "MTC-Low," a less demanding version of the MTC program). The sample size for the control group in Study 1 was divided in half to insure that power was not overestimated. All studies employed random assignment except Study 1, which used sequential assignment (7). A more complete narrative description of these studies, including program and subject characteristics, can be found in a recent publication (8), which presented a synthesis of the interventions and the methodological procedures of the 3 studies, study-by-study.

Study 1—Homeless

This series of studies began in 1991 with Study 1, which initiated the development of the MTC, a comprehensive residential program with a planned stay of 12 months. The interventions comprised the core set of MTC interventions either "as is" or "as adapted" (for a full description of the program see 3–5). Homeless men and women ($n = 342$) with MICA (co-occurring Mental Illness and Chemical Abuse) disorders were sequentially assigned (7) to 1 of 2 experimental (E) MTC groups (MTC-Moderate or MTC-Low) or to a control (C) group that provided treatment-as-usual. The 2 MTC programs were similar in planned duration of stay, structure, and array of interventions, but the MTC-Low program was modified to have lower demands and more staff guidance.

In an intent-to-treat analysis of all study entrants, follow-up interviews were obtained at 12 months post baseline for 65% of MTC-Moderate, 70% of MTC-Low, and 73% of C clients. As compared to the C group, outcomes for MTC-Low showed significant improvements on all measures of substance abuse and employment, whereas MTC-Moderate differed significantly only on employment. Although differences from the C group were not significant for either of the MTC groups on measures of mental health, crime, or HIV-risk behavior, the pattern of findings (indicating an advantage for the MTC group) was maintained. Findings also showed greater treatment effects for MTC-Low in comparison to the more rigorous MTC-Moderate. Retention rates for both E groups compared favorably to those reported in the literature (11, 12), but residents assigned to MTC-Low were more likely to be retained for 12 months compared to subjects in MTC-Moderate (56% versus 34%, respectively). The results of this study provide some evidence of the comparative effectiveness of the MTC approach and, more particularly, of a less demanding version of the MTC model (13).

Study 2—Offender

Upon completion of Study 1, the investigators studied the effectiveness of the MTC approach for offenders with MICA disorders. Study 2, conducted within the Colorado Department of Corrections, adapted the TC for offenders with MICA disorders to include: an emphasis on criminal thinking and behavior; recognition and understanding of the interrelationship of substance abuse, mental illness, and criminality (triple recovery); operational adjustments to comply with facility security guidelines; and expansion of the treatment team to include security personnel and other Department of Corrections staff.

The study randomly assigned 185 male inmates with MICA disorders either to the MTC program (E) or to a mental health treatment program (C). The planned duration of stay was 12 months for the MTC program; the duration of the C group program was considered to be variable (for a full description of the program see 14).

One year after being released from prison, retrieval rates for follow-up interviews were 82% for the MTC group and 69% for the C group.

An intent-to-treat analysis of all study entrants showed that 1 year post prison release, those who received MTC treatment both in prison and in aftercare (MTC+Aftercare) had significantly lower rates of reincarceration than did those in the C group; the prison MTC alone was somewhat effective in reducing reincarceration. Significant differences from the C group were also found for the MTC+Aftercare group across a variety of crime measures (i.e., any criminal activity, and alcohol- or drug-related criminal activity); these differences persisted after an examination of various threats to validity (e.g., initial motivation, duration of treatment, exposure-to-risk) (15). Significant differences favoring the MTC + Aftercare group were likewise observed for substance abuse outcomes (i.e., drinking to intoxication, using illegal drugs) (16). Overall, Study 2 findings were positive and consonant with other studies of integrated prison and aftercare TC programs for substance abusing (non-MICA) offenders (e.g., 17, 18), although qualified by a potential for selection bias (i.e., differences in motivation on entry into aftercare).

Study 3—Outpatient

As the investigative team continued its work in criminal justice settings, it became apparent that services were needed to bolster treatment for clients with co-occurring disorders in outpatient substance abuse programs. Study 3 sought to evaluate the effectiveness of an enhanced treatment track, *Dual Assessment & Recovery Track*, or DART, which added MTC features (e.g., community meetings) and 3 targeted MTC interventions (i.e., psychoeducational seminar, trauma-informed addictions treatment, and case management). DART programming was delivered as part of the outpatient program, with DART elements replacing some standard individual and group activities, and remained within the structure of 9 hours per week of program activities (3 hours on each of 3 days) for the 12-week program duration.

Study 3 (19) screened male and female clients on their admission to the outpatient addictions treatment facility to identify those with psychological symptoms ($n = 240$), who were then randomly assigned either to the E group (the enhanced DART treatment) or to the C group (basic program services without enhancements). An intent-to-treat analysis of all study entrants at 1-year posttreatment follow-up retrieved 85% of E group clients and 80% of C clients. Compared to C, the E group, as expected, had significantly better outcomes on measures of psychological symptoms and on one key measure of housing stability, "lived where paid rent." No significant differences between the groups were evident for measures of substance abuse, crime, HIV-risk behavior or employment, although these findings generally showed greater improvements for the E group. The results are qualified because the study lacked an untreated or low treatment control group and findings were obtained for only a few variables. Still, improvements in substance abuse and trauma that were detected for the E group were similar to other reported studies, and group differences were found in outcome domains targeted by the additional interventions. The study provides some support for the effectiveness, on specific outcomes, of outpatient substance abuse treatment programs that add MTC features and selected MTC interventions to strengthen their capacity to treat co-occurring disorders (19).

Study 4—HIV/AIDS

In the late 1990s individuals triply diagnosed with HIV/AIDS and co-occurring disorders were the focus of a special government initiative (20, 21), underscoring the importance of determining both effectiveness and cost of treatment models for this population. The participating site, a Gaudenzia, Inc., facility, provided 6 months of core residential MTC treatment before referring clients to aftercare services at outpatient sites operated either by Gaudenzia or by other agencies. To accommodate HIV/AIDS and co-occurring disorders, the core residential program altered the structure of the TC model to deliver a unique combination of fully integrated medical/psychiatric/nursing care. The adaptations

ensured that clients with co-occurring disorders, who were AIDS symptomatic (program eligibility criteria) and physically ill when they entered the program, were medically stabilized as rapidly as possible, and that their physical and mental health care was integrated within the residential substance abuse treatment program. One hundred thirty-five Study 4 participants entered the core MTC residential treatment; 57% completed the 6-month program. The retrieval rate at 1 year was 67%; follow-up interviews occurred at 12 months post baseline for dropouts and 12 months post residential treatment for subjects who completed the residential phase of treatment.

Study 4 randomly assigned men and women who had completed the core residential MTC program ($n = 77$) to either MTC-A1 or MTC-A2 for aftercare. The MTC-A1 group was referred to community-based agencies for post–residential MTC treatment, as had been established prior to the study, but Gaudenzia staff continued to monitor these clients for a full 90 days to encourage adherence to their medical and service plan. The clients assigned to MTC-A2 received an integrated MTC aftercare program of outpatient activities that were delivered in the residential facility. The MTC aftercare program, which had a planned duration of 6 months, incorporated case assistance and skills development, peer community meetings and activities, family/significant other support groups, a peer advocacy group and activities, a Re-Entry Group using tools for self-management, and a Health and HIV/AIDS Self-Management Group.

Analysis found improvements occurring predominantly during the residential phase for the subjects randomized into the 2 aftercare conditions ($n = 77$). Clients continued to make smaller improvements and their gains were stabilized during aftercare; however, no differences between the groups were evident. These findings provide some support for the MTC model in treating triply diagnosed clients, particularly for the residential phase of treatment (22).

Summary

In summary, the series of MTC programs studied the effectiveness of the MTC approach in comparison with alternative treatments for different populations with co-occurring disorders in a variety of treatment settings. In the course of these studies, the MTC program was altered to accommodate both the population and the setting while retaining core TC elements. In every study, significantly better outcomes emerged for the MTC group; however, the measures and domains in which differences were evaluated and detected varied from study to study. The availability of data across the studies enabled the examination of uniformity of the studies' findings.

QUANTITATIVE SYNTHESIS

Rationale

The quantitative analysis determines the consistency of the results from 4 comparisons of MTC treatment across 6 outcome domains and, if consistent, examines the size of the effects. The assessment of multiple measures and outcome domains is of interest in the field because (1) clients with co-occurring disorders have multiple problems in multiple domains; (2) the MTC intervention is meant to address multiple problem areas; and (3) multiple measurements and domains provide a more comprehensive picture of treatment effectiveness.

Heterogeneity

The Cochrane Handbook specifically advises reviewers to consider applying meta-analysis only "when a group of trials is sufficiently homogeneous in terms of participants, interventions and outcomes to provide a meaningful summary" (23; section 8.7.1). Higgins and Green (23) identified 3 broad types of heterogeneity—clinical, methodological, and statistical. *Clinical heterogeneity* refers to differences among studies in participant characteristics, intervention components and implementation. *Methodological heterogeneity* refers to differences in research design, such as the use of random assignment to study conditions, and the particular ways in which outcomes are defined and measured. *Statistical heterogeneity* refers to study differences in the size of effects observed. A degree of clinical heterogeneity

among studies to be synthesized is reasonable and appropriate. Some conditions are, by their nature, clinically heterogeneous, as is the case with co-occurring disorders, where different individuals may have different mental health diagnoses, use different substances, and present for treatment or services in different settings and under different terms of referral. Some of this heterogeneity may be more apparent than real; for example, individuals with co-occurring disorders may cycle through different systems, moving from criminal justice, to homelessness prevention, to outpatient substance abuse treatment, such that the same people are being observed in multiple contexts. In addition to clinical heterogeneity in the condition itself, heterogeneity in treatment is a factor because treatments are necessarily complex and require adaptation to local circumstances. A review that is overly concerned about clinical heterogeneity may render itself less relevant to the clinical reality of multiple settings, populations, and adaptations of an intervention, and be too narrowly drawn to permit broad application of its findings. The key is to take into account the complexity of the condition and the treatment approaches commonly employed, striking an appropriate balance between heterogeneity, on the one hand, and generalizability, on the other.

In examining the research of a single investigator, the meta-analytic techniques in this paper were used to answer 2 essential questions. The first question was whether the effect sizes were consistent for each outcome domain across the studies reviewed. If the effect sizes in a given domain were consistent, meta-analysis could answer the second question, and determine how effective the MTC was in producing positive outcomes in that domain. In short, meta-analysis was used to assess the consistency of results in each domain and, where consistent, results of different projects were combined to test the effectiveness of the MTC.

Operations

Sample of Studies

Each of the 3 studies included in the meta-analysis compared an MTC treatment condition with a treatment-as-usual control condition (13, 15, 19, 22). Because Study 4, described above, had 2 MTC conditions, and did not have a control condition, data from the study were not included in the meta-analysis, but the effect of that exclusion was explored in sensitivity analysis, described below.

Selecting Measures

Some aspects of syntheses of studies conducted by a single investigator are less commonly encountered in other applications of meta-analysis. One such aspect is access to the raw data from the primary studies, creating a need to select those measures to be synthesized from among all potential outcome measures. For example, in an outcome domain such as criminal behavior, an investigator may have data on the number and timing of offenses, arrests, and convictions, as well as the number and timing of any periods of incarceration. Offenses, arrests, and convictions each could be summarized in terms of their number, their timing, or whether they occurred at all during the follow-up period, but generally, it would not be useful to include effects captured in all of these related ways in the same synthesis. For this reason, some system for selecting from among potential measures is needed.

Because a single investigator usually has a stake in the outcome of the synthesis, it is important that measures be selected logically and transparently to reduce the appearance of bias; therefore, a comprehensive description of data collected and a detailed presentation of the criteria used to include or exclude measures are required. In this instance, several points were considered to form the basis for inclusion or exclusion of any given measure in this synthesis. First, *measures that were cited in previous published reports of the primary studies were included* to enable the reader to follow the development of an emerging research area from the first primary study to the results of the synthesis. Second, *in all studies, multiple measures (if possible) and an equal number of measures were selected* to maximize the data being assessed for each domain. Further, in the outcome domains of interest, as yet, specific single

measures have not emerged to represent the standard for the field. Third, *similar data across studies were included whenever possible; however, if 1 or more studies had alternative measures of greater relevance to the domain, these data were used*. The number of outcomes included in each domain ranged from 1 to 4 measures, and was equal to that of the fewest outcomes reported for any study. Fourth, *measures were chosen without regard to the direction of statistical significance*. This protected against bias that would have resulted from selecting only those measures that favored the MTC. To avoid bias, specific reasons for excluding each measure are presented along with information on the size and direction of excluded effects.

More specifically, this meta-analysis assessed data at 12-month follow-up for 4 comparisons, drawn from 3 of the 4 studies (Studies 1, 2, and 3), which contrasted a group that received MTC treatment with a group that received another treatment approach.[2] The 6 outcome domains of interest, which were measured across all studies, included substance use, mental health, criminality, HIV-risk behavior, employment, and housing. A crosswalk of studies was conducted to assess data collected for each domain (for a complete listing, see the earlier publication (10)).

Meta-Analytic Procedures

The data were analyzed using Comprehensive Meta-Analysis Version 2 (24). Within each domain, outcomes were coded to insure a consistent direction of treatment effects; specifically, odds ratios were scored so that an odds ratio below the value 1.00 indicates greater improvement for the MTC treatment group relative to the comparison group. Similarly, an odds ratio above 1.00 indicates more improvement for the comparison group relative to the treatment group. This reporting convention is a conservative way of presenting modest effects.

Comprehensive Meta-Analysis was used to analyze data to detect differential treatment effects (MTC versus comparison). Data entered into the software program included sample sizes for each treatment group, Hedges g effect sizes with their standard errors for continuous outcomes (e.g., the frequency of drug use, the number of crimes committed), or, for dichotomous outcomes, the log odds ratios with their standard errors (e.g., any time spent in jail/prison, any needle use). Irrespective of the type of data entered, an overall, or pooled, effect size was calculated using the relative weight of each comparison to produce an estimate of the heterogeneity of the results across studies, the I^2, the Cochran Q statistic, and the corresponding P value for similarity of the results across the studies. Results are reported more conservatively using a random effects model, which assumes a greater between-comparison variance than does a fixed-effects model. When effect sizes are consistent, the pooled effect size (e.g., an odds ratio) is a statistic to measure the **magnitude** (size) of the treatment effect in the combined data, while the P-value indicates the **significance**. For statistically significant results, the 95% confidence interval for a significant odds ratio should only contain values less than 1, since an odds ratio of 1 indicates no treatment effect.

Sensitivity Analyses

Sensitivity tests examine the limits of the significant findings by assessing measurement sensitivity and study sensitivity. In testing the limits of the main synthesis, sensitivity analyses indicate the degree to which findings are "robust" and minimize the appearance of bias attributable to the synthesis being conducted by an individual investigator who has a stake in the outcome.

Measurement sensitivity tests are used to explore the effect of measure inclusion; namely, does measure selection influence the findings or, in other words, are the effects attributable primarily to one measure? One such sensitivity test, which can be undertaken only for domains with 2 or more measures, is to remove the measure with the largest treatment effect. A second sensitivity test is to add a measure with limited effects to the original outcomes; i.e., half the strength of the average of the observed measures. The purpose of this sensitivity test, like the first, is to investigate potential bias due to measure selectivity by adding measures with limited effects.

Study sensitivity tests assess potential influences resulting from the inclusion of studies; namely, are the pooled effects attributable primarily to one study? A third sensitivity test

is to add a hypothetical study of average size (relative to the actual studies), containing the maximum number of measures in each domain, none of which indicate treatment effects (e.g., an odds ratio of 1.00) to the meta-analysis. A fourth sensitivity test is to include other actual studies (one by one) that differ from the included studies in some important respect to determine the effect of each study's exclusion on the results of the synthesis.

RESULTS

Differential Treatment Effects—MTC versus Comparison

All Outcome Domains

Magnitude of Effects. Table 1 reports the main findings of the meta-analysis across 4 comparisons and all domains. The magnitude of the pooled effect—odds ratios (ORs) and 95% confidence intervals (CIs)—indicated moderate and significant MTC treatment effects for 5 of 6 outcome domains. Table 1 shows that the MTC was associated with significantly greater improvements for 5 of the 6 outcome domains (significant P value shown in bold typeface): substance use, mental health, crime, employment, and housing. The effects were of moderate size and similar, ranging from 0.40 (employment) to 0.68 (mental health), with most of the other measures (substance abuse, crime, and housing) having odds ratios close to that of mental health. Significant differences were not observed for the remaining domain, HIV-risk behavior.

Consistency of Effects. The I^2 statistic was used to measure heterogeneity along with the P value computed for the Q statistic that also identifies the significance of the I^2 value. Consistent MTC effects across studies are indicated by I^2 statistics at or near zero. If the effects are in opposite directions, or if the magnitude of the effect sizes differs greatly, then the I^2 will be greater than zero. None of the I^2 statistics reported in Table 1 reach significance, which indicates consistency among the studies included in the analysis.

Each Outcome Domain

Table 1 presents results representing the magnitude, significance, and consistency of MTC effects for each domain; study-level results for each domain of interest are shown in Figure 1.

Substance Abuse. Moderate, significant (OR = 0.65, P = .05) and consistent (I^2 = 40.00, P < .18) effects across the studies favoring the MTC emerged for the substance abuse domain. The resulting ORs (pooled measures), which varied from 0.42 to 0.92, consistently favored the MTC in the 4 comparisons. Significant MTC effects were observed for 2 of the 4 comparisons: the MTC-Low comparison of Study 1—Homeless and Study 2—Offender.

Mental Health. Moderate, significant (OR = 0.68, P = .04) and consistent (I^2 = 0.00, P = .57) MTC effects across the studies were also detected for the pooled effect size for the domain of mental health. The range of mental health

TABLE 1. Summary of Meta-Analysis Combined Study Comparisons—Random Effects Analysis (Differential Treatment Effects: MTC versus Comparison)

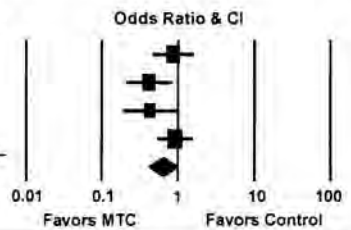
Domain	Effect size odds ratio[1]	95% CI	P	Q (P)	I^2
Substance abuse	**0.650**	(0.428–0.986)	**.043***	4.998 (.172)	39.977
Mental health	**0.679**	(0.478–0.966)	**.031***	2.026 (.567)	0.000
Crime	**0.662**	(0.454–0.966)	**.032***	2.573 (.462)	0.000
HIV-risk behavior	1.007	(0.659–1.539)	.974	3.068 (.381)	2.225
Employment	**0.404**	(0.251–0.651)	**.000*****	6.351 (.096)	52.761
Housing	**0.634**	(0.420–0.958)	**.030***	0.370 (.946)	0.000

*P < .05; ***P < .001.
[1]An odds ratio less than 1 indicates a greater improvement for clients in the MTC group than in the comparison group.
Bold indicates significance.

FIGURE 1. MTC domain effects for 4 studies.

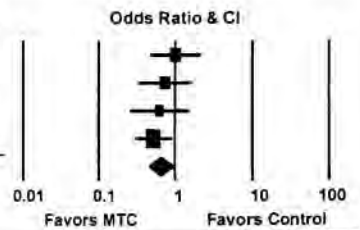
Substance Use

Study name	Odds ratio	p-Value
Homeless MTC-Mod	0.860	0.64
Homeless MTC-Low	0.416	0.02
Offender	0.431	0.05
Outpatient	0.915	0.74
	0.650	0.05



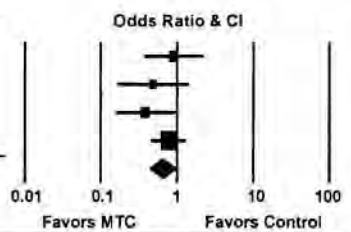
Mental Health

Study name	Odds ratio	p-Value
Homeless MTC-Mod	1.028	0.95
Homeless MTC-Low	0.749	0.48
Offender	0.640	0.33
Outpatient	0.534	0.03
	0.679	0.04



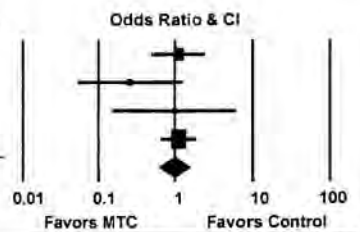
Crime

Study name	Odds ratio	p-Value
Homeless MTC-Mod	0.909	0.84
Homeless MTC-Low	0.485	0.19
Offender	0.384	0.04
Outpatient	0.772	0.34
	0.662	0.04



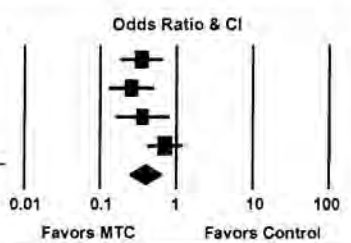
HIV Risk

Study name	Odds ratio	p-Value
Homeless MTC-Mod	1.117	0.79
Homeless MTC-Low	0.260	0.10
Offender	0.987	0.99
Outpatient	1.130	0.65
	1.007	0.98



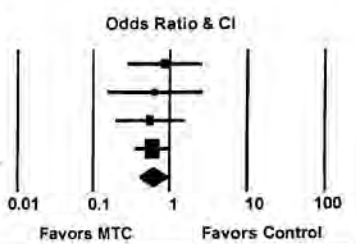
Employment

Study name	Odds ratio	p-Value
Homeless MTC-Mod	0.348	0.01
Homeless MTC-Low	0.256	0.00
Offender	0.360	0.02
Outpatient	0.712	0.21
	0.404	0.00



Housing

Study name	Odds ratio	p-Value
Homeless MTC-Mod	0.863	0.80
Homeless MTC-Low	0.646	0.56
Offender	0.562	0.28
Outpatient	0.610	0.07
	0.634	0.03



Squares represent effects at the study level and diamonds symbolize effect sizes across studies. The size of each square varies according to the weight attributed to the individual study.

treatment effects for the 4 comparisons was 0.53 to 1.03, with 1 study (Study 3—Outpatient) producing significant effects. Although not significant, the direction of treatment effects for one comparison (Study 1—Homeless, the MTC-Moderate comparison, OR = 1.03) was in opposition to the other comparisons, which favored the MTC condition.

Crime. Similar effects emerged from the analysis of the crime domain, revealing MTC treatment effects that were moderate, significant (OR = 0.66, $P = .04$), and consistent ($I^2 = 0.00$, $P = .47$) across the studies. The MTC effect was positive across all 4 comparisons with odds ratios ranging from 0.38 to 0.91; 1 comparison (Study 2—Offender) reached statistical significance.

HIV-Risk Behavior. The analysis of HIV-risk behavior, including needle use and HIV-related sexual behavior, found little or no MTC treatment effect. Across studies, MTC treatment produced similar ($I^2 = 2.23$, $P = .39$) and nonsignificant effects (OR = 1.01, $P = .98$) in HIV-risk behavior. In the 4 individual comparisons, the MTC effect varied from 0.26 to 1.13 and was never significant.

Employment. Across the studies, the employment domain indicated that MTC treatment produced consistent ($I^2 = 52.76$, $P < .10$), and statistically significant effects (OR = 0.40, $P < .001$). Treatment effects favoring MTC, ranging from 0.26 to 0.71, emerged for all comparisons, 3 of which were statistically significant (Study 1—Homeless, MTC-Moderate and -Low comparisons, and Study 2—Offender).

Housing. Results from the housing domain showed that MTC treatment produced moderate, significant (OR = 0.63, $P = .03$) and consistent ($I^2 = 0.00$, $P = .95$) effects across the comparisons. MTC treatment effects for the 4 individual comparisons ranged from 0.56 to 0.86, none of which was significant.

Sensitivity Testing

This section discusses the results of 4 sensitivity tests, displayed in Table 2, which were designed to test the limits of the significant findings by either excluding measures with significant effects, or by adding studies whose measures showed limited, or no, treatment effects. Sensitivity test results (Table 2) have been organized

TABLE 2. Summary of Sensitivity Tests for the Meta-Analysis—Random Effects Analysis (Differential Treatment Effects: MTC versus Comparison)

		Effect size odds ratio[e] (*P*)			
		Measurement sensitivity		Study sensitivity	
Domain	Original findings	Test 1[a]	Test 2[b]	Test 3[c]	Test 4[d]
Substance use	**0.650 (.043*)**	**0.667 (.043*)**	**0.673 (.021*)**	0.716 (.065)	**0.666 (.027*)**
Mental health	**0.679 (.031*)**	0.714 (.061)	**0.685 (.035*)**	**0.710 (.042*)**	**0.705 (.048*)**
Crime	**0.662 (.032*)**	**0.692 (.048*)**	0.735 (.105)	0.712 (.052*)	**0.681 (.038*)**
HIV-risk behavior[f]	1.007 (.974)	—	—	—	—
Employment	**0.404 (.000***)**	n/a	**0.521 (.000***)**	**0.480 (.004**)**	**0.495 (.014*)**
Housing	**0.634 (.030*)**	n/a	0.711 (.104)	**0.676 (.044*)**	0.719 (.102)

*$P < .05$; **$P < .01$; ***$P < .001$.
Bold indicates significance.
[a]Test 1—The measure showing the largest MTC treatment effect was treated as an outlier and removed in every domain with 2 or more measures (i.e., substance use, mental health, crime).
[b]Test 2—A measure with limited treatment effect (i.e., half the strength of the average of the observed measures) was added to each study in every domain.
[c]Test 3—A hypothetical study with no treatment effects was added. This study had the average number of subjects (92 MTC and 51 comparison = 143), and the same number of measures for each domain. An odds ratio of 1.00 and the mean standard error from all other studies were assigned to the hypothetical study.
[d]Test 4—All HIV cases were included.
[e]An odds ratio less than 1 indicates a greater improvement for clients in the MTC group than in the comparison group.
[f]Sensitivity tests were not conducted on the HIV-risk behavior domain because results for original findings were not significant.

to show tests assessing *measurement sensitivity* (Tests 1–2; Columns 3–4) and *study sensitivity* (Tests 3–4; Columns 5–6). Apart from the addition of the HIV study, the treatment effects resulting from the sensitivity tests were expected to be less than those from the original findings.

Measurement Sensitivity

The measures that were included in each domain all are commonly used to assess problems among individuals with co-occurring disorders. As described in Operations, the primary meta-analysis selected measures carefully to reduce bias; and to produce a fair representation, neither overestimating nor underestimating the effects; statistical significance was not a criterion for inclusion. Bias due to measure selectivity was investigated in Tests 1 and 2, which removed measures with the strongest effects (Test 1) or added measures with limited effects (Test 2). These 2 sensitivity tests created extreme conditions to evaluate the robustness of the observed findings.

The first sensitivity test treated the measure with the largest MTC treatment effect as an outlier and removed it from the analysis; Test 1 could only include domains with 2 or more measures (i.e., substance use, mental health, and crime). This sensitivity test examines measure inclusion to reveal if measure selection influenced the findings, or if the effects were primarily attributable to one measure. Sensitivity Test 1, which omitted 1 measure from each domain, or 3 of 36 measures (8%), produced odds ratios between 0.67 and 0.71, with significant results retained in 2 domains: substance use and crime (Column 3).

Test 2 added a measure with limited effects (half the strength of the average of the observed measures) to the original 36 outcomes; i.e., half the strength of the average of the observed measures. Across all domains, 3 of the 5 original significant findings remained significant after the addition of the limited effect measure: substance use, mental health, and employment (Column 4). When a measure with no MTC treatment effects (odds ratio = 1.00) was added to each comparison in each domain, a significant MTC effect emerged only for employment (data not shown).

Study Sensitivity

Tests 3 and 4 were conducted to investigate study sensitivity. Test 3 (Column 5) added a hypothetical study to the meta-analysis that was of average size (92 MTC and 51 Control) and that contained the maximum number of measures in each domain, none of which indicated MTC treatment effects (odds ratio 1.00). When this hypothetical study was included, significant results were sustained in 3 (mental health, employment, and housing) of the 5 domains that showed significant effects in the original analyses, as shown in Table 2 (Column 5).

The last sensitivity test, Test 4 (Column 6), added data from an "HIV study"; a study of MTC aftercare for HIV-positive clients with co-occurring disorders who had completed residential MTC treatment. This study was excluded from the primary meta-analysis because its design did not include a C group comparable to those of the other studies. Treatment effects for the experimental (MTC aftercare) and control (treatment-as-usual) comparisons in the HIV study were limited in magnitude and significance compared to the other studies, yet, when added to the meta-analysis in Test 4, 4 of 5 domains remained significant (Column 6; substance use, mental health, crime, employment). In aggregate, these tests of study sensitivity imply that more than 1 additional study with no differential MTC effects would need to be included to alter the basic picture of effectiveness that emerged from the primary meta-analyses.

DISCUSSION

Effectiveness of the MTC

The meta-analysis revealed significant MTC treatment effects for 5 of the 6 outcome domains across the 4 comparisons, which encompassed a large and varied population of clients with co-occurring disorders. Moderate and similar effects were evident in substance abuse, mental health, crime, employment, and housing; I^2 values indicated consistency of effects across domains. Specifically, significant MTC treatment effects emerged for substance abuse and employment in Study 1 (Homeless), for

substance abuse, crime, and employment in Study 2 (Offender), and for mental health in Study 3 (Outpatient).

In sensitivity analyses, the effects remained strong when the best measures were excluded, when measures with no effects were added, and when either a hypothetical study with no effects or an actual study without a comparable C group was included. These results have considerable clinical relevance, since individuals with co-occurring disorders are typically perceived to have extensive needs and the MTC provides a comprehensive treatment model intended to meet those needs.

A nonsignificant positive pooled treatment effect for MTC emerged for HIV risk when the analysis was limited to measures of sexual risk. The 4 comparisons produced MTC effects, ranging from 0.08 to 1.30, one of which was significant (Homeless MTC-Low). This analysis found more heterogeneous effects ($I^2 = 60.79$, $P = .06$) for MTC treatment across the studies. Although the analysis produced some evidence of positive MTC effects on HIV risk related to sexual behavior, none were evident for injection drug use. This finding is consistent with another meta-analysis (25) that evaluated HIV/AIDS risk-reduction interventions for clients enrolled in drug abuse treatment, reporting an overall odds ratio of 0.57; specific categories included odds ratios of 0.57 for knowledge/attitudes/beliefs, 0.63 for sexual behavior, 0.33 for risk-reduction skills, but 0.93 for injection practices (25). In view of the suggested benefit of MTC treatment to HIV outcomes, additional work is warranted to improve the capacity of MTC programs to reduce HIV risk for a range of behaviors, and to assess the utility of such efforts.

These findings add to, and strengthen, those reported previously (10) and have clinical relevance, since individuals with co-occurring disorders are typically perceived to have multifaceted needs requiring multidimensional interventions (26). The earlier paper stated that significant MTC effects were detected in each outcome domain and for every comparison; however, meta-analytic techniques enabled effect size odds ratios to be computed and tested across the comparisons. Comparison- and domain-level results were explored in the meta-analysis, which allowed specific values to be assigned to the average size of MTC treatment effects. Furthermore, inconsistencies in effects across studies could be tested, producing a clear picture, rather than merely an impression, of consistency. Both of these results, derived from the meta-analysis, provide more specificity than could be achieved without meta-analysis.

A more concrete measure of effectiveness can be derived from the odds ratio of 0.65 for substance abuse. First, consider a posttreatment plausible rate of relapse to substance use of 30% for a treatment-as-usual group (based on data from the foundation studies). Together with the estimated odds ratio, this suggests that whereas 30% of the treatment-as-usual group will relapse, 22% of the MTC group will likewise fail to maintain abstinence.[3] Similar odds ratios (i.e., around 0.50), as in the employment and crime domains, suggest similar clinical impacts. Thus, clients completing MTC treatment displayed measurable and observable positive change in areas that are both critical in their own right and essential to sustaining recovery and to integrating with mainstream society.

Core Elements/Fidelity

The 4 studies demonstrated the effectiveness of the MTC program with different co-occurring disorders populations and in different settings. The course of these studies reflects the shifting focus of co-occurring disorders as the condition became identified in different populations, and as specialized populations became an area where research efforts were encouraged and supported. Core elements of the model were present in each of the MTC programs studied (i.e., community meetings, psychoeducational classes, dual-recovery groups) and the delivery of core elements was demonstrated. For example, in examining program fidelity to the MTC model (Study 1), the investigators reported that clients endorsed items 87% of the time (3), indicating that the delivery of core program elements was consistent with the program manual description (4). However, the programs included in this meta-analysis differed in the extent to which the core elements were present and in the specific

enhancements provided for each particular population. For example, in Study 2 (Offender), the MTC program had a far greater emphasis on the reduction of criminal thinking and behavior than did the other program models and, in Study 3 (Outpatient), many fewer core MTC elements were offered than were included in the other study programs, and certain of those elements were only partially delivered. The data offered some evidence that those programs providing specific enhancements (e.g., the criminal thinking curriculum in the prison MTC) produced better outcomes in the targeted area (e.g., of criminal behavior). Further work is needed to identify the essential core MTC elements and the nature of specific enhancements with the potential to improve MTC treatment for any given population and setting.

Strengths of the Meta-Analytic Approach

This application of meta-analysis is potentially useful in at least 2 ways. First, it allows investigators to plan their own future research with greater insight into the size and consistency of previous effects. When an intervention under study has had either weak or inconsistent effects, changes in study design or intervention components and delivery can be considered. Pooled effect sizes and effect size consistency also can be considered when determining the number of participants required to detect effects in a new study. Second, this type of meta-analysis allows investigators to present a quantitative summary of their work, which may help identify promising treatment approaches needing a broad research base and spur other investigators to undertake related studies. In the latter application, a high standard of transparency is required. Although this type of meta-analysis has the potential to appear biased when presented to outside audiences, several approaches (e.g., a priori establishing of criteria for selection of measures, sensitivity testing) can be used to enhance transparency and reduce the potential for bias. This paper describes a particularly challenging instance of using meta-analytic tools to synthesize the work of a single investigator or research team, in terms of the heterogeneity of specific implementations of the MTC, the populations and contexts studied, and the range of outcome measures. Other applications of the methodology will not necessarily contain all of these complications simultaneously.

Limitations

Important considerations that should be kept in mind when interpreting these results stem from the research sample, the MTC treatment as delivered, and the meta-analytic techniques employed.

Although meta-analysis helps to increase statistical power relative to individual studies, none of the other study-specific issues are affected, including the design (e.g., studies designed with rigorous assignment methods that take on quasi-experimental characteristics), fidelity, validity of self-report data, treatment dose, sample attrition, and length of follow-up. In this sense, apart from sample size, meta-analysis retains the limitations of the primary studies, which should be considered when drawing conclusions from any quantitative synthesis. For example, data from Study 1, which compared 2 MTC programs to 1 comparison group, may have over- or underestimated the effects of MTC treatment. Although the sample size for the control group was divided in half, insuring that power was not overestimated, control group means were used in comparisons with both MTC groups, so interdependency may have occurred.

Although an array of outcomes was included in the meta-analysis, the mental health domain was limited to measures of symptomotology and use of psychotropic medication. Mental health is a multidimensional domain and, in addition to symptom change and medication use, should include measures such as avoidance of hospitalization, improved self-esteem or sense of psychological well-being, compliance, and use of services. A reduction in hospitalization is key, both because it is a critical treatment goal for clients with mental disorders, and because of the cost savings that accrue from reducing the number of days an individual or group uses inpatient services. *Differential* change of psychological symptoms may be difficult to achieve due to the widespread use of medication for clients in both experimental and comparison conditions

and the effectiveness of recent (and some older) medications in reducing and controlling symptoms (27).

The interactive relationship between various mental health measures and between mental health outcomes and those in other domains may be useful to consider. For example, the investigators observed a significant relationship between medication compliance and reductions in criminal behavior in Study 2 (28), but a corresponding relationship between symptom reduction and improved crime outcomes was not apparent. Finally, it may be equally constructive to measure positive psychological change (e.g., self esteem, psychological well-being), as these effects may be the target of certain interventions and may well be fundamental to broader behavior change.

Although meta-analysis has advantages in terms of similarities of methods and procedures, its use by a single investigator is complicated because those most identified with the development of a treatment model are both conducting the key studies and interpreting the results. It is usual for key investigators to report initial findings of studies, as the research advances it becomes necessary for the approach and findings of the research to be examined by a investigators not involved in the development of the model.

In the results presented above, effects were generally consistent, indicating treatment effects favoring the MTC across the studies for each outcome domain. In general, in the application of meta-analysis to a small number of studies by a single investigator, when effects are not consistent, the power will not be sufficient to examine effect size moderators quantitatively. In such cases, it may be difficult to identify the reasons for inconsistency. Nonetheless, merely being able to identify inconsistencies via meta-analysis provides an advantage and, at the very least, suggests that effects may be more sensitive to the context in which they are investigated than previously anticipated. Armed with this knowledge, investigators could plan changes in context more cautiously in their subsequent work.

Future Directions

Study findings have implications for both methodological initiatives and additional clinical research. The MTC approach, although shown to be effective with various populations of people who abuse drugs, including those with co-occurring disorders, encounters difficulty in achieving more widespread use. To achieve greater receptivity to the MTC and application of its methods and to strengthen the research base, several developments are necessary:

With regard to methodological considerations—Others should consider using the tools of meta-analysis for synthesizing a small number of studies in a specific research area conducted by a single investigator. Although these applications of meta-analysis must overcome the potential for the appearance of bias, when approached carefully, ensuring transparency, meta-analysis could increase the objectivity of a review relative to a narrative approach. As new studies of MTC for the treatment of co-occurring disorders by the same investigator, or by investigators new to the area, are completed, meta-analysis can provide an updated snapshot of the research base supporting the approach. This cumulative application of meta-analysis has the potential to guide the design of new studies by identifying methodological and clinical gaps in knowledge and to incorporate the knowledge gained from new studies into revised overall summaries of the evidence.

With regard to clinical research—The results of the meta-analysis confirm the capacity of the MTC to achieve positive outcomes with a number of co-occurring disorders populations. At the same time, it is recognized that residential treatment is costly and that resources are limited. In that context, 2 kinds of studies are of particular significance: (a) it is important to identify the clients who are more likely to benefit from MTC treatment—Simpson and colleagues have concluded that clients "with more severe problems at intake were more likely to benefit from longer care in residential services [TC and MTC], affirming the importance of maintaining long-term intensive care as a treatment option" (29:513); (b) it is important to clarify whether components of the residential MTC can be exported to outpatient settings such that the benefits of the MTC can be injected into outpatient care, thereby increasing the capacity to deliver effective services.

Summary

The findings from this single investigator meta-analysis add to the research base supporting the effectiveness of MTC treatment for clients with co-occurring substance use and mental disorders. Results included significant MTC treatment effects for 5 of the 6 outcome domains (substance use, mental health, crime, employment, and housing) across the 4 comparisons; one domain, HIV-risk behavior, showed little or no treatment effect. Outcomes favoring the MTC group emerged in every study; however, the domains in which differences were detected varied from study to study. A single investigator (or research team) application of meta-analytic tools is not intended to provide a definitive determination of the effectiveness of a particular approach using a review of results accumulated from some number of large-scale clinical trials. Instead, a single-investigator meta-analysis is designed to consolidate the results of a few studies to produce a quantitative synthesis of the current status of the research and to encourage others to undertake additional and related studies.

Findings suggest that MTC programs should be strengthened to increase their impact on HIV-risk behaviors, and research should be designed to measure the effects of these efforts on outcomes. Future research should emphasize independent replications, clinical trials, multiple outcome domains, and additional meta-analyses. Nevertheless, findings from this research synthesis hold considerable clinical relevance, since individuals with co-occurring disorders are typically perceived to have multifaceted needs requiring multidimensional interventions (26). Given the need for research-based approaches, program and policy planners should consider the MTC when designing programs for individuals with co-occurring disorders.

NOTES

1. The modified therapeutic community has traditionally been abbreviated to "modified TC"; however, in this paper, the short form "MTC" has been used throughout, primarily for the reader's convenience and for consistency with individual study usage.

2. In Study 4 (HIV/AIDS), both the experimental and comparison groups received MTC treatment; in other words, the experimental comparison involved residential aftercare for which a non-MTC control group was not available. This study was not included in the meta-analysis; instead, the results of a pre-post test are presented separately.

3. If the odds ratio is written as OR (0.65 in this case), and the relapse rate is written as p (30% or 0.30 in this case), then the relapse rate for the MTC group is determined by: Relapse rate = $OR/(((1 - p)/p) + OR)$.

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07

Modified Therapeutic Community for Persons with Co-occurring Disorders

SAMHSA's *National Registry of Evidence-based Programs & Practices* — **NREPP**

Online at: http://nrepp.samhsa.gov/ViewIntervention.aspx?id=144

07. NREPP — Modified Therapeutic Community for Persons With Co-Occurring Disorders

Introduction

Date of Review: March 2008

The Modified Therapeutic Community (MTC) for Persons With Co-Occurring Disorders is a 12- to 18-month residential treatment program developed for individuals with co-occurring substance use disorders and mental disorders. MTC is a structured and active program based on community-as-method (that is, the community is the treatment agent) and mutual peer self-help. A comprehensive treatment model, MTC adapts the traditional therapeutic community (TC) in response to the psychiatric symptoms, cognitive impairments, and reduced level of functioning of the client with co-occurring disorders. Treatment encompasses four stages (admission, primary treatment, live-in reentry, and live-out reentry) that correspond to stages within the recovery process. The stage format allows gradual progress, rewarding improvement with increased independence and responsibility. Goals, objectives, and expected outcomes are established for each stage and are integrated with goals specific to each client in an individual treatment plan. Staff members function as role models, rational authorities, and guides.

The MTC model retains most of the key components, structure, and processes of the traditional TC but makes three key adaptations for individuals with co-occurring disorders: It is more flexible, less intense, and more personalized. For example, MTC reduces the time spent in each activity, deemphasizes confrontation, emphasizes orientation and instruction, uses fewer sanctions, is more explicit in acknowledging achievements, and accommodates special developmental needs.

When used in prison settings, MTC has included additional programmatic and operational adaptations to address the particular circumstances of offenders with co-occurring disorders. Programmatic alterations have included an emphasis on criminal thinking and behavior that recognizes the interrelationships of substance abuse, mental illness, and criminality, while operational adjustments have included adding security personnel to the treatment team and making other changes to comply with the security requirements of correctional facilities. In other community applications, outpatient substance abuse treatment programs have adopted certain features of the MTC model to improve services for their clients who have co-occurring disorders.

Descriptive Information

Areas of Interest	Co-occurring disorders
Outcomes	1: Substance use 2: Criminal behavior 3: Psychological problems 4: Employment 5: Economic benefit 6: Housing stability
Outcome Categories	Alcohol Cost Crime/delinquency Drugs Employment Homelessness Mental health
Ages	26-55 (Adult)
Genders	Male Female
Races | Ethnicities	Black or African American Hispanic or Latino White Race/ethnicity unspecified
Settings	Residential Outpatient Correctional
Geographic Locations	Urban Suburban
Implementation History	First implemented in 1992, MTC for Persons With Co-Occurring Disorders has been used at 25 sites with an estimated 21,000 participants. Outside the United States, the intervention has been implemented in Auckland, New Zealand, and Montreal, Canada.
NIH Funding | CER Studies	Partially/fully funded by National Institutes of Health: Yes Evaluated in comparative effectiveness research studies: Yes
Adaptations	Adaptations to the intervention have been made for a prison population, primarily to incorporate a programmatic emphasis on criminal thinking. In addition, some features of the intervention have been added to intensive day treatment programs in community outpatient substance abuse treatment centers.
Adverse Effects	No adverse effects, concerns, or unintended consequences were identified by the developer.
IOM Prevention Categories	IOM prevention categories are not applicable.

Information on the categories below can be found at

http://nrepp.samhsa.gov/ViewIntervention.aspx?id=144

● *Outcomes*	● *Study Populations*	● *Quality of Research*
● *Readiness for Dissemination*	● *Costs*	● *Replications*
● *Contact Information*		