Published in final edited form as:
Addiction. 2012 June ; 107(6): 1099–1108. doi:10.1111/j.1360-0443.2011.03769.x.

COLLABORATIVE BEHAVIORAL MANAGEMENT AMONG PAROLEES: DRUG USE, CRIME & RE-ARREST IN THE STEP'N OUT RANDOMIZED TRIAL

Peter D. Friedmann, **Traci C. Green**, **Faye S. Taxman**, **Magdalena Harrington**, **Anne G. Rhodes**, **Elizabeth Katz**, **Daniel O'Connell**, **Steven S. Martin**, **Linda K. Frisman**, **Mark Litt**, **William Burdon**, **Jennifer G. Clarke**, **Bennett W. Fletcher**, and **Step'n Out Research Group of CJ-DATS***

Abstract

Aims—To determine whether collaborative behavioral management (CBM) reduces substance use, crime and re-arrest among drug-involved parolees.

Design—Step'n Out was a randomized behavioral trial of CBM versus standard parole (SP) during 2004-2008. CBM adapted evidence-based role induction, behavioral contracting, and contingent reinforcement to provide parole officer/treatment counselor dyads with positive tools in addition to sanctions to manage parolees' behavior over 12 weeks.

Setting—Six parole offices in five states in the U.S.A.

Participants—Parolee volunteers with a mandate for addiction treatment and a minimum of three months of parole (N=476). Follow-up was 94% at 3- and 86% at 9-months.

Measurements—Drug use and crime in a given month from calendar interviews 3- and 9-months after parole initiation, and re-arrests from criminal justice administrative data.

Findings—The CBM group had fewer months in which they used their primary drug (adjusted risk ratio (ARR) 0.20, 95% CI: 0.05, 0.78, $p = .02$) and alcohol (ARR 0.38, 95% CI: 0.22, 0.66, p=.006) over follow-up. CBM had its greatest effects among parolees who reported marijuana or another "non-hard" drug as their primary drug; parolees who preferred stimulants or opiates did not benefit. No differences were seen in total crime, re-arrests or parole revocations.

Conclusions—Collaborative behavioral management may reduce substance use among primary marijuana or other "non-hard" drug-using parolees without increasing revocations. Since the majority of drug violation arrests in the U.S. are for marijuana, these findings have important implications for the management of a substantial proportion of the U.S. community correctional population.

Address correspondence to: Peter D. Friedmann, M.D., M.P.H., Division of General Internal Medicine, Rhode Island Hospital, 593 Eddy Street, Providence, RI 02903. Telephone: (401) 444-3347; Fax: (401) 444-5040; pfriedmann@lifespan.org..
*For affiliations please see acknowledgements.

Declaration of Interests: The Criminal Justice Drug Abuse Treatment Studies (CJ-DATS) was funded under a cooperative agreement from the National Institute on Drug Abuse, National Institutes of Health (NIDA/NIH), with support from the Center for Substance Abuse Treatment, SAMHSA; the Centers for Disease Control and Prevention (CDC); the National Institute on Alcohol Abuse and Alcoholism (all part of the U.S. Department of Health and Human Services); and from the Bureau of Justice Assistance of the U.S. Department of Justice. The authors have no conflicts of interest to declare.

Introduction

The return of drug-involved inmates to the community is a critical issue for public health and safety.[1] In the U.S., over 700,000 inmates leave prisons annually and over two-thirds have a drug problem.[2-4] Relapse contributes to the rearrest of more than two-thirds, and the reincarceration of over half of inmates in the three years after release.[1, 5-7] Drug-involved exinmates give limited priority to addiction treatment,[8] even though treatment reduces relapse and recidivism.[9-10]

Community correctional officers can influence parolees' engagement in addiction treatment,[11-13] but few studies have evaluated whether correctional collaboration with addiction treatment would be beneficial.[12, 14] Surveillance with the threat of sanctions is the traditional way that parole and probation agents encourage compliance with supervision conditions, but coercion is a blunt tool to encourage treatment.[14-15] Collaboration of community corrections with addiction treatment may increase supervision contacts either directly or indirectly, and could increase revocations through greater detection of non-compliant behavior.[14, 16-17] Thus, a collaborative approach that intensifies correctional supervision might augment offenders' risk for reincarceration.[18] For such collaborations to work, parole and probation officers need behavioral management tools beyond sanctions alone.

In the Step'n Out Study, the collaborative behavioral management (CBM) intervention adapted evidence-based role induction, behavioral contracting, and contingent reinforcement to provide parole officer/treatment counselor teams with behavioral management tools in addition to sanctions.[19] This article examines whether CBM improved substance use, crime and re-arrest outcomes compared to standard parole (SP) over a 9-month follow-up period.

Methods

Collaborative Behavioral Management (CBM)

CBM and its theoretical foundations are described in detail elsewhere.[19-20] Briefly, CBM involved an initial session between the parole officer, treatment counselor and offender, followed by 12 weekly parole contacts which were attended by the treatment counselor every other week. The CBM model:

1. Explicitly articulates staffs' and offenders' roles, their expectations of one another, and the positive or negative consequences of failing to meet expectations;
2. negotiates a weekly behavioral contract that specifies target behaviors; these target behaviors include requirements of supervision and formal addiction treatment, as well as behaviors that facilitate recovery (e.g., getting a job; enhancing non-drug social network);
3. tracks adherence to the behavioral contract and administers both reinforcers (e.g., social incentives such as verbal congratulations or tangible incentives such as gift certificates) and sanctions (e.g., increased frequency of reporting) to shape behavior; and
4. establishes a systematic and progressive approach to reinforcement and sanctioning to ensure consistency and fairness.

Initial and one-month sessions were audiotaped and rated on elements considered essential (i.e., critical, specific elements of the CBM intervention), allowed (i.e., allowed but not specific elements), or not-allowed (i.e., elements deemed inconsistent with CBM). Adherence necessitated at least 80% of essential, 50% of the allowed and fewer than 20% of

the not-allowed elements. Overall 82% of sessions coded (84% of initial, 78% at one-month) met criteria. **Standard parole (SP)** included traditional sanctions and, at minimum, face-to-face contacts and urine testing at variable intervals.

Study Design

Step'n Out was a six-site trial to evaluate whether collaborative behavioral management (CBM), compared to standard parole (SP), improved parolees' outcomes over nine months of follow-up.[19] Sites included Providence, Rhode Island; Bridgeport and Hartford, Connecticut; Wilmington, Delaware; Richmond, Virginia and Portland, Oregon. Participants were volunteers. Institutional review boards at each institution approved the protocol, which complied with federal protections for research involving prisoners.

Following screening, informed consent and a baseline interview, research coordinators randomized participants to CBM or SP using a computerized urn randomization procedure. Treatment assignment was balanced by gender, receipt of in-prison or transitional residential addiction treatment, incarceration of more or less than 18 months, and moderate versus high risk for recidivism on the Lifetime Criminality Screening Form (LCSF).[21-22]

Study Population

The target population was individuals with pre-incarceration substance use disorders initiating parole. Inclusion criteria were: (a) age 18 years or older; (b) English speaking; (c) probable drug dependence prior to incarceration (score of 3 or higher on the TCU Drug Screen II[23] or mandated drug treatment); (d) substance use treatment as a mandated or recommended condition of parole; (e) moderate-to-high-risk of drug relapse and/or recidivism (LCSF score of 7 or greater[21] or 2 or more prior drug-related treatment episodes or convictions). Exclusion criteria were: (a) psychotic symptoms[24] or (b) correctional or supervision conditions that prohibit study participation, including failure to leave prison on parole or probation, mandate to a special parole caseload or transfer to a non-participating site.

Study Sites

Parole processes varied at the six sites. Parole officers' standard caseloads ranged from 32 to 132. Baseline contact frequency varied from 1 to 4 per month, as did required urine tests. In all sites except one, the CBM parole officer had a mixed caseload of offenders assigned to CBM procedures and others to standard parole. Parolees who received standard parole from a CBM officer were not included in the study. All offices were affiliated with an outpatient substance abuse program; four offered cognitive behavioral treatment, while two offered only alcohol and drug education. Treatment or education in some form was available on-site at four of the six parole offices. Counselors' caseloads ranged from 25 to 50.

Data Collection

The intake interview gathered baseline characteristics prior to the index incarceration, while follow-up interviews captured information for the appropriate follow-up window. Personal interviews at study intake (pre-randomization), 3-, and 9-months after the initial parole session assessed socio-demographics, health and psychological status, criminal involvement, and drug use history (including primary drug of abuse). In essence, these 3- and 9-month follow-up evaluations represented end-of-intervention and 6-month post-intervention assessments. Participants were tracked using standard procedures[25] and reimbursed approximately $20, $40 and $60, respectively, for the three interviews.

Primary Outcomes—Primary outcomes were self-reported primary drug use, self-reported criminal activity and re-arrest from administrative data. Timeline follow-back calendar interviews at 3- and 9-month follow-up assessed daily substance use for each day back to the preceding data collection point, criminal activity, and number of days at risk (i.e. community dwelling days).[26] Substance use and crime were aggregated monthly and dichotomized (any/none) for each of the 9 months.

Primary drug use was grouped into four types: opiates, stimulants cocaine/crack, methamphetamine marijuana, or other (e.g., hallucinogens, inhalants). Primary drug use type was further dichotomized into hard drug (heroin and other opiates; cocaine, methamphetamines and other stimulants) or non-hard drug (marijuana and other drugs) categories in *post-hoc* stratified analyses. Self-reported drug use was compared to urine drug toxicology results present in correctional administrative records; self-reported drug use agreed moderately with substance-positive urine screens (Kappa=.38; n=292 due to no urine collected, refusal, or incarceration at time of intake). Self-reported days of any alcohol use and heavy drinking days (5 or more drinks for men, 4 or more for women) were also assessed.

Self-reported crime was examined as any crime and by type: property crime, drug-related crime, violent crime, and other. Arrests for new charges and technical violations of parole, were taken from administrative databases and standardized parole record abstractions. Arrests were dichotomized (any/none) for the total follow-up period.

Statistical Analysis

Bivariate t-tests, Wilcoxon rank sum tests, and Pearson χ^2 tests compared the two conditions on baseline measures. Similar techniques evaluated the effect of administrative post-randomization exclusions on the balance of the study conditions. Some randomized individuals (n = 93; 48 SP and 45 CBM) were never released, released with less than three months remaining on parole, or rearrested prior to reaching parole. These administrative challenges precluded further involvement in the study and a lack of any follow-up rendered a traditional intent-to-treat analysis approach impossible. Instead, the analysis uses a modified intent-to-treat approach where, once participants were randomized and attended a single session with the parole officer, their data were analyzed regardless of protocol adherence or missing data during follow-up.

Generalized estimating equation (GEE) models assessed the effect of study condition on substance use (primary drug, substance class) and crime (total crime and by class) monthly during the 9-month follow-up.[27] GEE models included effects for dummy-coded study site, log-transformed community-dwelling days, time, study condition, and the interaction of time and study condition. For the primary drug and crime outcomes, the moderating effects of primary hard drug use were modeled using an interaction between an indicator variable for hard primary drug use, study condition, and time. Stratified analyses by primary hard drug use were conducted to elucidate moderating effects. All substance use models also controlled for self-reported substance use (yes/no) in the 6 months prior to the index arrest and for unbalanced baseline variables, including number of lifetime jail episodes and number of arrests in the 6 months prior to baseline. The fit of nested models tested time effects (linear, quadratic). Condition effects reflected changes in outcome (i.e., substance use, crime) during the study period, and the time by condition interaction reflected that the effect changed over time.

For re-arrest, logistic models regressed any rearrest over the 9-month follow-up against study condition (controlling for study site and log days in the community), because few

people reported more than one rearrest. All analyses were conducted in SAS version 9.2 and tests of significance were two-sided.

Sample Size—*A priori* estimates were that 400 subjects per group would be required to detect a small effect size, assuming two-sided α=0.05, an intra-class correlation coefficient of 0.5, three repeated measurements and 10% loss to follow-up.[28] The *post-hoc* intra-class correlation coefficients were .46 for primary drug use and drinking days, .45 for heavy drinking days, and .39 for any crime. The recruitment goal was not reached.

Results

Of the 623 individuals screened (Figure 1), 569 were randomized to CBM or SP; 476 participated in one or more parole session during the study period (03/10/2005 to 06/30/2008). Participants were 83% male, mean age was 34 years, and more than half were racial or ethnic minorities. Among the 437 participants reporting a primary problem drug, 61% (n=265) indicated problems with a hard drug with similar proportions by group (62% SP, 59% CBM). Mean lifetime arrests exceeded thirteen, and 47% had high criminality scores on the LCSF (Table 1). In the post-randomization population, the CBM participants reported fewer arrests in the previous 6 months (Wilcoxon $z = 2.68$, $p = .007$) and more lifetime jail experience (Wilcoxon $z = -2.18$, $p = .03$). These variables were included in all multivariate analyses.

Follow-up was 94% at 3 months and 86% at 9 months. Participants lost to follow-up were older (37.7 vs. 33.9 years, $t(472) = -2.38$, $p=0.02$), and reported fewer drug related crimes in their lifetime (2088 vs. 2744, Wilcoxon, $z = -2.41$ $p = .02$) than those lost to follow-up.

Substance Use

Rates of drug use were low over the 9 month follow-up period, with a median (interquartile range) of 0 (0 – 1.99) days of primary drug use per 100 community days. Participants who reported any drug use over the follow-up period reported a median of 7.60 (1.47 – 38.91) days of primary drug use, 7.69 (1.10-24.25) days of marijuana use, 19.10 (1.60-47.97) days of heroin use, 5.80 (1.10 – 26.89) days of cocaine or crack use, and 2.55 (0.39 – 26.60) days of methamphetamine use per 100 community days. For alcohol use, the median was 0 (0 – 3.37) days per 100 community days. Those who reported any alcohol use drank on a median of 6.22 (1.54 – 20.51) days per 100 community days. Comparison of substance use between CBM and SP group revealed fewer alcohol use days in the CBM group (Wilcoxon z = 2.61, p = .01), but no differences for days of primary drug or other drug use.

In GEE models, the CBM intervention was associated with less use of the primary problem drug (adjusted risk ratio (ARR) 0.20, 95% CI: 0.05, 0.78, $p = .02$) over the follow-up period, controlling for baseline days of substance use, type of primary drug and time (Table 2). To give a sense of the magnitude, the average monthly predicted probability of primary problem drug use was 3.39% in the SP group and 0.69% in the CBM group over the 9-month follow-up period. However, the effect decreased over time (group by time interaction,β= 0.23 (0.10 standard error (SE)), p=0.02).

Examining specific substances, the CBM group had a trend toward lower marijuana use than SP participants (ARR 0.43, 95% CI: 0.17, 1.08, $p = 0.07$); the estimated probability of marijuana use was 1.36% in the SP group and 0.59% in the CBM group per month over the same follow-up period. This effect did not change over time. CBM participants also used less alcohol (ARR 0.38, 95% CI: 0.22, 0.66, $p = 0.0006$), with an average monthly predicted probability of alcohol use of 3.30% in the SP group and 1.27% in the CBM group. A group by time interaction (β=0.10 (0.05 SE), $p = .03$) indicated that the reduction in alcohol use

associated with CBM waned over time. CBM participants also tended to report less heavy drinking (ARR 0.49, 95% CI: 0.23, 1.02, $p = .06$). Stimulant and opiate use did not differ by condition or time.

Stratified analyses indicated that CBM was most beneficial for primary marijuana or other non-hard drug (e.g., hallucinogens, inhalants) users than those who preferred "hard drugs" (Figure 2) (ARR 0.14, 95% CI: 0.04, 0.51, $p = 0.003$). The average monthly predicted probability of primary problem drug use was 2.89% in the SP group and 0.42% in the CBM group over follow-up. This difference waned over time (group by time interaction,β=0.24 (0.10), $p = 0.01$).

Crime

Crime was also low over the 9 month follow-up period, with a median (interquartile range) of 0 (0.00-0.36) crime days per 100 community days. Among participants who reported any crime, excluding parole violations, crimes were committed on 8.21 (1.29- 35.93]) days per 100 community days. They committed property crimes on 0.92 (0.53 -7.69) days, violent crimes on 0.90 (0.44 – 26.60) days, drug-related crimes on 12.52 (2.92 - 42.53 days, parole violations on 0.93 0.44 – 19.30) days and other crimes on 0.51 (0.38 – 3.60) days per 100 community days. The study conditions did not differ in total crime days in GEE models controlling for baseline crime rates (Table 2). Disaggregating the crime outcome revealed a reduction in property crime associated with CBM (ARR 0.03, 95% CI: 0.001, 0.79, p=0.04) when the model included hard drug use and related interactions (all p>0.10), but no differences by condition on self-reported violent, drug, or other crime. Again, among non-hard primary drug users the CBM group tended to report fewer total crimes over follow-up (ARR 0.35, 95% CI: 0.11, 1.06, p=0.06), but estimates are marginal because of the small number of events. Among parolees with a primary "hard drug", no differences were detected for any crime outcomes.

Re-arrest

We hypothesized that there would be a reduction in re-arrests for new offenses as a positive outcome of CBM, but we were concerned that the greater intensity of CBM might cause an increase in parole violations. A non-significant reduction in re-arrest favored CBM in both the criminal justice administrative data (ARR 0.87, 95% CI: 0.56, 1.35) and self-reported arrest data (ARR 0.88, 95% CI: 0.57, 1.36). As with the self-report data, the administrative data demonstrated no difference between groups in violations of parole (ARR 1.0, 95% CI: 0.61, 1.74).

Discussion

Collaborative behavioral management was associated with fewer months of primary drug use among parolees over 9 month follow-up. Decreased use of "non-hard" drugs (i.e., marijuana, hallucinogens and inhalants) drove these reductions. There were no differences in overall crime, and the detected reduction in months in which the CBM group committed a property crime should be considered exploratory. A reduction in re-arrest for new offenses did not reach statistical significance and CBM was not associated with more re-arrests for parole violations. Despite the limited scope of the intervention within the parole offices, the brief time for the parole agents to develop new skills, and the low incidence of the outcomes of interest, these findings provide support for a behavioral management approach to community corrections for some drug-involved clients.

The current analysis found no difference in parole violations despite intensification of correctional supervision in the CBM condition.[20] Research from the 1970s and 1980s

suggested that intensive supervision might increase detection of technical violations and revocations for minor infractions, and thus increase re-incarceration without improving public health or safety.[17,29] Recent studies, however, suggest that changing the orientation of the probation/parole officer from “surveillance/enforcement” to “therapeutic/ rehabilitative” might help to address concerns about increased revocations.[30-32] A meta-analysis of effects of corrections programs concluded that intensive community supervision programs focused on surveillance (N=24) were ineffective while treatment-oriented programs (N=10) reduced recidivism.[9] Recent work on Drug Courts and alternative models of community supervision suggests that approaches that improve the immediacy and reliability of graduated correctional responses to offender behavior benefit substance-involved offenders.[9,34-35] The accumulation of evidence suggests that theory-based models of behavioral change should be the foundation for more intensive and effective rehabilitative approaches to community corrections for substance-involved offenders.

CBM conceptualized parole as an ongoing opportunity to assist ex-offenders in setting feasible, recovery-oriented and pro-social goals, reinforcing progress toward those goals, and problem-solving challenges to progress. The CBM approach allows nuanced responses to minor infractions as well as positive reinforcement of successes. This approach appeared most beneficial for parolees who preferred marijuana and other “less hard” drugs. Although the limited effect on parolees who preferred opioids or stimulants is disappointing, the substance abuse treatments offered at the sites varied in quality: several sites offered only addiction education and none routinely offered medication assisted treatment for opiate dependent parolees.[33] Collaborative behavioral management might work better for opioid or stimulant dependence in community correctional settings with more standardized, evidence-based treatment and greater availability of medication assisted treatment for opioid dependence. Nonetheless, collaborative behavioral management provides an alternative approach to the management of parolees with primary marijuana and other ‘non-hard’ drug problems -- over 40% of the current study population and half of drug violation arrests in the U.S.[36]

Because it was a behavioral study in complex, real-world correctional systems, the Step’n Out Study had many limitations.[19-20] First, concerns about giving rewards to offenders limited the material incentives to $50 over three months. CBM might have had greater effects with more generous rewards. Second, parole officers and treatment counselors volunteered to participate in the CBM intervention, so differences in their motivation and skill might have contributed to the observed effect. However, assignment to specialized caseloads is commonly voluntary. Study participants were also volunteers, who likely differed from those who did not volunteer. This effect might explain the relatively low incidence of the outcomes of interest. CBM may work better or less well were it mandated for all substance-involved parolees. Third, recruitment of parolee volunteers was challenging and the inability to reach recruitment goals likely left the study underpowered to detect some effects. Fourth, few parole officers per site implemented CBM, while other officers continued to deliver standard parole with traditional assumptions and support. CBM might work better if normalized in a supportive agency environment. Fifth, substance use and crime outcomes came from self-report, the limitations of which are well-described.[37] The administrative databases and parole records were challenging to standardize across the sites and were often incomplete. Arrests might be underestimated, and the better documentation among the CBM group (administrative records were available for 70% of the CBM and 64% of the standard parole group) might have introduced detection bias unfavorable to the CBM group. Sixth, training and skill development to implement CBM was limited. The modest findings likely reflect an early phase of adoption, in which parole officers and treatment counselors are still adapting to new roles and learning new skills. Seventh, the greater intensity of contacts in the CBM intervention,[20] rather than its theory-

based content, might have caused the improvement in outcomes, although prior literature suggests that greater intensity of contacts in parole produces more revocations, not better outcomes. [14, 16-18] Finally, the "modified intention to treat analysis" excluded 45 CBM and 48 standard parole volunteers who could not participate in the study after randomization. Most of these exclusions came from the Wilmington, Delaware site where early in the project subjects were enrolled too early in their prison term to predict whether they would be released in time to participate in the study. When they were not released from prison or were released with less than 3 months in parole, they were excluded and not followed-up. This situation was administrative and, as the balance of these exclusions across study conditions supports, independent of study condition. The post-randomization exclusions were thus likely to have been random with regard to study condition, so their exclusion was unlikely to have influenced internal validity. However, the possibility of selection bias cannot be discounted completely.

Despite these limitations, collaborative behavioral management appears to be a promising theory-based approach that adapts role induction, behavioral contracting and contingent reinforcement to community corrections. Among drug-involved parolees whose primary drug was not an opioid or stimulant, CBM reduced substance use and possibly property crime, without increasing revocations.[20] Future studies should examine CBM's costs and effectiveness in community correctional settings with greater availability of evidence-based addiction treatment as well as stronger material and social incentives.

Acknowledgments

The Criminal Justice Drug Abuse Treatment Studies (CJ-DATS) was funded under a cooperative agreement from the National Institute on Drug Abuse, National Institutes of Health (NIDA/NIH), with support from the Center for Substance Abuse Treatment, SAMHSA; the Centers for Disease Control and Prevention (CDC); the National Institute on Alcohol Abuse and Alcoholism (all part of the U.S. Department of Health and Human Services); and from the Bureau of Justice Assistance of the U.S. Department of Justice. The Step'n Out study was supported by grant numbers 5U01DA016191, 5U01DA016213, 5U01DA016230, 5U01DA016194, and 5U01DA016211.

Dr. Friedmann had full access to all of the data in the study and takes responsibility for the integrity of the data and the accuracy of the data analysis. The authors have no conflicts of interest to declare. Dr. Bennett W. Fletcher, a scientific officer of the funding agency (National Institute on Drug Abuse) participated in design and conduct of the study, review and approval of the manuscript. The authors gratefully acknowledge the collaborative contributions by NIDA, the Coordinating Center and Research Centers participating in CJ-DATS. The authors are also grateful for the contributions of the criminal justice and addiction treatment partners, parole officers, treatment counselors and parolees, without whom this study would not have been possible. Finally, the authors thank Redonna Chandler, PhD, Akiva Liberman, PhD and the staff of the Services Research Branch, Division of Epidemiology, Services and Prevention Research (DESPR), National Institute on Drug Abuse, for their support. The contents are solely the responsibility of the authors and do not necessarily represent the views of the Department of Health and Human Services, NIDA/NIH, the Department of Justice, other CJ-DATS participants or the Department of Veterans Affairs.

Step'n Out Research Group of CJ-DATS

Peter D. Friedmann, MD, MPH (Lead Investigator), Jennifer G. Clarke, MD, MPH, Randall Hoskinson, Jr., MA, Traci C. Green, PhD; Magdalena Harrington, MA.; Kristina Richards, MA. Research Enhancement Award Program, Research Service, Department of Veterans Affairs Medical Center, Providence, RI; General Medicine Research Section, Rhode Island Hospital; Memorial Hospital of Rhode Island; Rhode Island Department of Corrections and Warren Alpert Medical School of Brown University, Providence, RI.

Elizabeth Katz, PhD, Towson University, Towson, MD, and Friends Social Research Center, Baltimore, MD.

Faye S. Taxman, PhD, Anne G. Rhodes, MS, George Mason University, Fairfax VA.

Daniel O'Connell, PhD, Steven S. Martin, PhD, Center for Drug and Alcohol Studies, University of Delaware, Newark, DE.

Linda K. Frisman, PhD, Connecticut Department of Mental Health and Addiction Services and University of Connecticut, West Hartford, CT.

Mark Litt, Ph.D., University of Connecticut Health Center, Farmington, CT.

William Burdon, PhD, Michael L. Prendergast, PhD, Carter Bartee, MA, Integrated Substance Abuse Programs, University of California, Los Angeles.

Bennett W. Fletcher, PhD, National Institute on Drug Abuse, National Institutes of Health, Department of Health and Human Services, Rockville, MD.

References

1. Chandler RK, Fletcher BW, Volkow ND. Treating drug abuse and addiction in the criminal justice system: improving public health and safety. JAMA. 2009; 301(2):183–190. [PubMed: 19141766]
2. Hammett T, Roberts C, Kennedy S. Health-related issues in prisoner reentry. Crime Delinq. 2001; 47(3):390–409.
3. Karberg, JC.; James, DJ. Substance dependence, abuse and treatment of jail inmates 2002. U.S. Department of Justice, Bureau of Justice Statistics; Washington, D.C.: 2005.
4. West, HC.; Sabol, W.; Cooper, M. Prisoners in 2008. U.S. Department of Justice, Bureau of Justice Statistics; Washington, D.C.: 2009.
5. Langan, NP.; Levin, DJ. Recidivism of prisoners released in 1994. U.S. Department of Justice, Bureau of Justice Statistics; Washington, D.C.: 2002.
6. Nurco DN, Hanlon TE, Kinlock TW. Recent research on the relationship between illicit drug use and crime. Behav Sci Law. 1991; 9:221–242.
7. Martin SS, Butzin CA, Saum CA, Inciardi JA. Three-year outcomes of therapeutic community treatment for drug-involved offenders in Delaware: from prison to work release to aftercare. Prison J. 1999; 79(3):294–320.
8. Sung H, Belenko S, Feng L. Treatment compliance in the trajectory of treatment progress among offenders. J Subst Abuse Treat. 2001; 20(2):153–162. [PubMed: 11306218]
9. Aos, S.; Miller, M.; Drake, E. [Accessed: 2011-11-17] Evidence-based adult corrections programs: what works and what does not. Olympia: Washington State Institute for Public Policy; 2006. http://www.wsipp.wa.gov/rptfiles/06-01-1201.pdfArchived by WebCite® at http://www.webcitation.org/63GXJFsRJ
10. Prendergast ML. Interventions to promote successful re-entry among drug-abusing parolees. Addict Sci Clin Pract. 2009; 5(1):4–13. [PubMed: 19369913]
11. Young D. Impacts of perceived legal pressure on retention in drug treatment. Crim Justice Behav. 2002; 29(1):27–55.
12. Marlowe DB. Integrating substance abuse treatment and criminal justice supervision. Sci Pract Perspect. 2003; 2(1):4–14. [PubMed: 18552716]
13. Center for Substance Abuse T. Treatment Improvement Protocol (TIP) no. 12. Substance Abuse and Mental Health Services Administration; Rockville, MD: 1994. Combining Substance Abuse Treatment With Intermediate Sanctions for Adults in the Criminal Justice System. DHHS Pub. no. (SMA) 94-3004
14. Taxman FS. Supervision -- Exploring the dimensions of effectiveness. Federal Probation. 2002; 66(2):14–27.
15. Inciardi JA. The use of parole prediction with institutionalized narcotic addicts. J Res Crime Delinq. 1971; 8:65–73.
16. Seiter RP. Prisoner reentry and the role of parole officers. Federal Probation. 2002; 66(3):50–54.
17. Petersilia J. A decade with experimenting with intermediate sanctions: what have we learned? Perspectives. 1999; 23(1):39–44.
18. Travis, J.; Solomon, A.; Waul, M. From Prison to Home: The Dimensions and Consequences of Prisoner Reentry. Urban Institute Press; Washington, DC: 2001.

19. Friedmann PD, Katz EC, Rhodes AG, et al. Collaborative Behavioral Management for Drug-Involved Parolees: Rationale and Design of the Step'n Out Study. J Offender Rehabil. 2008; 47(3): 290–318. [PubMed: 19809591]
20. Friedmann PD, Rhodes AG, Taxman FS. Collaborative behavioral management: integration and intensification of parole and outpatient addiction treatment services in the Step'n Out study. J Exp Criminol. 2009; 5(3):227–243. [PubMed: 19960114]
21. Walters GD. The Lifestyle Criminality Screening Form as a predictor of federal parole/probation/supervised release outcomes: A 3-year follow-up. Legal Criminol Psychol. 1998; 4(1):15–21.
22. Stout RL, Wirtz PW, Carbonari JP, Del Boca FK. Ensuring balanced distribution of prognostic factors in treatment outcome research. J Stud Alcohol. 1994; 12(suppl):70–75.
23. Peters RH, Greenbaum PE, Steinberg ML, et al. Effectiveness of screening instruments in detecting substance use disorders among prisoners. J Subst Abuse Treat. 2000; 18(4):349–358. [PubMed: 10812308]
24. First, M.; Spitzer, R.; Williams, J.; Gibbons, M. Structured clinical interview for DSM-IV - Patient version. NY State Psychiatric Institute; New York: 1995.
25. Hall, EA.; Zuniga, R.; Cartier, J., et al. Staying In Touch: A Fieldwork Manual Of Tracking Procedures For Locating Substance Abusers In Follow-Up Studies. Vol. 2nd. UCLA Integrated Substance Abuse Programs; Los Angeles: 2003.
26. Sobell, LC.; Sobell, MB. Timeline followback: a technique for assessing self-reported alcohol consumption. In: Litten, RZ.; Allen, J., editors. Measuring alcohol consumption: psychological and biological methods. Humana Press; New Jersey: 1992. p. 41-72.
27. Liang KY, Zeger SL. Longitudinal data analysis using generalized linear models. Biometrika. 1986; 73:13–22.
28. Hedeker D, Gibbons RD, Waternaux C. Sample size estimation for longitudinal designs with attrition: comparing time-related constrasts between two groups. J Educ Behav Stat. 1999; 24(1): 70–93.
29. Petersilia J, Turner S. Comparing intensive and regular supervision for high-risk probationers: early results from an experiment in California. Crime Delinq. 1990; 36(1):87–111.
30. Taxman FS. No Illusion, Offender and Organizational Change in Maryland's Proactive Community Supervision Model. Criminol Pub Policy. 2008; 7(2):275–302.
31. Taxman FS, Thanner M, Weisburd D. Risk, Need, and Responsivity (RNR): It All Depends. Crime Delinq. 2006; 52(1):28–51. [PubMed: 18542715]
32. Taxman, FS.; Byrne, JM.; Thanner, MH. Evaluating the Implementation & Impact of a Seamless System of Care for Substance Abusing Offenders - the HIDTA Model. National Institute of Justice; Washington, DC: 2003.
33. Friedmann PD, Taxman FS, Henderson CE. Evidence-based treatment practices for drug-involved adults in the criminal justice system. J.Subst.Abuse Treat. 2007; 32(3):267–277. [PubMed: 17383551]
34. Wilson, DB.; Mitchel, O.; MacKenzie, DL.; Campbell Collaboration. [Accessed: 2011-11-17] Effects of Drug Courts on Criminal Offending and Drug Use. 2011-11-17. http://www.campbellcollaboration.org/lib/download/367/Archived by WebCite® at http://www.webcitation.org/63GfQSu0q
35. Hawken, A.; Kleiman, M. Managing Drug Involved Probationers with Swift and Certain Sanctions: Evaluating Hawaii's HOPE. U.S. Department of Justice: National Institute of Justice; Washington DC: Dec. 2009 2011-11-17. https://www.ncjrs.gov/pdffiles1/nij/grants/229023.pdf: 2011-11-17. (Archived by WebCite® at http://www.webcitation.org/63GeebSqf
36. U.S. Department of Justice. [Accessed 11/17/2011] Federal Bureau of Investigation, "Arrests for Drug Abuse Violations," Crime in the United States, 2010; 2011. http://www.fbi.gov/about-us/cjis/ucr/crime-in-the-u.s/2010/crime-in-the-u.s.-2010/persons-arrested
37. Hubbard, RL.; Marsden, ME.; Allison, M. Reliability and validity of TOPS data (RTI/1901/01-15s). Research Triangle Institute; Research Triangle Park, NC: 1984.

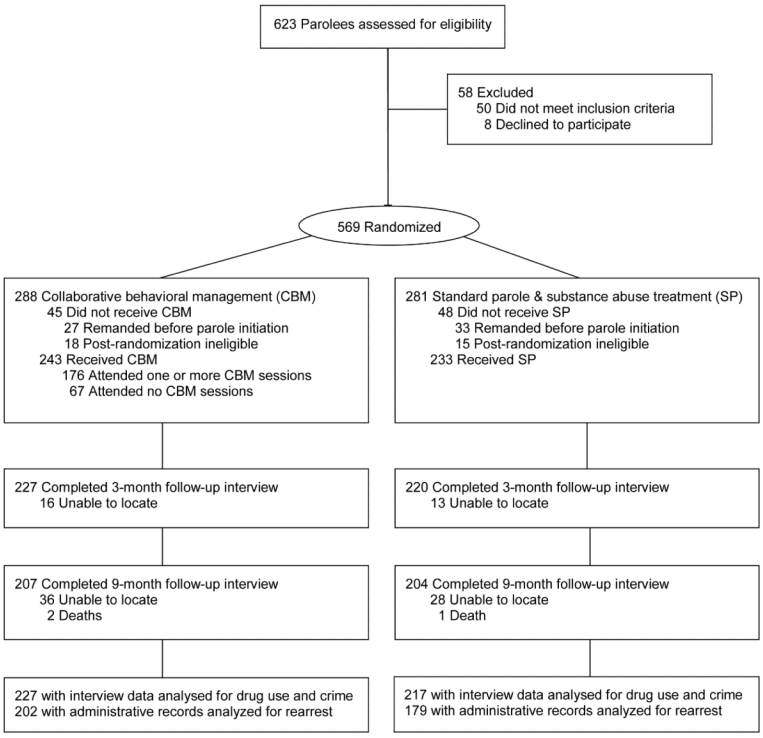

Figure 1. CONSORT chart of study participation

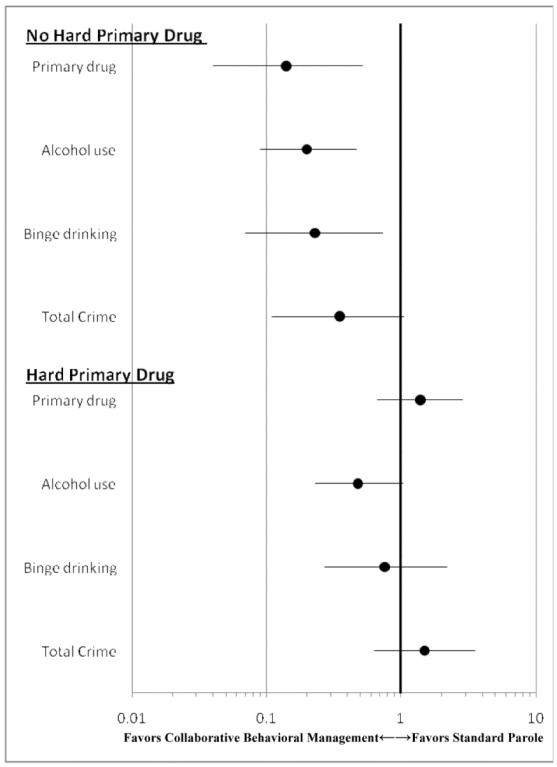

Figure 2. Forest plot of adjusted risk ratios for self-reported substance use and total crime over the 9-month follow-up, stratified by hard primary drug use

From generalized estimated equation (GEE) models including effects for study site, self-reported frequency of use of the outcome variable prior to incarceration, log-transformed community-dwelling days, time, study condition, and the interaction of time and study condition.

Addiction. Author manuscript; available in PMC 2013 June 01.

Table 1

Characteristics of Subjects by Study Condition and Parole Initiation

	Randomized		P-value*	Initiated Parole		P-value*
	Collaborative Behavioral Management	Standard Parole		Collaborative Behavioral Management	Standard Parole	
Total	288	281		243	233	
Female Gender, *N (%)*	46 (15.93)	48 (17.08)	0.72	40 (16.46)	41 (17.6)	.75
Age, *mean ±SD*	34.15±8.77	33.67±9.12	.53	34.44±8.71	33.79±8.97	.42
Race, *N (%)*						
Hispanic/Latino	40 (13.99)	31 (11.03)	.29	38 (15.77)	26 (11.16)	.14
African American/Black	143 (49.65)	149 (53.02)	.42	118 (48.56)	126 (54.08)	.23
White	102 (35.42)	99 (35.23)	.96	84 (34.57)	77 (33.05)	.73
Asian	1 (0.35)	4 (1.42)	.17	1 (0.41)	4 (1.72)	.16
Native American/Pacific Islander	3 (1.04)	2 (0.71)	.77	3 (1.23)	2 (0.86)	.74
Other	33 (11.46)	23 (8.19)	.19	31 (12.76)	21 (9.01)	.19
Site, *N (%)*			.92			.93
Richmond, Virginia	39 (13.54)	46 (16.37)		39 (16.05)	46 (19.74)	
Bridgeport, Connecticut	37 (12.85)	37 (13.17)		36 (14.81)	36 (15.45)	
Hartford, Connecticut	27 (9.38)	24 (8.54)		26 (10.70)	23 (9.87)	
Wilmington, Delaware	133 (46.18)	125 (44.48)		91 (37.45)	82 (35.19)	
Portland, Oregon	34 (11.81)	35 (12.46)		34 (13.99)	32 (13.73)	
Providence, Rhode Island	18 (6.25)	14 (4.98)		17 (7.00)	14 (6.01)	
Primary Drug of Abuse, *N (%)*						
Heroin	74 (25.69)	53 (18.86)	.05	59 (24.28)	49 (21.03)	.40
Other opioids	3 (1.04)	4 (1.42)	.68	3 (1.23)	4 (1.72)	.66
Cocaine	69 (23.96)	68 (24.20)	.95	55 (22.63)	54 (23.18)	.89
Methamphetamine	20 (6.94)	19 (6.76)	.93	20 (8.23)	17 (7.30)	.70
Cannabis	47 (16.32)	47 (16.73)	.90	42 (17.28)	40 (17.17)	.97
Other	75 (26.04)	90 (32.03)	.12	64 (26.34)	69 (29.61)	.43

	Randomized		P-value*	Initiated Parole		P-value*
	Collaborative Behavioral Management	**Standard Parole**		**Collaborative Behavioral Management**	**Standard Parole**	
No. of Arrests Lifetime, *mean ±SD*	13.46 ± 22.58	13.75 ± 23.16	.88	14.06 ± 24.47	12.12 ± 14.37	.30
No. Arrests Past 6 mos., *median [25%, 75%]*	1 [1, 1]	1 [1, 2]*	.003	1 [1, 1]	1 [1, 2]*	.01
No. Times Jailed Lifetime, *median [25%, 75%]*	6 [3, 10]	5 [3, 10]	.07	6 [3, 12]	5 [3, 9]*	.03
No. Times Jailed Past 6 mos., *mean ±SD*	0.62 ± 0.96	0.75 ± 1.23	.19	0.59 ± 1.02	0.67 ± 1.07	.37
No. Mos. Jailed Lifetime, *mean ±SD*	67.98 ± 58.30	65.24 ± 64.49	.60	72.31 ± 60.95	67.58 ± 66.99	.42
No. Days Jailed Past 6 mos., *mean ±SD*	15.27 ± 37.68	14.80 ± 35.92	.88	17.27 ± 39.85	13.99 ± 34.51	.35
Lifetime Criminality Screening Form Score, *N(%)*			.98			.81
Moderate (<10)	137 (47.57)	134 (47.69)		131 (53.91)	123 (52.79)	
High (≥10)	151 (52.43)	147 (52.31)		112 (46.09)	110 (47.21)	
No. Drug-related Crimes Lifetime, *mean ±SD*	2932.7 ± 1594.1	2771.5 ± 1616.2	.60	2783.9 ± 1596.3	2611.4 ± 1635.1	.25
No. Drug-related Crimes Past 6 mos., *mean ±SD*	778.6 ± 1071.0	804.2 ± 1103.5	.78	809.8 ± 1158.6	852.9 ± 1200.6	.69

*comparing previous two columns

Table 2
Multivariate Predictors of Substance Use and Crime

Variable	Months with Primary Drug Use*	Days of Alcohol use*	Episode of heavy drinking*	Months with Any Crime*
	Parameter estimate (standard error)			
Study condition is Collaborative Behavioral Management	−1.63 (0.71)†	−0.98 (0.28)†	−0.72 (0.38)‡	−0.88 (0.59)
Time	−0.07 (0.06)	−0.008 (0.03)	−0.05 (0.05)	−0.07 (0.07)
Primary drug is a hard drug	−0.09 (0.47)	--	--	−0.24 (0.51)
Study condition by time	0.23 (0.10)†	0.10 (0.05)†	0.07 (0.07)	0.10 (0.10)
Study condition by primary hard drug	1.92 (0.80)†	…	…	1.22 (0.74)‡
Time by primary hard drug	0.05 (0.08)	…	…	0.06 (0.09)
Study condition by time by primary hard drug	−0.26 (0.12)†	…	…	−0.18 (0.13)
Drug or alcohol use in 6 months prior to incarceration	0.66 (0.35)‡	0.72 (0.23)†	1.04 (0.37)†	…
Number of times jailed lifetime	−0.003 (0.004)	0.003 (0.005)	−0.001 (0.007)	−0.003 (0.004)
Number of arrests in 6 months prior to incarceration	−0.09 (0.08)	−0.19 (0.09)†	−0.06 (0.08)	0.009 (0.06)
Log days in the community at follow-up	0.45 (0.06)†	0.65 (0.07)†	0.63 (0.08)†	0.58 (0.07)†

…variable not included in model

*Total N=444, 227 collaborative behavioral management and 217 standard parole.

†p<.05

‡p < .10