Published in final edited form as:

J Offender Rehabil. 2014 ; 53(7): 543–561. doi:10.1080/10509674.2014.944739.

Economic Costs of a Postrelease Intervention for Incarcerated Female Substance Abusers: Recovery Management Checkups for Women Offenders (RMC-WO)

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Abstract

This study estimates the economic costs of Recovery Management Checkups for Women Offenders (RMC-WO), highlighting the unique mix of services and differential costs between two distinct phases of the intervention. Participants were randomly assigned to quarterly outcome monitoring (OM) only (n=242) or OM plus Recovery Management Checkups (OM-plus-RMC) (n=238). The OM-only condition has a total annual economic cost of \$76,010, which equates to \$81 quarterly per person. The average cost per OM interview completed is \$86. OM-plus-RMC generates a total annual economic cost of \$126,717, or \$137 quarterly per person. The cost per interview completed is \$147 and the cost per intervention session completed is \$161. RMC-WO has a relatively modest additional cost compared with the average costs of post-release supervision, which can range from \$3.42 (\$1,250) per day (year) for probationers to \$7.47 (\$2,750) per day (year) for parolees. The clinical, economic, and policy implications of incorporating RMC-WO into existing corrections and/or community-based treatment settings are discussed.

Keywords

cost analysis; women offenders; recovery management; economic analysis; outcome monitoring

INTRODUCTION

Substance use disorders among criminal offenders present unique challenges to criminal justice, health care, and social services systems. Within the criminal justice system, stakeholders must balance punishment and public safety concerns while addressing the issues of rehabilitation and the treatment of addiction—a chronic, cyclical, and

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ClinicalTrials.gov ID: NCT01334164

multidimensional disease that is pervasive among criminal offenders and requires long-term monitoring and extended care protocols (Hser, Longshore, & Anglin, 2007; McLellan, Lewis, O'Brien, & Kleber, 2000; NIDA, 2006; Scott, Foss, Lurigio, & Dennis, 2003). Central to these challenges are concerns about the economic feasibility and viability of corrections-based and post-release interventions for offenders with substance use disorders. In the face of unprecedented local, state, and federal budget crises, economic analysis can bridge science and policy by identifying and valuing the resources needed to successfully implement evidence-based interventions. Cost analyses form the foundation for identifying cost-effective programs that could also save money over time by reducing the negative consequences associated with substance use and criminality.

Women offenders, approximately 70% of whom have substance dependence or abuse issues (Karberg & James, 2005), are of particular concern as they represent the fastest-growing subgroup of detainees in local jails (Harrison & Beck, 2006; Minton, 2011). Women offenders are also more likely to have co-occurring mental health problems that further complicate their rehabilitation, recovery, and reentry experiences (CASA, 2010; Guydish et al., 2011; Adams et al., 2011; Zlotnick et al., 2008; Grella, Scott, & Foss, 2005). Moreover, the social and economic implications of addiction and criminality extend to the children of women offenders. Women in the criminal justice system have an estimated 1.3 million children and nearly 80% of these women were the primary caretakers of their children prior to incarceration (Mumola, 2000).

Jail stays are usually for only a few weeks or months; hence a large number of women are released into the community every year after serving a brief time in jail. Efforts to close the "revolving door" between jail and the community for women offenders have had dubious success, and recidivism among women offenders remains high, ranging from 23% after 6 months to 46% after 3 years (Heilbrun et al., 2008). Without structured and successful interventions to assist women offenders as they transition from jail to the community, many of the challenges they face are insurmountable. Limited access to treatment, health care, social services, and employment opportunities likely contribute to high rates of recidivism among women offenders (Grella & Greenwell, 2007; Scroggins & Malley, 2010; Richie, 2001).

Continuing care and other re-entry protocols for offenders with substance use disorders are an important focus in criminal justice and public health programs (NIDA, 2006; Pelissier, Jones, & Cadigan, 2007; Taxman, Perdoni, & Harrison, 2007). Yet, only limited clinical evidence, and almost no economic research, support a standard set of evidence-based re-entry models for women offenders with substance use disorders. This study responds to the need for economic information on re-entry and community-based interventions for women offenders by presenting findings from the first comprehensive cost analysis of a novel recovery management strategy for women offenders being released from jail: Recovery Management Checkups for Women Offenders (RMC-WO). The following section discusses the effectiveness of post-release interventions for offenders with substance use disorders and reviews the limited findings that are specific to women offenders.

POST-INCARCERATION TREATMENT AND RECOVERY SUPPORT FOR WOMEN OFFENDERS WITH SUBSTANCE USE DISORDERS

An extensive collection of primary studies, systematic reviews, meta-analyses, edited books, and government reports define the current state of knowledge on treating criminal offenders with substance use disorders (e.g., Knight & Farabee, 2004; 2007; Taxman et al., 2007; Prendergast, 2009; CASA, 2010; NIDA, 2006; Andrews et al., 1990; Friedmann, Taxman, & Henderson, 2007; Belenko & Peugh, 2005). The most prevalent treatment programs and services for offenders include in-prison therapeutic communities (TCs), drug treatment courts, work release programs, intensive probation/parole, and case management. Jails tend to have a more limited set of substance abuse services, consisting primarily of drug/alcohol education, group counseling, and relapse prevention (Taxman et al., 2007).

Results from randomized trials and quasi-experimental studies of various treatment strategies for criminal offenders with substance use disorders are generally mixed, but one key finding has been consistent. Namely, post-release aftercare programs play a pivotal role in reducing substance use relapse and/or criminal recidivism among offenders (e.g., Prendergast, Hall, Wexler, Melnick, & Cao, 2004; Wexler, Melnick, Lowe, & Peters, 1999; Inciardi et al., 1997; Knight, Simpson, & Hiller, 1999) and generate cost-savings (McCollister et al., 2003; 2004; Griffith, Hiller, Knight, & Simpson, 1999). The specific type of aftercare (e.g., residential or standard outpatient treatment) is actually less important than simply having access to pre-release services designed to facilitate community re-entry and engagement with aftercare and recovery support services (Burdon, Dang, Prendergast, Messina, & Farabee, 2007).

Several studies have tested probation- and parole-based interventions for male and female offenders with substance use disorders, including two recent multi-site trials funded under the National Institute on Drug Abuse's Criminal Justice Drug Abuse Treatment Studies (CJ-DATS) cooperative. Transitional Case Management (TCM), which incorporates a strengths-based case management model into parole supervision, was compared with standard parole services across four sites on measures of substance abuse treatment participation, receipt of social services, and behavioral outcomes related to substance use, criminal activity, and HIV risk behaviors (Prendergast et al., 2011). Over a nine-month follow-up period, no significant differences were found in service utilization or behavioral outcomes between TCM and standard parole.

The Step'n Out trial was implemented in six sites, and compared standard parole to collaborative behavioral management (CBM), in which parole officers and treatment counselors worked in teams to reduce substance use relapse and reincarceration among parolees (Friedmann et al., 2013). As with the TCM study, no main intervention effects of CBM were found in terms of hard drug use, rearrest, or criminal activity. Significant differences in outcomes favoring CBM were reported for a subgroup of participants whose primary drugs were marijuana, inhalants, or hallucinogens.

A separate study on a subset of Step'n Out participants evaluated the influence of gender as well as the interaction effect between gender and treatment on follow-up substance use and

criminal recidivism (Johnson, Friedmann, Green, Harrington, & Taxman, 2011). In CBM and standard parole, women were significantly less likely to use substances during the follow-up period than their male counterparts. In addition, women in the CBM condition were significantly less likely to use alcohol than men in CBM. These findings suggest that CBM is potentially more effective in addressing substance use recovery issues specific to women offenders.

Another recent study reports findings from a randomized clinical trial comparing probation case management (PCM) designed specifically for women offenders to standard probation supervision for women offenders (Guydish et al., 2011). PCM officers had reduced caseloads, which allowed for more intensive involvement with clients in order to provide supervisory and case management services (e.g., client counseling, home visits, service referrals, and attend court, medical, and other appointments with client). PCM was expected to facilitate greater access to needed services and generate significantly better behavioral outcomes (measured by lower ASI scores and fewer arrests) than standard probation. Results showed no significant differences between PCM and standard probation among most measures, including service utilization. The authors posit that imposing a dual role on probation officers (i.e., supervision and case management) could have limited the effectiveness of case management activities.

The literature summarized here illustrates the lack of consensus in defining one or more preferred approaches to providing post-incarceration substance use recovery and community reentry support services for women offenders. From a purely economic perspective, the absence of a treatment effect would lead to a comparison of costs only, and the least expensive alternative would be the optimal choice. Economic data on these programs, however, is sparse. Previous studies have estimated the cost of conventional “acute care” treatments for criminal offenders including in-prison residential treatment, work release therapeutic community programs, community-based residential aftercare, intensive probation or parole supervision, and diversion programs such as drug court (e.g., McCollister & French, 2002; Aos, Phipps, Barnoski, & Lieb, 2001; Aos et al., 2011; Logan et al., 2004). Average (per participant) episode costs for these programs range from \$217 for a cognitive behavioral therapy session to \$7,124 for intensive post-release supervision with relapse monitoring (Aos et al., 2011). Standard probation costs (per probationer) average \$1,250 per year and standard parole costs \$2,750 per parolee, per year (Pew Center on the States, 2009). These estimates will be revisited later in the paper to benchmark our cost estimates for RMC-WO.

RECOVERY MANAGEMENT CHECKUPS (RMCs)

One promising approach for women offenders is the Recovery Management Checkups (RMC) model, which is based on the premise that ongoing monitoring and early reintervention will positively affect the long-term trajectory of addiction careers. Results from recent clinical trials of RMCs in a community-based population of adults with substance use disorders indicated that, relative to a control group, RMC subjects spent less time in the community using drugs, experienced quicker linkages with substance abuse treatment, had greater treatment engagement, exhibited less long-term substance use, and

experienced fewer symptoms of a substance use disorder (SUD) (Scott & Dennis, 2009; Dennis & Scott, 2012).

Motivated by these significant findings supporting the effectiveness of RMC, a formal cost-effectiveness analysis was conducted in which the incremental cost of adding the RMC component to standard quarterly assessments was estimated as well as the incremental effectiveness in terms of the number of days abstinent from drugs and alcohol and the number of substance-use-related problems over a four-year period (McCollister et al., In Press). The incremental cost estimates were relatively small, but the mean differences for both effectiveness measures were statistically significant ($p < 0.01$) and favored RMC. The incremental cost-effectiveness ratio for OM-plus-RMC was \$23.38 per day abstinent and \$59.51 per reduced substance-related problem. When additional costs to society from health care services, criminal justice system involvement, social services, and employment were factored into the analysis, OM-plus-RMC was actually less costly and more effective than OM-only.

The Recovery Management Checkups for Women Offenders (RMC-WO) experiment (Scott & Dennis, 2012) is currently testing the long-term effectiveness of the RMC model with a group of women offenders following their release from jail. In addition to linkage services to improve treatment access, engagement, and retention, the intervention also includes an HIV risk reduction component during the first three months. The intervention is designed to foster change in three specific areas: substance use, HIV risk behaviors, and illegal activity.

To address the absence of information on the costs of continuing care for women offenders, this study estimated the economic costs of RMC-WO between two distinct phases of the intervention. Phase 1 refers to the first 90 days post-release from jail, during which time the women in the RMC condition receive three (monthly) sessions designed to evaluate their progress and link them with substance abuse treatment, if needed. They also receive a structured intervention to reduce HIV risk behaviors. Phase 2 refers to months 3 through 36 post-release, which focuses on tracking, monitoring, and delivering the RMC intervention each quarter. Cost analysis results are summarized by resource category for each intervention phase as well as overall in terms of an aggregate annual estimate. Summary cost statistics are presented for quarterly cost per participant, average cost per OM interview completed, and average cost per RMC intervention session completed.

OVERVIEW OF RMC-WO TRIAL

The RMC-WO trial targets adult women offenders with a range of substance use disorders who are processed through the Cook County Illinois Sheriff's Department of Women's Justice Services (DWJS). To be eligible for the study, women must have substance-use-related problems including any reported substance use (i.e., illicit drugs and alcohol) within the 90 days prior to incarceration or a clinical diagnosis of a substance abuse or dependence disorder. More than 3,000 women admitted to the DWJS were screened during the RMCWO trial recruitment period. Of the 1,483 women who were eligible to participate, 617 (42%) were released from jail before the 14-day inclusion criteria, leaving a total of 866 eligible participants. Fifty-six (6% of 866) women refused to complete the intake interview, 230

(28% of 810) were not released to the Chicago community, and 88 (15% of 580) were still pending release at the time recruitment for the study ended. Of the remaining 492 women, 12 (2%) refused to participate in the study.

Women who consented to the trial (N=480) were randomly assigned to one of two study conditions upon release from the DWJS jail-based substance abuse program: OM-only (N=242), the control condition, or OM-plus-RMC (N=238), the experimental condition. Both OM-only and OM-plus-RMC participants received a baseline assessment, substance abuse treatment in jail, and referrals to community-based treatment upon release. Follow-up interviews and checkups were always conducted in person and occurred post-release at 30, 60, and 90 days; and then quarterly for three years. Annual interviews were also conducted as part of the research evaluation. The average time to complete a monthly or quarterly interview was 1.5 hours; the annual interview lasted about 3 hours.

The original RMC protocol was modified to directly address special issues pertaining to women offenders. The intervention involves a mixed strategy (Field, 2004) comprised of substance abuse treatment in jail, post-release services, motivational interviewing, and a structured, gender-specific, HIV supplementary intervention (Wechsberg, Dennis, & Stevens, 1998; Wechsberg, Lam, Zule, & Bobashev, 2004). During each check-up, women in the RMC-WO experimental condition met with a Linkage Manager whose role was to identify individuals who were at risk or perceived themselves to be at risk for relapse; to generate greater awareness of high-risk behaviors and motivate participants to make positive changes; and to link participants with formal substance abuse treatment as needed. The linkage process extends beyond simply facilitating participants' admission to treatment. RMC linkage managers work with participants to improve treatment retention rates using a protocol that combines a standardized schedule of personal visits and telephone calls. Through this process, participants also learn the importance of early, formal reintervention when substance use or related problems arise (Scott & Dennis, 2012).

OM refers to the tracking and monitoring component of RMC-WO in which participants complete a formal outcome monitoring interview using a modified version of the Global Assessment of Individual Needs (GAIN) (Dennis, Titus, White, Unsicker, & Hodgkins, 2003) to collect information on substance use, illegal activity, and risky sexual or drug using behavior as well as a host of contextual factors (Scott & Dennis, 2012). OM is based on a highly structured follow-up model for successfully completing outcome assessments with more than 90% of participants in drug outcome studies (Scott, 2004; Scott & Dennis, 2009; Scott, Sonis, Creamer, & Dennis, 2006). This model has been used to conduct more than 30,000 monitoring interviews with an average completion rate of over 94%.

COST DATA COLLECTION AND ANALYSIS

Cost data for OM-only and OM-plus-RMC were obtained from internal accounting and clinical records at Chestnut Health Systems. These data contain extensive details on staff activities, which allowed for the allocation of personnel time and other resources by the actual minutes spent tracking and monitoring participants and delivering the RMC intervention. Study investigators also listened to a random selection of participant interview

tapes to validate staff time reported in the internal records. Cost estimation methods combined activity-based costing for personnel costs and the use of aggregate quarterly expenditures for other allocated intervention resources based on the proportion of staff time dedicated to each intervention condition (Kaplan & Anderson, 2007; Drummond et al., 2005).

The main component of OM costs was personnel effort; specifically, the time spent tracking participants and completing the OM interview. For RMC, investigators used a Linkage Assistance Worksheet (LAW), which delineated the items that drove the RMC intervention, including identifying a potential relapse, conducting a motivational interview to provide feedback on a participant's current situation and encourage her to return to treatment, and completing the actual linkage with treatment. During the first 90 days post-release, RMC participants also received a structured HIV intervention targeting risky sexual and drug using behavior at each of the 30-, 60-, and 90-day meetings with intervention staff. The first 90 days is intensive in terms of intervention resources and costs; thus, we refer to this quarter as Phase 1 of the intervention and everything occurring after this point as Phase 2.

Additional categories of RMC-WO costs include contractors, supplies, travel, miscellaneous resources, and indirect costs. Participants were also provided with cash incentives for completing the checkup that were paid upon completion of the interview. The total amount varied by type of interview completed (e.g., annual, quarterly), interview completion date (e.g., within a week of the scheduled date), and willingness to submit urine and saliva samples for drug and HIV testing. As an example, the compensation to complete the 3-hour annual interview was \$50, and \$25 for the 1.5-hour quarterly interview. If all targets were met (completing all assessments in a timely manner and providing drug screening samples), participants could earn up to \$845 over the duration of the trial. In an effort to exclude research-related costs from the analysis, investigators prorated the amount of participant reimbursement and other intervention costs using the number of minutes required to complete the standard set of outcome monitoring and linkage assistance measures as a percentage of total interview duration (i.e., what would be delivered without a research study in place).

We selected 2010 as the representative year for the cost analysis because all study participants were actively participating in at least one phase of the intervention at that time. Total annual costs were calculated for OM and RMC by summing the subtotals for each resource category described above. To estimate the quarterly cost per participant, we first calculated the actual number of months each participant received intervention services in 2010. An individual who started the intervention on January 1st would have received 3 interviews during Phase 1, and then three additional quarterly interviews through December 31st. This person would have been considered actively engaged for the full 12 months of 2010 and assigned a participation weight of 1.0. Another individual who already completed Phase 1 prior to January 1st would only receive quarterly interviews during 2010. If an interview occurred towards the end of 2009, the individual may have completed her next quarterly interview in April 2010, followed by August 2010, and then not again until 2011. In this case, an individual who was only interviewed twice during 2010 would have been weighted 0.5 (6 out of 12 months). This approach more accurately reflects the flow of

intervention services and costs, which would have been underestimated had we simply divided total costs by the full analysis sample (i.e., 242 for OM-only and 238 for OM-plus-RMC). This produced a count of active “person-quarters” for each study condition with which we could divide the annual, Phase 1, and Phase 2 total costs to produce a phase-specific cost per quarter. We further divided total costs by the corresponding number of OM interviews and the number of intervention sessions completed to estimate the average cost per interview and cost per RMC session.

RESULTS

Table 1 provides information on participant characteristics including socio-demographics, substance use, victimization, and criminal activity. This information is adapted from Table 2 of Scott and Dennis (2012), which contains the full summary of participant characteristics by randomized condition. The sample is comprised of mostly African American women (83%). Approximately 5% reported being of Hispanic ethnicity, and more than 90% of the sample reported being non-white. Most women were between 30 and 50 years of age; 7 % were younger than 21, and 12% were older than 50. More than 60% of the participants reported having at least one child, the majority of which had sole (41%) or joint (27%) custody of their children. In addition, participants reported high rates of weekly substance use, victimization, HIV risk behaviors, and criminality, and only about 16% reported being employed at the intake interview. All of these characteristics are indicative of a socially and economically disadvantaged group at high risk for substance use relapse and criminal recidivism.

Results of the cost analysis are presented in Table 2. The columns represent three different perspectives on costs for each study condition: aggregate annual costs, Phase 1 costs, and Phase 2 costs. As described above, Phase 1 pertains to the first 90 days post-release where RMC participants received a monthly HIV-focused supplementary intervention. For ease of interpretation, this is indicated in Column 5 as “OM-plus-RMC with HIV intervention.”

Costs attributable to each resource category are reported in the top half of Table 2. Summary cost statistics are presented in the bottom half of Table 2 and include: average cost per quarter (weighted by months of participation as described in the Methods section), average cost per OM interview completed, and average cost per intervention session completed (relevant to the RMC participants only). The first set of columns presents the aggregate annual costs in 2010 dollars for each study condition. OM-only has a total annual economic cost of \$76,010. The average cost per quarter is \$81, which, as expected, is very close to the average cost per OM interview completed (\$86), as these interviews were conducted quarterly.

OM-plus-RMC generates a total annual economic cost of \$126,717, which is \$137 per quarter for the average participant. The cost per interview completed is \$147, and the cost per intervention session completed is \$161. Subtracting the economic cost of OM-only from OM-plus-RMC yields the incremental costs associated with RMC alone (i.e., the additional intervention cost on top of OM). On an annual basis this amounts to $\$126,717 - \$76,010 = \$50,707$; \$56 per quarter for the average participant; and \$61 per OM interview completed.

Phase 1 costs associated with the first 90 days post-release are \$11,401 for OM-only and \$31,679 for OM-plus-RMC (with HIV intervention). On a per-participant basis, Phase 1 costs are \$165 for OM-only and \$461 for OM-plus-RMC. This shows that the RMC intervention costs are about \$20,000 more than OM-only (or about \$297 per participant) during Phase 1. As described above, this additional cost comprises the extra resources to deliver the HIV intervention and the more frequent meetings with intervention staff during this phase (three times during the first 90 days instead of once per quarter). The cost per OM interview completed during Phase 1 is \$75 for OM-only and \$210 for OM-plus-RMC. The cost per RMC intervention session completed during Phase 1 is \$236.

Phase 2 costs reflect monitoring and RMC-specific activities beyond the first 90 days post-release. Staff time and other resources were averaged over intervention months 4 to 33 to derive an average quarterly cost per study condition. The total economic cost reported for Phase 2 actually represents three quarters (i.e., a nine-month perspective on intervention activities) such that Phase 1 and Phase 2 costs sum to the aggregate annual costs presented in the first set of columns. The total economic cost of these three representative quarters of Phase 2 is \$64,608 for OM-only and \$95,038 for OM-plus-RMC.

The average cost per quarter during Phase 2 is \$76 for OM-only participants and \$113 for OM-plus-RMC. The incremental cost associated with RMC specifically is only \$37 per quarter for the average participant during this phase. Based on the number of interviews completed during Phase 2, the cost per OM interview is \$88 for OM-only and \$134 for OM-plus-RMC. The average economic cost per RMC intervention session completed during Phase 2 is \$146. A simple comparison of costs between OM-only and OM-plus-RMC over these two phases reveals that the costs of these study conditions begin to converge over time.

Given that cost data tend to be highly skewed, Figure 1 provides a useful illustration of the variation by individual in the cost of RMC sessions overall and then of the variation by phase using Tukey Box Plots (McGill, Tukey, & Larsen, 1978). Each column shows the median cost per RMC intervention (with an asterisk *), interquartile range (box), and arithmetic range (red line). During Phase 1, when participants received RMC plus HIV interventions monthly, half the sessions cost between \$230 and \$278. During Phase 2, when participants received RMC monthly, half the sessions cost between \$124 and \$150. While session costs display some spread around the mean, the distribution is still relatively tight.

DISCUSSION

This study provides the first comprehensive economic cost analysis of a non-punitive (i.e., not mandated by the DWJS), post-release approach to long-term recovery management for women offenders with substance use disorders. In other words, reported use during the interviews and checkups were not linked to criminal justice consequences. Broad and detailed record keeping by study investigators allowed for a careful analysis of the resources and costs attributable to each phase of the intervention. This research contributes significantly to the literature, which contains very limited economic information on post-release recovery management protocols for women offenders.

Beyond summarizing the total and per-participant costs of each condition, an important goal of this study was to highlight the unique aspects and costs of each intervention phase to better understand the financial considerations of implementing RMC-WO on a broader scale. Direct questions answered by the study findings are: how much is invested in OM-only; what are the additional costs of RMC; how do these costs vary by intervention phase; and what are the average costs per person, per interview completed, and per intervention session completed?

Results show that OM-only has a very modest cost (\$81 per quarter for the average participant) and that the incremental cost of RMC is also quite modest (an additional \$56 per quarter). To put these data into a broader context, consider alternative post-release programs for offenders. Current approaches tend to be probation- or parole-based and absorb significant resources from the criminal justice system. For instance, based on a study conducted by the Pew Charitable Trusts (2009), the average cost for “managing an offender in the community” ranges from \$3.42 per day for probationers to \$7.47 per day for parolees – about \$1,250 to \$2,750 per year, respectively. Even at the low end of this range, the quarterly cost per participant in OM-plus-RMC (\$137) is less than half of the quarterly probation costs ($\$1,250/4 = \313 per quarter).

These cost comparisons are useful to benchmark OM-plus-RMC to existing services for women offenders, but it is not immediately transparent how RMCs might overlap and/or complement existing corrections-based monitoring through probation and parole. RMC monitoring would overlap, to some extent, the screening for substance use and referral to substance abuse treatment protocols that are operating in most probation/parole systems. The extent to which probation and parole officers and/or treatment program staff attempt to facilitate linkage and engagement with treatment varies tremendously among jurisdictions, however, and limited information is available on how standard monitoring handles the special needs of women offenders. Consequently, RMCs could overlay standard monitoring and fill the gaps in these areas. RMCs could be operated within a probation and/or parole department, or as a separate treatment reengagement service provided by contractors (as with case management programs such as Treatment Alternatives to Safe Communities [TASC]). Alternatively, RMC could be integrated into existing substance abuse treatment networks—perhaps most logically through a central intake and referral center for individuals seeking publicly-funded treatment.

The exact logistics and broader implementation questions are best understood in the context of the financial aspects of providing RMC-WO, which was the main goal of this study. With the addition of this economic analysis of RMC-WO, the evidence base for RMCs now includes effectiveness, cost effectiveness, and cost-savings data, as well as a detailed cost analysis of RMC adapted to the needs of a high-priority population of women offenders. The findings that RMCs are cost-effective and cost-saving in a non-corrections based sample, and have relatively modest costs when adapted for women offenders, is suggestive that RMC-WO will also be cost effective and cost saving. Of course, such a claim is speculative until the full economic evaluation is completed. Nevertheless, the cost estimates alone are likely to initiate interest from criminal justice, treatment provider, and government/private

payer stakeholders to explore a formal role for RMCs with the female offender population and in other settings.

From economic and policy perspectives, it is important to understand the potential RMC-WO has for generating large net economic benefits through reductions in the negative consequences associated with substance use, HIV risk behavior, illegal activity, and other antisocial behavior. Economic benefits can be measured across multiple domains, such as physical health services, mental health services, criminal activity, criminal justice services, employment/education, social and community services, and child welfare services. In pecuniary terms, avoiding one inpatient hospital day saves \$1,910 in assorted healthcare expenses (Henry J. Kaiser Family Foundation, 2012), and avoiding one aggravated assault saves more than \$107,000 (McCollister, French, & Fang, 2010). Similarly, avoiding an HIV infection would save anywhere from \$5,104 to \$46,482 in annual medical costs (Beck, Harling, Gerbase, & DeLay, 2010). Based on these monetary conversion factors, even modest reductions in these negative consequences would more than offset the cost of OM-plus-RMC. Future research from the investigative team will examine the full range of economic benefits associated with RMC-WO, allowing us to estimate the corresponding short-term and long-term cost-savings.

A few research limitations are notable. The RMC-WO sample is predominately African American, which is a high-risk population of special interest, but also limits the generalizability of the findings. Second, despite efforts to carefully omit research-related costs, the fact that this intervention is being run as a clinical trial could have slightly inflated what we are reporting as direct RMC-WO intervention costs. We know, for instance, that in a real world setting, OM interviews and RMC linkage assessments would probably be shorter in duration. As described in the Methods section, we attempted to adjust for this by prorating costs across all resource categories based on the staff time allocated to intervention-specific tasks. Third, the adaptability of RMC-WO to existing criminal justice, substance abuse treatment, and/or general healthcare settings is not clear. This is an important practical issue we will continue to explore as we evaluate the long-term effectiveness and economic benefits of RMC-WO in separate studies. Finally, additional services, such as helping participants locate a place to stay in a recovery house, that, while not formally a part of the RMC-WO intervention, were accessed by study participants. We did not include any ancillary services in the cost analysis, but will explore differences in ancillary services utilization and related costs across conditions in a separate study.

CONCLUSION

This is the first study to provide a rigorous economic cost analysis of RMC-WO – a novel approach to addressing substance use and related problems among women offenders within a chronic disease model. Findings provide important information for policy makers trying to understand how to allocate scarce public resources to re-entry programs for women offenders. Future research will conduct a full economic evaluation of RMC-WO to quantify the net economic benefits and examine the incremental cost effectiveness of RMC in achieving reductions in drug use, criminality, and HIV risk behaviors.

Acknowledgments

Funding Source: Financial assistance for this study was provided by the National Institute on Drug Abuse (NIDA; grant numbers R01 DA031785 & R01 DA021174).

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Figure 1.
Individual Variation in RMC Costs Per Session by Intervention Phase

Table 1Summary of Select¹ Participant Characteristics

	RMC-WO (Column %)		
	OM-only (n=242)	OM-plus-RMC (n=238)	Full Sample (n=480)
Demographics			
African American	81	85	83
Caucasian	8	8	8
Hispanic	5	4	5
Other/Mixed	5	3	4
Non-white	92	92	92
18–20 Years Old	7	7	7
21–29 Years Old	20	24	22
30–39 Years Old	29	24	27
40–49 Years Old	32	35	33
50+ Years Old	13	11	12
Family Characteristics			
Married/living with someone	11	13	12
Divorced/separated/widowed	18	15	17
Never married	71	72	71
Child/Custody - None	41	33	37
Has custody	33	37	35
No custody	18	22	20
Mixed custody	8	8	8
Substance Use			
Weekly Alcohol Use in Home	28	33	31
Weekly Drug Use in Home	29	30	30
Environment			
In school ²	5	8	7
Employed ²	17	15	16
Current CJ Involvement ²	42	46	44
Ever Been Victimized ³	67	69	68
Acute Victimization ³	48	48	48
Legal			
Moderate/High Crime or Violence	50	55	53
Property Crime	24	22	23
Interpersonal Crime	10	10	10
Drug Related Crime	30	32	31
Moderate/High Violence	39	43	41

Note: Relevant percentages may not add to 100 due to rounding.

¹ Full list of participant characteristics by randomized condition available in Scott and Dennis (2012).

² During the past 90 days

³ Attacked with a weapon, beaten to the point of bruises or broken bones, sexually assaulted, or emotionally abused; Acute victimization is 4+ symptoms on the GAIN's General Victimization Index.

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Table 2

RMC-WO Cost Analysis Results

Resource Category	Aggregate		Phase 1:		Phase 2:	
	Annual Costs ¹		First 90 Days Post-release ²		3–36 Months Post-release ³	
	OM-only	OM-plus-RMC	OM-only	OM-plus-RMC plus HIV interv.	OM-only	OM-plus-RMC
Personnel	34,544	53,444	5,182	13,361	29,363	40,083
Contractors	3,711	5,898	557	1,474	3,154	4,423
Supplies	10,593	23,967	1,589	5,992	9,004	17,975
Travel	502	494	75	123	427	370
Participant	5,445	5,355	817	1,339	4,628	4,016
Other/Miscellaneous	1,592	4,723	239	1,181	1,353	3,542
Indirect (34.8%)	19,623	32,837	2,943	8,209	16,679	24,628
Total Economic Cost	76,010	126,717	11,401	31,679	64,608	95,038
Average Economic Cost per	N	Average Cost	N	Average Cost	N	Average Cost
Quarter (weighted) ⁴	239	80.8	236	164.5	79	75.7
OM Interview Completed	884	86.0	862	75.0	151	88.3
Intervention Session Completed	—	—	785	161.4	134	—
						651
						146.0

Notes: dashed line indicates not applicable (N/A).

¹ Aggregate annual cost is calculated as the sum of total costs during the first 90 days and the average monthly cost over months 4 to 33 of the intervention times 9 (to provide a 12 month perspective on intervention costs). Based on steady state year of 2010.

² Phase 1 represents the first 90 days of the RMC intervention. RMC costs during this phase include a specialized HIV intervention (Wechsberg et al., 2004) delivered at months 1, 2, and 3.

³ Phase 2 reflects intervention activities beyond the first 90 days. The cost estimates represent average quarterly costs for a nine-month period based on total intervention costs over months 4 to 33.

⁴ To estimate the average cost per quarter, participation in 2010 was weighted based on the actual months of participation in intervention activities during Phase 1 and Phase 2.