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The Economic Costs of Quarterly Monitoring and Recovery Management Checkups for Adults with Chronic Substance Use Disorders

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Abstract

Recovery management checkups (RMCs) for clients with substance use disorders reduce the time from relapse to treatment re-entry, increase treatment retention, and improve long-term outcomes. The objectives of this paper are to calculate and compare the economic costs of providing outcome monitoring (OM) only with those of providing OM + RMC in order to help understand the feasibility of disseminating this model more widely. We estimate the total and incremental costs of OM and OM + RMC using data from a recently completed randomized controlled trial with adult chronic substance users (N=446). Adding RMC to OM increased total intervention costs by about 50% per person per year (\$707 to \$1,283) and quarter (\$177 to \$321). It cost an average of \$834 to identify a person in relapse and \$2,699 to identify, link, and retain them in treatment. The increased costs of RMC are modest relative to the substantial societal costs of chronic substance users returning to regular use, crime, and other risk behaviors.

Keywords

Economic cost; Recovery management; Controlled clinical trial; Substance abuse treatment

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1. Introduction

Historically, addiction treatment systems have been organized around an episode of care in which a person seeks treatment, is given an assessment, receives services, and is presumed cured—all in a relatively short period of time. We then examine outcomes months or even years later to determine the impact of this single episode of care (Scott & Dennis, 2011). The statistics pertaining to addiction tell a different story: 50-70% will relapse within the first 90 days after discharge, over half the people entering treatment are returning for another episode of care, and the average person takes 3 to 4 episodes of treatment over 8 to 9 years before they are able to sustain a year of abstinence (Dennis & Scott, 2007).

Recent surveys show that Americans are about evenly split in terms of viewing alcohol and drug addiction as an acute vs. chronic disease (French, Homer, and Nielsen, 2006; McLellan, Lewis, O'Brien, & Kleber, 2000; McKay, 2001, 2005; Room, 2005; Baumohl, Speigman, Swartz, & Stahl, 2003; Kymalainen & Weisman, 2004; Leshner, 1997; Office of National Drug Control Policy (ONDCP), 2010). These distinctions are not merely semantics, as important policy decisions and billions of public dollars depend on whether addiction is treated as an acute or chronic condition. If a chronic disease model prevails, a public health approach that significantly invests in prevention, treatment, and continuing care follows. Alternatively, if substance use is largely considered a personal choice rooted in rebellious tendencies, single-episode treatment and criminal justice policies such as source country controls, interdiction, legal sanctions, and incarceration become the choice architecture. Although this socio-political debate will likely persist for decades, the vast majority of economic evaluation research has demonstrated that a medical or public health approach is significantly more cost-beneficial to society than a criminal justice strategy (Caulkins, 2000; Caulkins, Everingham, Rydell, Chiesa, & Bushway, 1999; Cartwright, 1999, 2008; Anglin & Hser, 1990; Kerr, Small, & Wood, 2005; Substance Abuse and Mental Health Service Administration (SAMHSA), 2009). However, much of this work has focused only on outcomes after acute episodes of care or incarceration.

One of the public health approaches to managing substance use disorders as chronic conditions, quarterly Recovery Management Checkups (RMCs) over multiple years, has shown great promise in two recent clinical trials (Dennis, Scott, & Funk, 2003; Scott, Dennis, & Foss, 2005; Dennis & Scott, 2007; Rush, Dennis, Scott, Castel, & Funk, 2008; Scott & Dennis, 2009; Scott & Dennis, 2011). Based on the premise that ongoing monitoring and early re-intervention impact the long-term trajectory of addiction careers, the RMC model provides clients with quarterly assessments over several years, personalized feedback on their conditions, and linkage to treatment when they display symptoms of relapse. Clinical trial results indicate that, relative to a control group, RMC subjects spend less time in the community using drugs, experience quicker linkages with substance abuse treatment, and demonstrate greater treatment engagement. Consequently, they exhibit less long-term substance use and have fewer substance use disorder (SUD) symptoms, and the length of time they are “continuously using” in the community decreases. Reduced substance use is associated with fewer psychological problems, fewer HIV risk behaviors, and reduced criminal activity, all of which often lead to expensive health care use, incarceration, reduced productivity, and family disruption. However, before implementing on a larger scale such a strategy for managing addiction as a chronic condition, policy makers and other stakeholders must know how much it costs. The primary objective of this paper is to calculate and compare the economic costs of providing outcome monitoring (OM) only with OM plus quarterly RMCs.

2. Methods

2.1. Recruitment

Participants were recruited from sequential intakes at the largest addiction treatment agency in Illinois (intent-to-treat sample) between February and April of 2004. To be included in the study, they had to have past-year symptoms of substance use disorders, plan to live in the Chicago area for at least the next 12 months, speak English or Spanish, and be mentally able to provide informed consent. Of the 480 who met these criteria, 446 (93%) agreed to participate.

2.1.1. Participant characteristics—The mean age was 38, 46% were female, and 85% were African American. While 63% had never been married, 73% had children under 21 (23% in their custody, 38% in the custody of others, and 8% with mixed custody). Over 62% had been homeless in their lifetime, including 27% in the month before intake. Only 32% were employed and 8% reported being in school. Participants self-reported past-year clinical criteria suggesting they had substance dependence (76%), violence/crime problems (54%), internalizing disorders (53%), externalizing disorders (33%), infectious diseases (32%), other major health problems (25%), or were recently pregnant (12%). They also reported multiple risks related to HIV and other infectious diseases, including being sexually active (94%); experiencing high levels of victimization (56%); having multiple sexual partners (37%); trading sex for money, drugs, or food (19%); using needles (4%); and sharing needles (1%). Individuals reported high rates of health and/or criminal justice system involvement including 5 or more admissions to a hospital or emergency department (51%), 5 or more arrests (33%), 5 or more addiction treatment admissions (31%), and 5 or more times in a mental hospital (6%). None of these characteristics displayed significant differences at baseline, by condition.

2.2. Design

Participants were randomly assigned to OM or OM plus RMC (described below). They were interviewed using the Global Appraisal of Individual Needs (GAIN) (Dennis, Scott, & Funk, 2003; Dennis, Titus, White, Unsicker, & Hodgkins, 2003) at intake and at every quarter for four years thereafter, with an average quarterly follow-up rate of 95% (including 94% completion of all attempted interviews and 81% completion of all 16 follow-up interviews).

2.3. Conditions

2.3.1. Outcome monitoring condition—In the mid-90's, Scott and colleagues developed a highly structured model for reliably completing outcome monitoring interviews with over 90% of participants in drug outcome studies (Scott & Dennis, 2009; Scott, 2004; Scott, Sonis, Creamer, & Dennis, 2006). This model has since been used to conduct over 30,000 monitoring interviews with an average completion rate of over 94%, regardless of demographic or clinical subgroup characteristics and the length of the follow-up window (e.g., three months to nine years post-intake). Moreover, over 35 distinct studies have adopted this method.

2.3.2. Recovery management checkups condition—The core principal of RMC is that extended monitoring through regular checkups and swift re-intervention facilitates early detection of relapses, reduces treatment re-entry times, and improves long-term outcomes (Scott & Dennis, 2009; Scott & Dennis, 2011; Scott & Dennis, 2003). Rather than rely on chronic substance users to identify their symptoms and return to treatment on their own, these checkups proactively include quarterly assessments and personalized feedback for each participant. Staff members use motivational interviewing (MI) techniques (Miller, 2000) to involve participants in decisions about their care and to help them resolve their

ambivalence about their dependence and commit to change. The key steps in RMC include: (1) locating the person for a follow-up interview; (2) determining eligibility for the intervention (i.e. verifying that the person is not already in treatment or jail and is living in the community) as well as the need for treatment; (3) transferring participants in need of treatment from the Interviewer to the Linkage Manager for the intervention; (4) obtaining participant agreement to complete an intake assessment for treatment; (5) linking participants to the intake assessment; (6) linking participants to treatment; and (7) working with the participant until he or she is engaged in treatment for at least 14 days. The RMC manual (Scott & Dennis, 2003) is available online at http://www.chestnut.org/LI/downloads/Scott_&_Dennis_2003_RMC_Manual-2_25_03.pdf, and Scott and Dennis have described the implementation of the program at length elsewhere (Scott & Dennis, 2009; Scott & Dennis, 2011).

2.3.3. Cost data and estimation—The standard approach when evaluating a public health intervention such as OM or OM plus RMC is to first estimate the economic or opportunity cost of service delivery from a societal perspective (Drummond, O'Brien, Stoddart, & Torrance, 2005; Gold, Siegel, Russell, & Weinstein, 1996). Economic costs are often greater than actual expenditures because the former incorporate the market value of all resources involved in the delivery of services, even when resources are obtained for free or at discounted prices (Cartwright, 2008; Drummond et al., 2005; Zavala et al., 2005; Garber & Phelps, 1997; Popovici, French, & McKay, 2008; Foster, Dodge, & Jones, 2003). The Drug Abuse Treatment Cost Analysis Program (DATCAP) (Roebuck, French, & McLellan, 2003; French, Dunlap, Zarkin, McGeary, & McLellan, 1997; French & McGeary, 1997; French, Popovici, & Tapsell, 2008; French, 2003) is a standardized and widely administered data collection instrument for estimating the economic costs of addiction treatment services. Because the DATCAP organizes cost data across standard categories of resources (e.g., personnel, buildings and facilities, supplies and materials, and miscellaneous), it can be used for other types of interventions, including RMC and OM (e.g., Screening, Brief Intervention, Referral to Treatment [SBIRT], Drug Courts, and HIV and substance use prevention).

All cost data were obtained from internal records at Chestnut Health Systems and correspond to aggregate resource use and cost within six broad categories: labor; supplies and equipment; consultants and contractors; travel; buildings, facilities, and overhead; and miscellaneous. Capital or rental costs are subsumed under the category of buildings/facilities/overhead. Supervision costs associated with each condition are included in the labor category. A minimal amount of start-up costs is necessary to initiate OM + RMC, but it is difficult to put an exact dollar figure on start-up expenses. Following the approach outlined in the DATCAP User's Manual (<http://www.datcap.com>), we selected for data collection a fiscal year (2006/2007) in which the trial operated in a steady state, or at full capacity. All costs are reported in 2007 dollars. To the extent possible, we separated out those costs that were research related (e.g., data cleaning, reporting requirements, etc).

The average rate of pay for the linkage managers was \$22.50 per hour. Research staff completed a formal training program and participated in ongoing quality assurance to achieve and maintain high adherence to project protocols. To maintain fidelity of the RMC intervention, all linkage meetings were audio taped and reviewed by an external RMC expert until the linkage managers were certified prior to intervention implementation. Following certification, a random sample of tapes was reviewed throughout the term of the study. Both linkage managers had master's degrees and all interviewers were GAIN certified.

As noted earlier, the trial involved random assignment to OM only (control condition) or OM + RMC (intervention condition). Thus, we report costs in the same fashion. In addition

to the category-specific and total annual cost estimates, we calculated several other summary cost measures: average annual (per client) economic cost; average quarterly (per client) economic cost; average (per treatment linkage) economic cost; and average (per treatment engagement) economic cost. The last two measures pertain to individuals who were assigned to OM + RMC and were subsequently linked with and participated in a treatment program.

3. Results

We present the cost estimates for the intervention and control conditions in Table 1. The total annual cost of OM only was \$157,754, with labor accounting for about half of this total. With 223 clients randomly assigned to the OM condition, the average annual (per client) cost of OM only was \$707 (\$177 per quarter). During the 12-month analysis period, the outcome monitoring sessions took a total of 4 to 6 hours of client time (depending on distance traveled). The experimental condition (OM + RMC) had a total annual economic cost of \$286,084, with labor comprising about 60% of this total. With 223 clients randomly assigned to the OM + RMC condition, the average annual (per client) cost of OM + RMC was \$1,283 (\$321 per quarter). During the 12-month analysis period, 62% of the time clients had no additional burden and 38% of the time they were transferred for linkage sessions. When the latter happened, it required an average of 1 hour of client time. We did not formally value the cost of client burden because only 32 percent of the subjects were employed full- or part-time during the analysis period and 10% were incarcerated. Moreover, the interviewing schedule was highly flexible to work around client obligations and we are not aware of any participant who missed work or a job interview because of the study.

RMC is designed to identify people in the community who have relapsed, quickly return them to treatment, and keep them in treatment for at least seven sessions of outpatient and/or 14 days of residential treatment. We therefore calculated the cost per person of each of these stages. During the year corresponding to this cost analysis, the 223 RMC clients were scheduled for 892 quarterly interviews and completed 844 (95%). Of the 844 completed quarterly interviews, 343 resulted in the identification of someone who had relapsed, at an average cost of \$834 per person identified (\$286,084/343). Of the 343 people in need of treatment, 343 (100%) completed their linkage meeting, 154 (45%) agreed to return to treatment, 142 (41%) attended an intake appointment, 118 (34%) attended their first treatment session, and 106 (28%) stayed in treatment for at least seven days of outpatient or 14 days of residential treatment. Thus, it cost an average of \$2,699 per person (\$286,084/106) to successfully complete the full continuum from identification to treatment retention. While detailed cost data were not collected by stage, we roughly estimate that the total cost of OM + RMC comprises an approximate split of 48% for the outcome monitoring, 40% for the linkage session including transfer and scheduling, and 12% for post-session reminders and engagement contacts.

The costs presented here are for a steady state year for both conditions and do not include the cost of start up. We used Ph.D.-level staff to train and supervise the start up because the interventions were part of a broader research study. It is not clear, however, if these skills are necessary or appropriate for replication, so we did not estimate start-up costs accordingly. The start-up costs that accrued over a brief 2-week period are minimal compared to the costs of providing the interventions over 4 years. Nevertheless, any organization considering replicating RMC should be aware of the need for a tracking/follow-up unit, initial staff training lasting approximately 2 weeks, and ongoing technical assistance to provide monitoring/feedback and quality assurance.

4. Discussion

People with chronic substance use disorders often generate a wide variety of negative externalities (e.g., criminal activity, serious accidents, workplace conflicts, emergency medical care, family disruption) with high costs for both themselves and the rest of society (Anglin and Hser, 1990; Harwood, Fountain, & Livermore, 1998; 1999; Miller, Levy, Cohen, & Cox, 2006; Mullahy & Sindelar, 1995; Rice, 2003; Rosen, Miller, & Simon, 2008; Cook & Moore, 1994; Currie & Madrian 1999). Many studies have shown that the economic benefits of acute episodes of addiction treatment usually far exceed the cost of care (Cartwright, 2000, 2008; French & Drummond, 2005; McCollister & French, 2003; Holder, 1998; Fleming et al., 2000; Koenig et al., 2005; Rajkumar & French, 1997). However, because addiction generally lasts for many years, and half or more of patients need multiple episodes of treatment before they can sustain abstinence (Dennis & Scott, 2007; Dennis et al. 2004), it is necessary to explore techniques like RMC that manage recovery between episodes of care. In fact, one can view RMC as a model for managing addiction as a chronic condition because early detection of relapse, along with facilitation of treatment re-entry, likely avoids many of the costly externalities that would occur if the individual did not receive the needed care.

Simple cost-benefit comparisons demonstrate the potential economic return of RMC. We calculate representative economic benefits by using monetary conversion factors (i.e. market prices) for unique outcomes such as reduced criminal activity and health services use. Representative monetary conversion factors for criminal activity are \$3,532 per avoided theft and \$107,020 per avoided aggravated assault (McCollister, French, & Fang, 2010). The cost per avoided inpatient hospital day is \$1,418 (American Hospital Association (AHA), 2005). We also incorporate substance abuse treatment costs into the comparisons using the average cost per treatment episode for adult residential and adult outpatient treatment based on a recent compilation of substance abuse treatment costs in the U.S. (French, Popovici, and Tapsell, 2008).

As reported in Table 1, the average economic cost per treatment retention under RMC is \$2,699. If clients are retained in adult residential treatment, the additional treatment-related cost of RMC per residential treatment episode would be \$7,134, for a total cost of \$9,833. If clients are instead retained in adult outpatient treatment, the additional treatment-related cost would be \$2,580 per episode, for a total cost of \$5,279. Thus, if participation in RMC reduced just two thefts for the average outpatient client (or three thefts for the average residential client), the net economic benefit would be positive ($\$7,064 - \$5,279 = \$1,785$ in net benefit). Similarly, avoiding four inpatient hospital days for RMC plus outpatient treatment or seven inpatient hospital for RMC plus residential treatment would generate a benefit-cost ratio greater than unity ($5,672/5,279$ or $9,926/9,833$). Reducing just one aggravated assault on average would generate a benefit-cost ratio for RMC plus treatment of more than 10:1 ($107,020/9,833 = 10.9$) for residential clients, and more than 20:1 for outpatient clients ($107,020/5,279 = 20.3$).

Although these simple benefit-cost exercises demonstrate the potential economic value of RMC, the estimated number of clients retained in treatment due exclusively to OM + RMC (106) is probably overstated. Presumably, at least some of these clients eventually would have returned to treatment independently (i.e., without any intervention). Indeed, as presented in Table 1, 65 OM-only clients returned to treatment during the analysis period. To what extent the OM + RMC condition facilitates quicker treatment re-initiation following relapse and thereby mitigates costly social consequences has yet to be explored. The best way to address these issues is through a comprehensive benefit-cost analysis of OM and OM + RMC. The investigative team will conduct such a study in future research.

RMC as applied in the clinical research trial was more time-intensive than it would be in practice. Although we excluded research costs from the cost analysis of the OM and RMC conditions, it is likely that, in practice, clients and intervention staff would spend less time completing assessments and performing treatment linkages. For example, a shorter assessment instrument could be used in practice to capture only clinically relevant data. Treatment linkage meetings would also require less staff time if the meetings were conducted on site at the treatment agency. Therefore, additional cost savings could be associated with future applications of RMC in the field.

One limitation of the present cost study is our inability to cost out each stage of the intervention. Future research should consider a more formal time and motion study to better understand resource allocations across categories. It is also important to note that this study of RMC is only the second of its kind in the literature. Thus, more trials of RMC are needed to examine its generalizability to other settings, patients, and client groups.

5. Conclusion

With governments facing tight budgets and an endless supply of possible services to fund, health care programs must demonstrate both clinical effectiveness and a favorable economic return to be competitive (Drummond et al., 2005; French & Drummond, 2005; Holder, 1998; Cartwright, 2000; Pelletier, 2001, 2005; Sherman, 2002). Earlier research has established the clinical effectiveness of RMC for adult chronic substance users (Scott, Dennis, & Foss, 2005; Scott & Dennis, 2009). The present study provides the first part of the economic equation by rigorously estimating the opportunity costs of OM only and OM + RMC. Future research will commence the much more challenging task of estimating the cost effectiveness and net economic benefits of these two conditions. The full economic evaluation findings will provide potential funding agencies with the quantitative data they need to make informed decisions on allocating their scarce resources.

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Table 1

Economic Costs of Outcome Monitoring (OM) and OM + Recovery Management Checkup (RMC) for Adult Chronic Substance Users (2007 dollars)

Resource Category¹	OM Only (Control n=223)²		OM + RMC (Experiment n=223)³	
Labor	\$75,330		\$169,270	
Supplies and Equipment ⁴	6,122		8,756	
Consultants and Contractors	6,317		14,583	
Travel	4,930		13,583	
Buildings/Facilities/Overhead	19,324		30,224	
Miscellaneous ⁵	45,733		49,670	
Total Annual Economic Cost	\$157,754		\$286,084	

Average Economic Cost per	# of People	Average Cost	# of People	Average Cost
Year	223	\$707	223	\$1,283
Quarter	892	\$177	892	\$321
Client Relapse Identified	477	\$331	343	\$834
Client Retained in Treatment	65	\$2,427	106	\$2,699

Note: All data were collected and organized via internal accounting records at Chestnut Health Systems. Research-related costs were identified and removed from the analysis.

¹ Values within resource categories are annual costs for fiscal year 2006/2007.

² All subjects in the trial received OM, the baseline condition.

³ Half the subjects in the trial were randomized to RMC in addition to OM. These figures represent the total costs of adding RMC to OM.

⁴ Included in this category are office supplies, client food, building maintenance supplies, computer hardware, miscellaneous equipment, subscriptions, lab supplies, drug screens, and computer software.

⁵ Included in this category are client incentives, equipment maintenance, bank service charges, telephone, recruiting, and outside printing.