

Regular article

## A practical system for monitoring the outcomes of substance use disorder patients

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### Abstract

Outcomes monitoring and management are receiving mounting attention because of increased emphasis on health care accountability and cost containment. Efficient, practical outcomes monitoring systems (OMSs) are crucial if health care system performance is to be determined and effective/cost-effective treatments are to be identified, but such practical monitoring systems generally are lacking. This article describes the features of such a system for monitoring the care received by, and the substance use and psychosocial outcomes of, patients treated for substance use disorders (SUDs) in the Department of Veterans Affairs (VA). In contrast to a 15–21% follow-up rate achieved by VA SUD program staff under a previously mandated systemwide monitoring system, the monitoring system used in this project achieved a 67% follow-up rate without paying patients for their participation. We provide data on patient characteristics and treatment outcomes, estimate the cost of implementing this type of monitoring system on a broad scale, and provide recommendations for OMSs in other large health care organizations. © 2006 Elsevier Inc. All rights reserved.

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### 1. Introduction

Berman, Rosen, Hurt, & Kolarz (1998) argued that “the collection and dissemination of outcomes data provide both the greatest opportunity and the greatest challenge to improving the delivery of behavioral health services” (p. 129). The “opportunity” reflects the fact that outcomes monitoring, by producing evidence on performance, can be a crucial component in efforts to improve health care treatment practices and patient outcomes while containing health care costs. The goals of an outcomes monitoring system (OMS) typically are to assess patient outcomes, including functional and quality of life outcomes, to be able to gauge program performance, enhance program effective-

ness, and improve patients’ outcomes (Ellwood, 1988; Mechanic, 1996).

Identifying cost-effective treatments is particularly important with respect to substance use disorders (SUDs). Accrued scientific findings indicate that SUD treatment works (Finney & Monahan, 1996; Prendergast, Podus, & Chang, 2000; Prendergast, Podus, Chang, & Urada, 2002) and there is some evidence of cost offsets with respect to reduced health care utilization (Holder, 1998; cf. Booth, Blow, Cook, Bunn, & Fortney, 1997) and savings to society in other areas. For example, a comprehensive study found a return on taxpayer investment of US\$7.14 in health care savings and a reduction in crime-related expenses for every US\$1 spent on alcohol and substance use treatment in the State of California (California Department of Alcohol and Drug Programs, 1994). However, less clear-cut information is available concerning what treatments work best for all or particular subgroups of patients (e.g., Prendergast et al., 2000; Project MATCH Research Group, 1997).

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Moreover, research findings typically come from “efficacy” trials in which treatments are provided under unusually rigorous, controlled conditions that ensure a level of treatment delivery and patient compliance unlikely to be matched in real-world settings. The lack of clear data on the “effectiveness” of different forms of treatment as implemented in real-world settings, coupled with providers’ allegiance to different treatment approaches based on their training and clinical experience, has resulted in a wide range in services provided and in the costs of SUD treatment (Humphreys & Horst, 2001).

Monitoring SUD treatment program performance by assessing patients’ outcomes should serve to concentrate health care systems on cost-effective treatment practices. However, the introduction and maintenance of a monitoring system requires significant managerial effort and commitment of resources (Smith, Fischer, Nordquist, Mosley, & Ledbetter, 1997); this is a substantial component of the “challenge” in outcomes monitoring referred to above by Berman et al. (1998). Because of the demands posed by OMSs, they have not been widely implemented (Sederer, Dickey, & Hermann, 1996) and, when instituted, their implementation has lagged far behind that of systems to contain costs (Berman et al., 1998; Brown Burlingame, Lambert, Jones, & Vaccaro, 2001). Nevertheless, some programs to monitor SUD patients’ outcomes and care have been instituted at the state and federal levels in the United States. Lessons for enhancing the viability of monitoring systems can be drawn from considering these initial efforts and the problems they encountered.

### 1.1. Examples of state SUD OMSs

#### 1.1.1. State of Minnesota system

The State of Minnesota implemented an OMS between 1993 and 1999 to provide greater accountability and to contain costs for its chemical dependency treatment programs. The system focused on assessing patient outcomes following short-term inpatient and outpatient treatment (Harrison & Asche, 2001). Patient data comprised the Treatment Episode Data Set, which is required by the U.S. Substance Abuse and Mental Health Services Administration (SAMHSA) for all admissions to programs with federal or state funding, as well as information from a modified Addiction Severity Index (ASI; McLellan, Kushner, et al., 1992) and the Treatment Services Review (McLellan, Alterman, Cacciola, Metzger, and O’Brien, 1992), which provides weekly summaries of services received. Treatment staff collected intake data and an independent research organization conducted the telephone follow-up interviews, which took between 10 and 15 minutes to complete (Harrison, Beebe, Fulkerson, & Torgerud, 1996). In all, 3,670 adult outpatients and 1,283 adult inpatients, as well as 214 adolescent outpatients and 173 adolescent inpatients, were assessed at treatment intake. Six-month follow-up

rates were good—64.4% of the adult patients and 83.5% of the adolescent patients completed follow-up interviews (Harrison & Asche, 2001).

However, the Minnesota OMS experienced considerable noncompliance and had substantial difficulty meeting the target number of patients for baseline assessment, even with ample time allowed for assessing the target number of patients. The complicated and time-consuming intake assessments placed a significant burden on program staff. Staff members had to complete a training program before they could begin collecting intake data. Small programs with few staff members reported particular difficulty in conducting the required assessments while trying to meet clinical and administrative demands. Programs with high staff turnover likewise were hard-pressed to have a trained staff member consistently available to conduct intake assessments. For example, each adult program had a target of assessing 30 patients at baseline; however, only 61% of adult programs submitted complete baseline data on 30 patients, whereas 13% failed to submit any data at all (Harrison & Asche, 2001). Adolescent programs had a data collection target of between 5 and 25 patients, depending on program size, but only 76% met their data collection targets (Harrison & Asche, 2001).

#### 1.1.2. Treatment outcomes and performance pilot studies enhancement (TOPPS II)

SAMHSA has started the TOPPS II project and the National Outcome Measures System (NOMs; [www.nationaloutcomemeasures.samhsa.gov](http://www.nationaloutcomemeasures.samhsa.gov)). The goal of the TOPPS II, sponsored by the U.S. Center for Substance Abuse Treatment (CSAT) at SAMHSA, was to develop a standardized OMS for state SUD treatment programs (CSAT, 2000). This program supports states in developing OMSs or in refining Management Information Systems that measure performance and outcomes for SUD treatment. For most states, data collection or analyses are still underway, but a few states have begun to report their findings, as well as some implementation difficulties.

For example, the State of Massachusetts collected treatment data on 278 patients: 146 in residential, 121 in outpatient, and 11 in methadone programs. Assessments included a 30-minute intake interview, a 5-minute weekly patient assessment form, 10-minute quarterly assessments, and a 45-minute follow-up interview 9 months after intake. The multiple assessments presented a time burden for staff. In addition, a high rate of staff turnover led to considerable time being spent on training to administer the multiple measures. At the time of the CSAT (2000) report, Massachusetts was considering alternatives to lessen staff burden, including a web-based system for data collection and feedback, and the use of secondary data to supplement and validate new primary data being collected.

In addition to the TOPPS project, SAMHSA has started the NOMs and has worked with the states to develop the

State Outcomes Measurement and Management System to build infrastructure and processes for performance management in all states and jurisdictions. States are in different stages of reporting readiness, and some of the measures are still being developed.

### *1.2. Outcomes monitoring in the Department of Veterans Affairs*

Similar to the efforts in Minnesota, Massachusetts, and SAMHSA, the U.S. Department of Veterans Affairs (VA) implemented a system in October 1997 to monitor the outcomes of all new patients admitted to the VA SUD treatment programs. The ASI (McLellan, Kushner, et al., 1992) was mandated to be used to obtain information at treatment initiation and at a follow-up 6 months later on substance use, psychiatric symptoms, and psychosocial functioning of all new patients entering SUD treatment (Moos et al., 1998). The OMS was reinforced by separate performance measures for intake and follow-up assessments. Regional and facility directors in the VA had financial incentives tied to performance on these, as well as other, performance measures.

This effort was an important first step in the development of an OMS for VA SUD care; however, as with the state systems, there were significant implementation problems. The system was burdensome for clinical staff; they needed to conduct 50- to 60-minute ASI interviews to gather intake and follow-up data. Clinical staff then had to key-enter data from these interviews into an electronic database, which took from 5 to 15 minutes per interview. Furthermore, prior to administering the ASI interviews, staff needed to undergo an intensive 2-day training program. The requirement of intensive training for the ASI interview created additional problems when staff turnover occurred. Furthermore, without ongoing training, staff members were subject to interviewer “drift” (lack of adherence to protocol; see Fureman et al., 1994).

Collecting the required baseline ASI data was challenging for program staff; therefore, only 47% of those eligible patients in the Fiscal Year 1998 cohort were assessed (Moos, Federman, Finney, & Suchinsky, 1999). Conducting follow-up interviews was even more challenging. Locating patients for follow-ups is a time-consuming process. Many VA SUD patients are difficult to locate because they do not have a stable residence; once located, some patients require repeated contacts to secure follow-up data. Given the competing demand on clinical staff to provide patient care, it is not surprising that clinical staff achieved low follow-up rates of 15–21% (Moos, Finney, & Suchinsky, 2000; Otilingam, Ritsher, Finney, Moos, & Suchinsky, 2002).

More important, the resulting follow-up data likely were drawn from an unrepresentative sample of patients. Patients still or back in treatment are more likely to receive a provider-administered follow-up, thus creating a sampling

bias. Also, having follow-up data collected by the same staff that provided treatment likely puts pressure on patients to provide “grateful testimonials” (Campbell, 1969) because it is difficult for a patient to tell a committed treatment provider that his or her efforts to change the patient’s behavior were unsuccessful. Alternatively, clinicians may also be biased to record positive patient outcomes, particularly when their competence is under question (McLellan, Woody, & Metzger, 1996).

### *1.3. Limitations highlighted in previous SUD OMSs*

The monitoring systems reviewed above illustrate several design features that are potentially fatal for a large-scale health care OMS: (1) collecting follow-up data from the entire population of patients entering treatment, (2) relying on interviews or other time-consuming assessment procedures, and (3) using treatment staff to collect follow-up data. These system features can compromise the quality of data from a monitoring system and cause it to be too costly and burdensome to have long-term viability.

Collecting data from all programs in a treatment system and on all patients entering treatment may be unnecessary for a large health care system, such as that operated by the VA. It may be sufficient to monitor patients from a representative random sample of programs (Longabaugh, 1991), rather than all programs. For example, it may be reasonable to select a sample of programs that represent only the most prevalent treatment modalities (Carise, McLellan, Gifford, & Kleber, 1999). More important, regardless whether a sampling or population approach is taken with respect to SUD treatment programs, it is not necessary to reassess all patients entering treatment at follow-up. Intake information, which is readily obtained on all patients, may be useful for treatment planning purposes and, therefore, reasonable to obtain for all patients. However, for more difficult follow-up assessments, careful sampling of patients can yield data that are much less expensive to gather and are as or more representative of the entire target population as would be data from attempting to follow-up all patients.

The use of clinical interviews and complex assessment procedures is time-consuming, costly, and may contribute to unreliable outcomes data. These procedures usually require extensive training and retraining of clinical staff if adequate reliability is to be maintained (Fureman et al., 1994). Such training is particularly disruptive and costly for systems in which staff turnover is prevalent. In fact, even with intensive training and the use of semistructured interviews, data quality can be problematic. For example, Fureman et al. (1994) found that it was common for those administering the ASI to drift from the standard protocol over time, reducing the reliability of the data collected.

Complex or lengthy assessment procedures may also lead to unrepresentative outcomes data. Much of provider noncompliance is due to the burden of time and effort

that outcome assessment places on staff members who usually have heavy clinical workloads (Brown, Topp, & Ross, 2003; Harrison & Asche, 2001). Moreover, some clinical staff members do not view a monitoring system as providing useful information for them (Brown et al., 2003). Consequently, the demands of participating in a monitoring system can lead to staff resentment, low motivation, and resistance, which, in turn, result in assigning outcome monitoring a low priority and, ultimately, noncompliance in the form of low follow-up rates and outcomes data that are incomplete, unrepresentative, or both. An outcome monitoring system needs to be practical and require as little clinical staff time as possible to be successful.

#### 1.4. Current project

The VA Outcomes Monitoring Project (OMP) sought to overcome some of the limitations identified in previously implemented SUD treatment monitoring systems to collect outcomes data in a cost-efficient way that placed relatively little burden on program staff, to gather outcomes data on a sufficiently large proportion of targeted patient samples to have representative data, and to test the feasibility of such a system under “routine conditions”—for example, when patients are not paid for their participation. The goals of the OMP were to gather data on VA SUD patients’ symptoms and functioning at intake and follow-up and to combine them with information from nationwide VA databases on patients’ demographic and diagnostics characteristics and their health care utilization and with information on guideline-concordant treatment practices and treatment costs from surveys of treatment program directors to evaluate VA SUD program performance and identify cost-effective forms of care. In this article, we describe the methods used in the OMP and the follow-up rate achieved, and we provide data on patients’ characteristics and overall SUD outcomes from the first of three annual data collection cycles.

## 2. Methods

The OMP has been collecting baseline and 6-month follow-up data on patients in the VA SUD treatment programs in three annual cycles. It was deemed an exempt project by the Stanford/VA Palo Alto Institutional Review Board as an evaluation of a federal service program. We focus here on the first annual cohort of patients for which we also have patient record data.

### 2.1. Sampling process

The sampling process for the intake assessments consisted of (1) enumerating all SUD treatment program in the VA Veterans Health Administration (VHA), (2) sampling

and recruiting programs, and then (3) sampling and recruiting patients.

#### 2.1.1. Program enumeration

Selecting a sample of programs that is representative of all VHA SUD treatment programs nationwide requires a sampling frame that includes all programs. Therefore, from October to November 2000, the OMP staff enumerated all specialty SUD treatment programs in the VHA nationwide. Program information that was compliant with a previous survey of the VA SUD treatment programs (Humphreys & Horst, 2001) was used as an initial list of programs. A program had to provide only a single treatment setting of care, offer SUD treatment services other than detoxification only, have at least two (full-time employee equivalents) FTEEs, and have unique patients as well as clinical services, policies, or both. A total of 322 programs falling into one of six categories were identified: 29 inpatient, 52 residential, 17 domiciliary, 100 intensive outpatient, 110 outpatient, and 14 methadone maintenance programs.

#### 2.1.2. Recruitment of programs

Programs were then randomly selected within each of the six categories to ensure that each type of program was appropriately represented in the sample. Programs in the small domiciliary and methadone strata were oversampled so that differences within program type could be more readily examined. Exclusion criteria included expecting fewer than 20 unique new patients over the 12-month baseline data collection period or having all new patients receiving treatment in another program for more than 2 weeks prior to intake in the selected program. Additional programs within the same stratum were randomly selected to replace programs that did not meet inclusion criteria or refused to participate.

In all, 76 programs were selected and contacted during the Cohort I program recruitment process. Twelve programs did not meet the inclusion criteria. Of the remaining 64 programs, 8 programs (12.5%) refused to participate, with most citing understaffing as the reason. Fifty-six programs (87.5% of the qualified programs) agreed to participate, but 1 intensive outpatient treatment program was under transition and did not enroll any new patients during the intake data collection period. Also, 2 residential programs were selected at one facility; ultimately, program staff members were not able to indicate from which program patients received care; thus, these programs were treated as 1 program. Consequently, 54 SUD treatment programs (86% of the eligible programs) provided data for the OMP: 5 inpatient, 8 residential, 6 SUD domiciliary, 16 intensive outpatient, 15 outpatient, and 4 methadone programs. Ninety-three percent (50/54) of the participating programs began data collection within the first 3 months of the projected intake data collection interval.

### 2.1.3. Patient selection and recruitment

The goal was to select a representative sample of more than 19 and up to 50 patients in each participating program. For programs expecting 50 or fewer patients to enter treatment during the intake data collection phase, an attempt was made to assess each new patient. For larger programs, patients were selected based on the last digit or last two digits of their Social Security numbers. For example, for programs that expected 1,000 patients over the 12-month data collection period, patients with Social Security numbers ending between 01 and 05 were selected to recruit approximately 50 patients (5%). All female patients were included (oversampled) due to the small percentage of female SUD patients in the VA (2–4%; e.g., McKellar, Lie, & Humphreys, 2003; McKellar & Saweikis, 2005). To improve adherence to recruitment protocol, the treatment staff recorded the name and Social Security number of every new patient entering the program. Logs of new patients were transmitted to the OMP every week using a system that did not jeopardize patient confidentiality (sensitive information was transmitted via telephone).

## 2.2. Measures

### 2.2.1. Outcome assessment

A brief (five-page) self-report form (Rosen, Henson, Finney, & Moos, 2000) of the ASI (McLellan, Kushner, et al., 1992) was developed and used in most cases to measure patients' functioning at baseline and follow-up. The ASI has been widely used to assess SUD patients' outcomes and had been mandated to be used in VHA SUD systemwide monitoring effort described earlier. Evidence supports the validity and reliability of the ASI composite scores (Carey, Cocco, & Correia, 1997; Hendricks, Kaplan, VanLimbeek, & Geerlings, 1989; Hodgins & el-Guebaly, 1992; Kosten, Rounsaville, & Kleber, 1985; McLellan et al., 1985; Stoffelmayr, Mavis, & Kasim, 1994; Zanis, McLellan, Cnaan, & Randall, 1994). As a result, composite scores typically are used to compare programs on patient follow-up functioning.

The self-report form is composed of all the items that are used to calculate the ASI composites, except for two items in the legal domain, which ask the participants about their illegal activities and income from such activities. The self-report form assessed problems over the past 30 days in each of the seven domains: alcohol use (6 items), drug use (13 items), psychiatric (11 items), medical (3 items), legal (3 items), family/social relationship (13 items), and employment (4 items) problems. In the drug use domain, the self-report ASI measure asked whether or not each of 9 illicit drugs had been used in the past 30 days, whereas the interview-based ASI asks on how many days in the last 30 days each drug had been used. Also, the OMP follow-up questionnaire did not ask about suicidal ideation and behavior for the psychiatric composite index; therefore,

the psychiatric composite at follow-up was calculated from 9 items. Data were checked for accuracy by the "double-entry" method and checked for out-of-range data and logical consistencies. We followed the algorithm and procedures for scoring the ASI composites set out by McGahan, Griffith, Parente, & McLellan (1986), adjusting for the differences in items noted above. The composite scores generated by the self-report ASI used in the OMP previously had been validated against interview-based ASI composite scores (Rosen et al., 2000). Composite scores for alcohol, drug, psychiatric, family, legal, and employment problems correlated between .59 and .87 across the two administration formats; medical composite scores, based on only three subjective items, correlated only .47 across formats (Rosen et al., 2000).

### 2.2.2. Program director surveys

The program director survey was adapted from the Drug and Alcohol Program Survey (DAPS; Humphreys, Dearmin Huebsch, & Moos, 1998) that has been completed by VA SUD treatment program leaders every 3 years since 1991 at the VA Program Evaluation and Resource Center (Peterson, Swindle, Paradise, & Moos, 1994). The DAPS assesses SUD treatment programs' structure and treatment orientation (Peterson et al., 1994; Swindle, Peterson, Paradise, & Moos, 1995). The OMP program director survey expanded on the DAPS by including items measuring (1) guideline concordance of treatment practices and procedures and (2) additional information on staff (e.g., time spent in group and individual treatment) to better assess program costs. Program director surveys were conducted in the middle of the baseline data collection interval.

### 2.2.3. Demographic, diagnostic, and service utilization information

Demographic and diagnostic information were obtained from existing VA administrative patient databases. These databases were also used to abstract information on such variables as SUD, psychiatric, and other inpatient and outpatient services received during the year prior to the beginning of the index episode, during the treatment episode, and during the remaining portion of the follow-up interval.

## 2.3. Procedures

### 2.3.1. Baseline data collection

Clinical staff at the SUD treatment programs continued to collect baseline ASI data but primarily with the self-report ASI. Staff members were instructed to allow patients to complete the ASI in a setting that provided adequate privacy. To facilitate location of patients for follow-up, they were encouraged to complete a contact information form that included their likely location 6 months later and contact information for persons who would know the

patients' whereabouts; however, approximately 30% of the patients in this sample were not able to provide such information. Program staff faxed intake forms to the OMP site with no direct patient identifiers (they were collected by telephone later). Data were key-entered and managed centrally at the OMP site.

### 2.3.2. Follow-up data collection

Patient follow-ups were conducted primarily via mailed surveys by the OMP staff, and patients were not offered any monetary or other incentive to complete the follow-up. The follow-up process consisted of an initial mailing of a cover letter and self-report questionnaire, a mailed reminder postcard 1 week later, a second mailing of the questionnaire 2 weeks after the postcard, and a third mailing of the questionnaire 5 weeks after the initial mailing. Non-responders were contacted via the telephone, when possible, and were encouraged to complete the questionnaire; they also were provided the option of completing the survey over the telephone. If patients were unable to be reached through these options, patients' alternate contacts were used to try to locate them. For those patients who were still unable to be reached, the OMP staff checked other available databases, such as VA national patient databases, and the National Change of Address Database maintained by the U.S. Postal System to gather potential updated contact information. The procedures and techniques used for follow-up were carefully selected and adapted to improve efficiency based on the literature (e.g., Dillman, 1991; Menendez, White, & Tulskey, 2001), such as timing of follow-ups, follow-up reminders, numerous contacts, personalization of correspondence (e.g., handwritten notes), telephone contacts with family and friends, promise of anonymity of response, simple and clear questionnaire layout, type of outgoing and return postage and envelope (e.g., VA official envelopes), content of cover letter, appealing to participants' interest and meaningfulness of responding to the survey, and systematically keeping track of surveys that have been returned so that resources were focused on nonresponders only, to reduce effort and cost.

## 3. Results

### 3.1. Program survey data

Program directors reported that 37% of the programs were specifically intended to provide specialized services to SUD patients who had serious comorbid psychiatric disorders, 69% of the programs provided addiction-focused pharmacotherapy, and 59% of the programs provided physiological stabilization or detoxification. Forty-two percent of the programs provided SUD-related self-help groups to all patients, and 34% did not provide any self-help group to any patient. Seventy-five percent of the

programs indicated that SUD-related group or individual psychotherapy was provided to all patients. Programs had an average of 14.8 ( $SD = 15$ ) FTEE staff members, including an average of 2.65 ( $SD = 3.7$ ) FTEE registered nurses, 2.5 ( $SD = 2.6$ ) FTEE addiction therapists, 1.5 ( $SD = 1.5$ ) FTEE social workers, 0.9 ( $SD = 1.0$ ) FTEE psychiatrists, and 0.7 ( $SD = 1.2$ ) FTEE psychologists.

### 3.2. Patient baseline data

The 54 participating programs admitted 8,167 unique new patients during the baseline data collection period. Using the sampling process described earlier, 2,317 patients were eligible for baseline assessment. Of those, 1,968 patients were administered the baseline ASI. Of those, 1,884 patients (81.3% of the 2,317 eligible patients) met the sampling criteria for the study as outlined above. An additional 84 patients (4.3% of 1,968) were administered the ASI by program staff although their Social Security numbers did not match the required numbers. Forty programs (73%) succeeded in administering the ASIs to over 80% of the eligible patients entering their programs. On average, each program administered the baseline ASIs to 36.4 patients ( $SD = 18.81$ ).

Eighty-one percent (44/54) of the programs provided data on more than 20 patients. Eleven programs (20%) failed to administer the ASI to at least 20 patients; four were small programs that had fewer than 20 new patients during the data collection period, and five programs overestimated the number of new patients they would admit, therefore, undersampling their patients for participation in the OMP. The other two programs (3.7%) provided data on fewer than 20 patients due to staff noncompliance in recording new patients, administering the ASI, and/or sending data to the OMP. The two ultimately combined residential programs noted earlier together recruited 103 patients.

On average, the 1,968 patients who completed the ASI were 47.6 years of age ( $SD = 8.7$ ; see Table 1). Overall, 91.7% were men; 49.7% were Caucasian, 31.2% were African American, 2.7% were Hispanic/Latino, and 16.5% were of other racial/ethnic backgrounds. A total of 18.5% were married and 8.9% were homeless. Patient record data indicated that many patients had serious psychiatric disorders, including schizophrenia (7.1%), bipolar disorder (9.0%), major depressive disorder (13.7%), and posttraumatic stress disorder (16.0%). In all, 84.6% of the patients were diagnosed with alcohol abuse or dependence and 66.5% were diagnosed with drug abuse or dependence. Fifty-four percent of the patients had both alcohol- and drug-related disorder diagnoses; 12.6% had drug-related disorders only, and 30.6% had alcohol-related disorders only. With respect to drug-related diagnoses, 35.5% of the patients in this sample were diagnosed with cocaine dependence and 9.5% were diagnosed with opioid dependence.

To determine the representativeness of the OMP sample, we compared the characteristics of the sampled patients with

Table 1

Comparison of baseline characteristics between patients who completed the follow-up versus those who were lost to follow-ups in the first wave of the OMP

Variables	All patients (N = 1,968)	Patients who completed follow-ups (n = 1,302)	Patients who were lost to follow-ups (n = 647)	Statistics
Average age	47.6 (SD = 8.7)	48.4 (SD = 9.0)	45.8 (SD = 7.8)***	$t = -6.4$
Male (%)	91.7	91.3	92.5	ns
Ethnicity (%)				
Non-Hispanic white	49.7	52.2	43.8**	$\chi^2 = 11.9$
African American	31.2	28.3	37.4***	$\chi^2 = 16.4$
Other	19.2	19.5	18.8	ns
Marital status (%)				
Married	18.5	22.6	10.2***	$\chi^2 = 44.0$
Homeless (%)	8.9	7.5	11.6**	$\chi^2 = 8.6$
ASI alcohol	.41 (SD = .28)	.40 (SD = .28)	.40 (SD = .28)	ns
ASI drug use	.19 (SD = .16)	.18 (SD = .16)	.22 (SD = .17)***	$t = 4.8$
ASI psychiatric symptoms	.38 (SD = .25)	.39 (SD = .26)	.36 (SD = .25)*	$t = -2.5$
ASI medical problems	.53 (SD = .32)	.54 (SD = .32)	.50 (SD = .32)*	$t = -2.0$
ASI family/social relation	.30 (SD = .21)	.30 (SD = .21)	.31 (SD = .21)	ns
ASI legal problems	.30 (SD = .26)	.30 (SD = .26)	.29 (SD = .25)	ns
ASI employment problems	.71 (SD = .28)	.69 (SD = .28)	.74 (SD = .27)***	$t = 4.3$
Disorders (%)				
Schizophrenia	7.1	7.0	7.5	ns
Bipolar disorder	9.0	7.9	11.6**	$\chi^2 = 7.0$
Major depressive disorder	13.7	13.9	12.7	ns
Posttraumatic stress disorder	16.0	16.8	14.2	ns
Alcohol dependence/abuse	84.6	84.5	84.4	ns
Any drug dependence/abuse	66.5	63.4	73.1***	$\chi^2 = 18.1$
Cocaine dependence	35.5	31.8	43.2***	$\chi^2 = 24.2$
Opioid dependence	9.5	8.6	11.6*	$\chi^2 = 4.4$

\*  $p < .05$ .\*\*  $p < .01$ .\*\*\*  $p < .001$ .

those of the other patients who entered the 54 programs, as identified in the weekly program logs and data retrieved from the VA national databases. The OMP sample included more Caucasian (49.7% vs. 44.5%) and fewer African American patients (31.2% vs. 34.2%). In addition, there was an expected higher percentage of female patients in the OMP sample, due to the attempt to include all female patients (8.3% vs. 0.9%). The samples were similar on marital status and age.

### 3.3. Follow-up data

At follow-up, 19 patients were deceased, as indicated in the VA Beneficiary Identification and Records Locator Subsystem (BIRLS) database. The BIRLS identifies about 95% of deceased veterans (Fisher, Weber, Goldberg, & Davis, 1995), and veterans' death data are entered into the BIRLS more rapidly than into the more widely used National Death Index (Bradley, Maynard, Kivlahan, McDonnell, & Fihn, 2001). Of the remaining 1,949 patients, the OMP achieved a follow-up rate of 66.8% ( $n = 1,302$ ). Follow-up ASIs were administered at an average of 6.7 months ( $SD = 1.9$ ) after the baseline assessment.

As depicted in Table 1, those patients who completed the follow-up ASI were slightly older, more likely to be Caucasian, less likely to be African American, more likely

to be married, and less likely to be homeless than patients who did not return a follow-up survey. With regard to baseline ASI composite scores, the two groups did not differ on the alcohol, family/social, and legal composite scores. Those who completed the follow-up survey had lower baseline scores (indicative of better functioning) on the drug and employment composites and higher scores (indicative of poorer functioning) on the psychological and medical composites. Participants and nonparticipants did not differ on the prevalence of schizophrenia, major depressive disorder, posttraumatic stress disorder, or any alcohol-related disorder. However, participants who completed the follow-up ASI were less likely to have a bipolar disorder, cocaine dependence, opioid dependence, or any drug-related disorder than were patients who were lost to follow-up.

Although most follow-up assessments were completed via mailed surveys, 312 (24.0%) patients completed the follow-up assessment via a telephone survey. Patients who completed telephone surveys were over 1 year younger (46.8 vs. 48.2, respectively) than those completing self-administered follow-ups, but the two groups were similar in ethnicity, gender, and marital status. ASI composite scores on follow-up surveys were also similar for the alcohol, psychiatric, medical, social, legal, and employment domains; however, patients completing phone surveys had significantly higher drug composite scores (.20 vs. .17).

Table 2  
Alcohol and drug ASI composite outcomes of patients by gender and by treatment program setting

Variable	<i>n</i>	Mean at baseline ( <i>SD</i> )	Mean at follow-up ( <i>SD</i> )	<i>t</i> value	Significance
All followed-up patients					
Alcohol	1,299	.40 (.28)	.21 (.20)	23.35	<.001
Drug	1,296	.18 (.16)	.09 (.10)	19.66	<.001
By gender					
Male					
Alcohol	1,176	.41 (.28)	.21 (.20)	23.00	<.001
Drug	1,173	.18 (.16)	.09 (.10)	18.91	<.001
Female					
Alcohol	113	.35 (.25)	.22 (.22)	4.87	<.001
Drug	113	.21 (.18)	.11 (.12)	6.00	<.001
By treatment setting					
Inpatient					
Alcohol	169	.50 (.28)	.22 (.22)	11.96	<.001
Drug	169	.24 (.18)	.10 (.11)	9.43	<.001
Residential					
Alcohol	258	.45 (.28)	.22 (.21)	11.22	<.001
Drug	259	.19 (.17)	.09 (.10)	8.70	<.001
Domiciliary					
Alcohol	156	.45 (.29)	.18 (.18)	10.24	<.001
Drug	154	.21 (.16)	.10 (.12)	8.29	<.001
Intensive outpatient					
Alcohol	381	.39 (.27)	.20 (.19)	13.09	<.001
Drug	379	.17 (.14)	.08 (.09)	12.00	<.001
Outpatient					
Alcohol	310	.32 (.26)	.22 (.21)	7.08	<.001
Drug	310	.12 (.14)	.08 (.10)	5.35	<.001
Methadone					
Alcohol	25	.16 (.17)	.14 (.15)	0.33	.74
Drug	25	.33 (.18)	.19 (.18)	3.24	.003

### 3.4. Patient outcomes

ASI composite scores decreased significantly from baseline to follow-up (showing improvement) for both alcohol (.40 vs. .21) and drug (.18 vs. .09; see Table 2). Gender group comparisons showed that both alcohol and drug composite scores decreased significantly for both male and female patients. Likewise, drug and alcohol composite scores also declined (improved) significantly for patients in each of the six program categories (e.g., inpatient, residential, intensive outpatient), except for the alcohol composite among methadone patients (see Table 2).

### 3.5. Time to conduct follow-ups

The OMP staff members devoted a large portion of their work in conducting follow-ups. Overall, to achieve the 67% follow-up rate with our sample of 1,968 patients, four project staff members devoted approximately 2.5 FTEEs for 1 year and 4 months or approximately 200 minutes per patient. As noted earlier, initial staff efforts to obtain follow-up surveys consisted of a series of mailings. These efforts resulted in a response rate of approximately 40%. On the basis of log information compiled by project staff, we estimate that it took about 1 FTEE for 14 months to conduct the activities involved in these mailings or approximately 74 minutes per

patient. Although conducting follow-ups solely through mailed surveys takes relatively little staff time, it also produces a low response rate (40%). Proportionately, the amount of effort expended to improve the follow-up rate from 40% to 67% was substantially greater than the effort required to attain the initial 40% response rate. Over 175% more time (from 74 to 200 minutes per patient, on average) was required to achieve an additional 27% response rate to raise the total follow-up rate to 67%.

## 4. Discussion

Without paying patients to complete follow-up assessments and without imposing any patient exclusion criteria at treatment entry, we were able to obtain follow-up data from two thirds (66.8%) of newly entering VA SUD treatment program patients not known to have died. This follow-up rate was achieved, although many patients in this sample were highly mobile, homeless, had a comorbid psychiatric disorder, and/or were severely impaired. In addition, the reported follow-up rate is conservative because patients who were incarcerated or in treatment at the time of follow-up were not excluded in our estimate, due to the lack of official records to corroborate with information we collected from patients' relatives and other contacts. On the other hand, we

were able to successfully follow up, at a later point, some patients who had been in structured environments at the point they were due for a 6-month follow-up.

In SUD treatment trials in which participants are usually filtered through multiple inclusion criteria, selected for the willingness to participate in the research, and paid for their participation, follow-up rates are expected to exceed 80%. For example, Project MATCH achieved approximately a 90% follow-up rate at 6 months after the end of the treatment phase (Project MATCH Research Group, 1997). However, participants not only received financial compensation to complete a follow-up interview but also were screened for a number of exclusion criteria, including inability to identify at least one “locator” person to assist in tracking for follow-up assessment, lack of clear prospects for residential stability, drug dependence, and severe psychiatric symptoms. This resulted in retaining 39% (excluding 61%) of the potential participants (Project MATCH Research Group, 1997) and likely made the follow-up process easier than that in our project. Although not in the range of 80–95% expected in randomized trials of treatments for SUDs, our follow-up rate of 67% of virtually all patients is quite acceptable for a cost-efficient OMS and far exceeds the rate of approximately 15–21% that was achieved by VA SUD program staff in a mandated system in the VA between October 1997 and September 2000 (Moos et al., 2000; Otilingam et al., 2002).

Our follow-up rate reflects several features that we believe are critical to a viable OMS, that is, a system that can become an integral and enduring component of a health care organization and the care it provides. The most important feature is the use of a brief, self-report questionnaire that allows most follow-ups to be completed by mail. Follow-ups conducted via mailed questionnaire are substantially less costly than in-person or even telephone interviews, which have time/costs associated with training staff to conduct the interviews, setting up a time for the interview, patients not being available for interviews, and, in the case of in-person interview, travel time to the interview site. Brief, self-report questionnaires are particularly well suited to systems of care, as is the case with the VHA, that have an electronic patient record system that can be accessed to obtain additional data on patients’ demographic and diagnostic characteristics, thus eliminating the need to assess such information in the mailed questionnaire.

A second important feature contributing to the 67% follow-up rate was using a centralized unit to conduct follow-ups rather than relying on SUD program staff. In the VHA, the number of staff devoted to treating patients with SUD decreased by half (from 4,718 to 2,427 FTE; Tracy, Trafton, & Humphreys, 2004) between 1994 and 2003, whereas the number of patients seeking SUD treatment in VHA did not decline (McKellar & Saweikis, 2005). Some of the staff reduction resulted from the closure of VHA SUD programs, especially inpatient programs, but the remaining staff members generally have been required to

treat larger numbers of patients (Humphreys & Horst, 2001). It is likely that this reduced number of program staff, in general, felt that their time was better spent caring for patients than gathering follow-up data. In that context, a 15–21% follow-up rate under the former mandated monitoring system is not surprising.

A third feature that fostered a high follow-up rate is the fact that we sought to follow-up only a sample of patients presenting for treatment. Under the former mandated system, the entire population of newly entering patients was targeted for follow-up 6 months later. Sampling procedures in which each patient in a program has an equal probability of being selected can yield data on follow-up functioning, which are representative of the population of patients. Representativeness is increasingly jeopardized as follow-up rates decrease, but a higher follow-up rate on a randomly selected sample of patients not only costs less (see below) but also is preferable on representativeness grounds to a lower follow-up rate for the entire patient population.

The current monitoring system also achieved a higher assessment rate (81.3%) at baseline than the prior mandated and more expensive VA monitoring system, which assessed 47% of those eligible in the Fiscal Year 1998 cohort (Moos et al., 1999). Thus, the prior mandated system likely was biased toward collecting data from slightly less severe patients. Although the baseline alcohol composite scores from patients of the current project (.41) are comparable with the alcohol composite scores of patients from the previous system (.42; Moos et al., 1999), patients from the current project had higher composite scores in all other domains, including drug (.19 vs. .12), psychiatric (.38 vs. .31), medical (.53 vs. .41), family and social (.30 vs. .22), legal (.30 vs. .10), and employment (.71 vs. .66). Outcomes data from this OMP showed improved SUD composite scores among VA SUD patients at follow-up, consistent with data from the previous VA-mandated system. The results indicated that VA SUD patients, among both men and women and in virtually all treatment settings, had better SUD composite scores at follow-up than at treatment initiation.

Although the VHA currently does not have a mandated OMS for patients treated in its SUD programs, it may institute such a system in the future. Accordingly, estimates of the cost of an OMS should be of interest to VHA managers and managers in other health care systems. We estimate that an OMS for the VHA of the type we are evaluating would need 25–35 FTEs or approximately US\$2 million annually in 2005 (personnel costs involving the actual follow-up efforts only) to follow up on up to 50 patients for approximately 215 SUD treatment programs in the VA (Tracy et al., 2004) to provide representative follow-up data for approximately 90,000 SUD patients (McKellar and Saweikis, 2005). This averages the cost to US\$22.22 per patient (US\$2 million/90,000 patients); an alternative and more conservative estimate would cost the system approximately US\$186 per patient (US\$2 million

for 50 patients by 215 programs) for a 67% follow-up rate. This estimate is relatively low compared with a previous study that shows an estimate of approximately US\$300/patient for reaching a 62% follow-up rate of nonincarcerated fathers in households where the mothers had already participated in a study on how public policy affects the lives of poor urban families (Teitler, Reichman, & Sprachman, 2003). Thus, planning for future monitoring systems may need to increase our estimate of follow-up costs. In addition, our estimate does not include time/costs for compiling and transmitting baseline patient data and contact information, as well as time/cost of supervisory, administrative, and other supportive staff, nor does it include costs of compiling and merging patient record data, analyzing, interpreting, and disseminating findings from the data (or overhead costs). Actual costs will depend on the particular health care system and the intended purposes of the monitoring system.

Support for an OMS would be money well spent. Berman et al. (1998) suggest that “outcomes data can have a greater political and economic impact than almost any other data obtained in quality improvement in behavioral health care” (p. 129). Such data are valuable to patients, clinicians, and managers. If prospective patients know about the outcomes of different forms of care provided by a health care system, they are better able to make intelligent treatment choices. Likewise, casemix-adjusted outcome data (not reported here) are of value to clinicians and managers in determining program performance and in identifying effective and cost-effective forms of care. Ultimately, feedback of findings from an OMS should lead to improved clinical decision making by individual providers, to more informed policy decisions by managers and administrators, and, more broadly, to a more cost-effective SUD treatment system that better serves patients.

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