The Impact of Managed Care on Substance Abuse Treatment Services

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Objective. To examine the impact of managed care on the number and types of services offered by substance abuse treatment (SAT) facilities. Both the number and types of services offered are important factors to analyze, as research shows that a broad range of services increases treatment effectiveness.

Data Sources. The 2000 National Survey of Substance Abuse Treatment Services (NSSATS), which is designed to collect data on service offerings and other characteristics of SAT facilities in the United States. These data are merged with data from the 2002 Area Resource File (ARF), a county-specific database containing information on population and managed care activity. We use data on 10,513 facilities, virtually a census of all SAT facilities.

Study Design. We estimate the impact of managed care (MC) on the number and types of services offered by SAT facilities using instrumental variables (IV) techniques that account for possible endogeneity between facilities' involvement in MC and service offerings. Due to limitations of the NSSATS data, MC and specific services are modeled as binary variables.

Principal Findings. We find that managed care causes SAT facilities to offer, on average, approximately two fewer services. This effect is concentrated primarily in medical testing services (i.e., tests for TB, HIV/AIDs, and STDs). We also find that MC increases the likelihood of offering substance abuse assessment and relapse prevention groups, but decreases the likelihood of offering outcome follow-up.

Conclusion. Our findings raise policy concerns that managed care may reduce treatment effectiveness by limiting the range of services offered to meet patient needs. Further, reduced onsite medical testing may contribute to the spread of infectious diseases that pose important public health concerns.

Key Words. Substance abuse treatment facilities, managed care, test for HIV/AIDS, instrumental variables, wraparound services

The aim of this study is to determine if managed care affects the number and type of services offered by substance abuse treatment facilities. This topic is important for several reasons. Substance abuse is an important and costly societal problem that can be mitigated by treatment (Office of National Drug Control Policy 2001). Research shows that providing ancillary social and medical services ("wraparounds") to substance abusers improves treatment outcomes and reduces relapse rates (McLellan et al. 1993; Milby et al. 1996;

McLellan et al. 1997; McLellan et al. 1998; Gould, Levine, and McLellan 2000; Marsh, D'Aunno, and Smith 2000; Smith and Marsh 2002). Managed care (MC) is growing rapidly in the substance abuse treatment (SAT) market.¹ Given the emphasis of MC on cost containment, a concern is that these wraparound services may become less available, thereby reducing the effectiveness of SAT. Reduced effectiveness, in turn, could have a negative impact on society through increases in crime, welfare dependency, and the spread of HIV/AIDS and other infectious diseases.

While there is a substantial body of literature on the impact of managed care in the general medical market, relatively little is known about the impact in substance abuse treatment. Moreover, lessons learned from the general medical sector do not necessarily apply to SAT due to differences in financing (e.g., more grant funding in SAT), clientele (e.g., substance abusers frequently have a broader range of medical and other problems), negative externalities associated with unsuccessful treatment or no treatment, and stigma associated with treatment. Thus, there is a need for research specifically on managed care in SAT.

We use the 2000 National Survey of Substance Abuse Treatment Services (NSSATS), which is designed to collect data on the characteristics of all substance abuse treatment facilities and services throughout the 50 states. These data allow us to examine the availability of 26 different services at more than 10,000 SAT clinics. We use an instrumental variables approach to obtain unbiased estimates of the impact of MC on SAT services offered.

This article contributes to the literature in several ways. It is the first to estimate the causal effect of managed care on both the range of services and detailed specific services offered, two important and policy relevant aspects of substance abuse treatment. It is also one of the few articles to use the full set of current NSSATS data to examine managed care, thereby obviating the need to generalize from a sample. Our findings should be of interest to policymakers, researchers, patients, providers, public and private payers, and clinicians.

We would like to acknowledge financial support from the National Institute on Drug Abuse (NIDA RO1-DA14471).

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BACKGROUND

Managed Care in the General Medical Sector

Managed care has become an integral part of the U.S. health care system and has had a significant impact on costs and treatment patterns. Managed care payers aim to contain costs and improve performance of service offerings using selective contracting, utilization review (UR), and novel financial incentives such as capitation. Changes in payment incentives or administrative controls due to MC may affect provider decisions about the mix and intensity of service offerings (Dranove and Satterthwaite 2000). In the empirical literature, managed care has been associated with reductions in overall utilization, shorter lengths of stay, and changes in patterns of health care delivery (Glied 2000; Dranove and Satterthwaite 2000; Miller and Luft 2002).

Managed Care in Substance Abuse Treatment

Findings from the general medical sector and even the mental health sector do not necessarily apply to the SAT sector because of differences in how the treatment market operates. One important difference is financing. In the general medical sector, insurance coverage is usually “attached” to the patient. In SAT, private insurance and self-pay cover some patients. However, much of the funding for SAT services comes through the public sector, much of which is in the form of grants to the provider. For example, in 1996, only 15.8 percent of funding for SAT facilities came from private health insurance and 10.7 percent came from self-pay, while 73.5 percent came from public funds. Medicaid and Medicare account for relatively little of the public funding. The share of public funding was particularly high in public facilities: 90 percent. In private nonprofits it was 69 percent, while in for-profits it was 42 percent (Substance Abuse and Mental Health Services Administration 1997). The bulk of this public funding initially comes from the federal government and is then passed to the states in the form of so-called block grants; other grants such as correctional and courts are also prevalent. States then give grants directly to SAT clinics to pay for the care of SAT patients. In the case of block grant funding, some forms of MC control are not applicable in SAT, for example, capitation. Managed care may, however, use administrative controls, which may affect service offerings. Service offerings may also be affected through payment rates (low funding may lead facilities to drop services) and conditions imposed for contracting (some facilities might have to add services to meet contracting requirements). Another difference is that when SAT is part of

general medical coverage, these services may be “carved-out” and financed or managed separately.

A second factor that makes the SAT market different is that many of those who need SAT have other significant, related problems that need attention in addition to the addiction itself. For example, in the case of treatment for illicit drug dependence, drug use is associated with many negative externalities such as crime, welfare dependence, and the spread of infectious diseases. This has several implications. One is that the effectiveness of treatment increases with the provision of more kinds of services, such as social, psychiatric, legal, housing assistance, and others (McLellan et al. 1993; Milby et al. 1996; McLellan et al. 1997; McLellan et al. 1998; Gould, Levine, and McLellan 2000; Marsh, D'Aunno, and Smith 2000; Smith and Marsh 2002). Such wraparound services are increasingly viewed as improving effectiveness and quality and reducing the probability of relapse, though the cost-effectiveness of these services has not yet been well established (Kraft et al. 1997). A related issue is that there is less social concern with moral hazard compared to the general health sector in that SAT may benefit society beyond the private benefit to the patient. Further, the stigma attached to SAT may prevent patients from advocating on their own behalf if MC prevents them from obtaining sufficient services. Because of these important differences, findings from other health sectors may not apply and there is a need for analyses of MC specifically in the SAT sector.

Literature on Managed Care in Substance Abuse Treatment

Lemak and Alexander (2001) studied the impact of MC on outpatient treatment providers and found that treatment *intensity* (months in treatment and number of therapy sessions received) is negatively affected by the *stringency* of MC (average number of visits per patient authorized by MC), but unaffected by the *scope* of MC (number of different MC oversight activities). They have published several studies using these data on about 600 facilities drawn from a national sample. In an earlier descriptive article, Alexander and Lemak (1997a) found that facilities that are either private for-profit or associated with a hospital are more likely to have MC arrangements. In a related study, Alexander and Lemak (1997b) found that MC results in additional administrative burdens related to compliance with UR. Durkin (2002), using similar data, finds that when a greater proportion of an outpatient SAT facility's clients are members of health maintenance organizations (HMOs) or private practice organizations (PPOs), the facility is less likely to

provide employment counseling and financial counseling, but more likely to provide routine medical care and physical exams.

Other studies of the impact of MC on SAT use claims data. While the unit of observation differs from that of the provider, as in our study, several findings are applicable. A relatively early study of the impact of a Medicaid MC carve-out in Massachusetts found that the carve-out reduced overall costs and slowed growth in expenditures by reducing the use of inpatient care and lowering prices paid for services. Interestingly, use of methadone maintenance and some outpatient detoxification services increased (Callahan et al 1995; Frank and McGuire 1997). In other studies, managed care in SAT has also been found to reduce the use of inpatient care (e.g., Steenrod et al. 2001) and to reduce costs in both the public (McCarty and Dilonardo 2003) and private sectors (Sturm 2000).

CONCEPTUAL FRAMEWORK

We provide a brief conceptual framework for examining the impact of managed care on the range of services offered by a substance abuse treatment facility. We focus on the range of services offered as one component in the quality of care. The literature finds that a greater range of services increases the effectiveness of care (National Institute on Drug Abuse [NIDA] 1999; McLellan et al. 1998; McLellan et al. 1999). Payment to an SAT facility is not, however, typically explicitly determined by the number or range of services offered, but rather payment is made on a per diem or weekly basis. Thus, the range of services may be more akin to higher amenities or quality of care that are not paid for directly.

In our analysis there are two simultaneous decisions to be made by the SAT facility. One is made jointly with the managed care organization (MCO)—whether or not the facility and the MCO will contract.² For those SAT facilities that decide to contract with the MCO, a simultaneous decision is whether, and how, to change their service offerings as a function of the MC requirements or incentives.

The Contracting Decision

A managed care organization and a facility may negotiate terms and agree to contract. This mutually determined decision is a function of the characteristics and goals of both parties. On the demand side, the MCO is looking for a set of characteristics that the facility may either currently offer, or would be willing to offer to meet the needs of the MCO. Important factors affecting the MCO's

decision include the price the facility is willing to accept; a facility's existing service offerings; anticipated changes, if any, in its behavior in response to contracting; and the facility's willingness and ability to provide administrative information and to conform to MC rules.

On the supply side, key issues in a facility's decision about whether or not to accept a contract include price offered relative to current price (costs) and changes in service offerings required. In addition, a facility's capacity to meet contract requirements associated with managed care may be important. Administrative and clinical requirements could include different types of utilization review, assessments, and reporting stipulations.

The Service Offering Decision

Facilities that accept managed care contracts decide what kind of services to offer based on the requirements and incentives in the MC contract. Some facilities may already have the service offerings desired by MCOs, or may have the negotiating power to put off MCO demands. As a result, they may not change their behavior and the contracting process may simply take the form of matching on the basis of existing characteristics with no change in service offerings. On the other hand, the facility may respond to the MCO's efforts to influence cost, quality, and type and quantity of services. Managed care organizations may request additional assessments and documentation, place restrictions or requirements on service offerings, and affect price.

Facilities may respond to administrative controls and UR by lowering overall levels of service offerings. As discussed earlier, however, the literature suggests that the impacts may vary with service type. Managed care organizations may, for example, promote service offerings associated with improved monitoring of utilization and adherence to treatment regimes. In contrast, MCOs may be unwilling to reimburse for ancillary services that do not directly contribute to their profitability, or services that are not "medically necessary" for treating substance abuse. Services with a large public good aspect may be affected for these reasons.

Changes in service offerings may also be associated with changes in prices and financial incentives. The literature on monopolistic competition suggests that if MC reduces provider prices and lowers price cost margins, this may lead to reductions in quality³ (Dranove and Satterthwaite 2000; Dranove, Satterthwaite, and Sindelar 1986). Specifically, in our analysis, to the extent that the range of service offerings is a component of quality, this may be reflected through reductions in the number and types of services offered.

ANALYTIC APPROACH

We use the instrumental variables (IV) approach to analyze the effect of managed care on both the number and types of treatment services offered by SAT facilities. We use the IV approach because of the concern that facilities with and without managed care differ in terms of unobserved characteristics that affect service offerings. This would be the case, for example, if managed care is attracted to facilities with an unobserved (to the analyst) propensity to offer more (or fewer) services (e.g., if administrative sophistication is unobserved and correlated with both service offerings and MC). With valid instruments, the IV approach corrects for omitted variables bias and produces consistent estimates of the causal effect of managed care on service offerings (Davidson and MacKinnon 1993). The general model is as follows:

$$Y = \beta X + \gamma MC + \varepsilon \quad (1)$$

$$MC = \alpha X + \kappa Z + \mu \quad (2)$$

where Y is the outcome variable under study (i.e., either total number of services at the facility or presence of a specific service at the facility), MC is a dummy variable indicating the presence of managed care at the facility, X is a vector of facility and environmental characteristics, ε is the error term for Equation (1) that captures unobserved determinants of Y , Z is a vector of instruments that influence the presence of managed care but are uncorrelated with ε , and μ is the error term for Equation (2).

When the outcome variable in (1) is total number of services, we estimate the two-equation system using a full-maximum-likelihood “treatment effects” model (Maddala 1983) that considers the effect of an endogenously-chosen binary treatment (managed care) on another endogenous, fully-observed, continuous variable (number of offered services). When the outcome variable in (1) is the presence of a specific service (a binary indicator), we estimate the two-equation system using a maximum likelihood bivariate probit model (Maddala 1983).⁴ In both models, we cluster facilities by county to account for possible spatial correlation among facilities operating in the same geographic area.

The IV approach depends on finding one or more variables to be used as instruments, Z , that substantially affect MC but have no direct impact on Y . We use two different county-specific instruments in our model: number of Medicare MC enrollees and number of HMO enrollees. Given that we control for county population and density, the number of Medicare MC (or HMO) enrollees is, in essence, a percentage. Both instruments plausibly satisfy the

first condition inasmuch as facilities in counties with a large number (“percentage”) of Medicare MC (or HMO) enrollees are more likely to have agreements or contracts with managed care than their counterparts in counties with relatively few Medicare MC (or HMO) enrollees. That is, the same environmental factors (e.g., local tastes, state/local laws, demographics) that lead to large numbers of Medicare MC (or HMO) enrollees in a given county probably also make it more attractive for managed care to institute and pursue relationships with SAT facilities in that county. Spillover effects of many kinds could increase the favorable climate for managed care.

As for the second condition, it seems plausible that the number (“percentage”) of Medicare MC enrollees in a given county—the vast majority of whom are 65 or older—is unlikely to directly influence the service-offering decisions at SAT facilities in that county inasmuch as SAT facilities treat very few elderly clients and few elderly seek SAT.⁵ Similarly, the number (“percentage”) of HMO enrollees in a given county is likely to have little effect on the service offering decisions at SAT facilities in that county because there is relatively little overlap between HMO enrollees and SAT clients, albeit more than for Medicare MC enrollees.⁶

We examine the sensitivity of our results to both instruments and formally assess the validity of our results by testing for the presence of bias due to weak instruments and conducting a standard test of overidentification.

DATA

We use data on SAT facilities from the 2000 National Survey of Substance Abuse Treatment Services (NSSATS). The 2000 NSSATS is a national survey designed to collect information on the location, characteristics, and use of SAT facilities and services (U.S. Department of Health and Human Services 2002b). The list frame for the 2000 NSSATS is the Inventory of Substance Abuse Treatment Services (I-SATS), a continuously-updated, comprehensive listing of all known substance abuse treatment facilities, both public and private, throughout the 50 states, the District of Columbia, and other U.S. jurisdictions.⁷

Of the 14,622 facilities deemed eligible for the survey, 13,749 (94 percent) completed the survey.⁸ Of these, we exclude facilities located in other U.S. jurisdictions ($n = 120$), owned by federal or tribal governments ($n = 481$), or offering detoxification services only ($n = 41$). An additional 2,594 facilities are excluded due to missing data, resulting in a final study sample comprising

10,513 SAT facilities.⁹ We supplement the 2000 NSSATS data on facility characteristics with county-specific data from the 2002 Area Resource File (ARF) (U.S. Department of Health and Human Services 2002a), a database containing historical information on population and managed care activity in the United States.¹⁰ We also control for geographic region as defined by the U.S. Census Bureau.

Tables 1 and 2 provide definitions and summary statistics for the variables used in our study. Statistics are presented for the full sample, as well as for facilities with and without relationships with managed care. The outcome variables (Table 1) include the total number of services offered at SAT facilities and whether or not a facility offers specific services. The 26 individual services are grouped by NSSATS into 5 categories: medical testing, therapeutic/counseling, assessment, transitional, and other. Our measure of managed care is whether or not the facility has a relationship with a managed care company, *MC*, set to 1 if a facility has at least one agreement or contract with a managed care organization to provide substance abuse treatment services, and 0 otherwise. The NSSATS does not collect data on client characteristics, thus we cannot directly measure client mix. However, we control for types of payment accepted and ownership status, both of which proxy for client mix to some degree. Other regressors (Table 2) fall into two categories: facility characteristics and county-specific characteristics. Facility characteristics include organizational control, focus, setting, size, and sources of revenue. County-specific characteristics include measures of population size, metropolitan area, region, competition among facilities, and managed care activity.

RESULTS

Number of Services

By examining the raw means of the facility data in Table 1, we find that managed care appears to be associated with *more* services offered by a facility (approximately 1.4 more services out of a maximum of 26). However, as shown in Table 2, facilities with and without managed care differ significantly in other ways as well. The systematic differences by MC status shown in Table 2 indicate a need to control for relevant variables when investigating the effects of managed care on service offerings.

Given that MC is likely to be endogenously determined, we turn to the IV models. Our two instruments are: (1) number of individuals in the county

Table 1: Summary Statistics of Outcome Variables*

<i>Variable Name</i>	<i>Definition</i>	<i>Full Sample</i> <i>N = 10,513</i>	<i>MC Absent</i> <i>N = 4,681</i>	<i>MC Present</i> <i>N = 5,832</i>	<i>P Value</i>
Total Services	Total number of services offered at SAT facility	13.70 (4.76)	12.93 (4.81)	14.32 (4.62)	<.001
<i>Medical Testing</i>					
Blood alcohol test	0-1 dummy variable, = 1 if facility offers blood alcohol testing	.45 (.50)	.39 (.49)	.50 (.50)	<.001
Drug/alcohol urine screen	0-1 dummy variable, = 1 if facility offers drug/alcohol urine screening	.79 (.40)	.81 (.42)	.81 (.39)	<.001
Hepatitis	0-1 dummy variable, = 1 if facility offers hepatitis testing	.24 (.42)	.21 (.41)	.26 (.44)	<.001
HIV test	0-1 dummy variable, = 1 if facility offers HIV testing	.32 (.47)	.31 (.46)	.32 (.47)	.446
STD test	0-1 dummy variable, = 1 if facility offers STD testing	.23 (.42)	.21 (.41)	.24 (.43)	.002
TB screen	0-1 dummy variable, = 1 if facility offers TB screening	.36 (.48)	.35 (.48)	.37 (.48)	.042
<i>Therapy/Counseling</i>					
Family counseling	0-1 dummy variable, = 1 if facility offers family counseling	.78 (.42)	.67 (.47)	.86 (.35)	<.001
Group therapy	0-1 dummy variable, = 1 if facility offers group therapy	.89 (.31)	.86 (.34)	.91 (.28)	<.001
Individual therapy	0-1 dummy variable, = 1 if facility offers individual therapy	.95 (.22)	.93 (.26)	.97 (.18)	<.001
Pharmacotherapy	0-1 dummy variable, = 1 if facility offers pharmacotherapy	.41 (.49)	.29 (.46)	.50 (.50)	<.001
Relapse prevention groups	0-1 dummy variable, = 1 if facility offers relapse prevention groups	.78 (.42)	.75 (.43)	.80 (.40)	<.001
Aftercare counseling	0-1 dummy variable, = 1 if facility offers aftercare counseling	.78 (.41)	.71 (.45)	.84 (.37)	<.001

<i>Assessment</i>					
Substance abuse assessment	0-1 dummy variable, = 1 if facility offers substance abuse assessment	.93 (.25)	.89 (.31)	.97 (.17)	<.001
Mental health assessment	0-1 dummy variable, = 1 if facility offers mental health assessment	.43 (.49)	.31 (.46)	.52 (.50)	<.001
<i>Transitional</i>					
Asst. obtaining social services	0-1 dummy variable, = 1 if facility offers assistance obtaining social services	.51 (.50)	.48 (.50)	.53 (.50)	<.001
Discharge planning	0-1 dummy variable, = 1 if facility offers discharge planning	.82 (.39)	.78 (.42)	.85 (.36)	<.001
Employment training	0-1 dummy variable, = 1 if facility offers employment training	.36 (.48)	.33 (.49)	.33 (.47)	<.001
Housing assistance	0-1 dummy variable, = 1 if facility offers housing assistance	.30 (.46)	.29 (.46)	.29 (.46)	.023
Referral to other trans. services	0-1 dummy variable, = 1 if facility offers referrals to other transitional services	.84 (.37)	.81 (.39)	.86 (.35)	<.001
<i>Other Services</i>					
Case management	0-1 dummy variable, = 1 if facility offers case management	.66 (.47)	.65 (.48)	.67 (.47)	.023
Child care	0-1 dummy variable, = 1 if facility offers child care	.10 (.30)	.10 (.30)	.10 (.30)	.944
Domestic violence	0-1 dummy variable, = 1 if facility offers domestic violence	.34 (.47)	.31 (.48)	.36 (.48)	<.001
HIV/AIDS education	0-1 dummy variable, = 1 if facility offers HIV/AIDS education	.55 (.50)	.56 (.50)	.54 (.50)	.052
Outcome follow-up	0-1 dummy variable, = 1 if facility offers outcome follow-up	.49 (.50)	.47 (.50)	.52 (.50)	<.001
Transportation assist	0-1 dummy variable, = 1 if facility offers transportation assistance	.35 (.48)	.33 (.47)	.36 (.48)	.008
Acupuncture	0-1 dummy variable, = 1 if facility offers acupuncture	.05 (.23)	.05 (.22)	.06 (.23)	.093

*Summary statistics are sample means with standard deviations in parentheses. P values are for tests of differences in facilities with and without managed care.

Table 2: Summary Statistics of Regressors*

Variable Name	Definition	Full Sample N = 10,513	MC Absent N = 4,681	MC Present N = 5,832	P Value
MC	0-1 dummy variable, = 1 if facility has agreements or contracts with managed care organizations to provide substance abuse treatment services	.55 (.50)	0 (0)	1 (0)	—
Control: Private and for-profit	0-1 dummy variable, = 1 if facility is operated by a private for-profit organization	.28 (.45)	.27 (.45)	.28 (.45)	.538
Control: Private and nonprofit	0-1 dummy variable, = 1 if facility is operated a private nonprofit organization	.61 (.49)	.59 (.49)	.63 (.48)	<.001
Control: Public	0-1 dummy variable, = 1 if facility is operated by a public organization	.11 (.31)	.14 (.34)	.09 (.28)	<.001
Focus: Substance abuse	0-1 dummy variable, = 1 if primary focus of facility is substance abuse treatment services	.62 (.48)	.69 (.46)	.57 (.50)	<.001
Focus: Mental health	0-1 dummy variable, = 1 if primary focus of facility is mental health services	.09 (.29)	.08 (.08)	.10 (.30)	<.001
Focus: General health	0-1 dummy variable, = 1 if primary focus of facility is general health care	.02 (.13)	.01 (.10)	.02 (.15)	<.001
Focus: Mental health and substance abuse	0-1 dummy variable, = 1 if focus of facility is a mix of mental health and substance abuse treatment services	.24 (.43)	.18 (.39)	.29 (.46)	<.001
Focus: Other	0-1 dummy variable, = 1 if primary focus of facility is "other"	.02 (.16)	.04 (.19)	.01 (.12)	<.001
Hospital: General	0-1 dummy variable, = 1 if facility is located in, or operated by, a general hospital	.10 (.30)	.04 (.20)	.15 (.36)	<.001
Hospital: Psychiatric	0-1 dummy variable, = 1 if facility is located in, or operated by, a psychiatric hospital	.02 (.15)	.01 (.10)	.03 (.18)	<.001
Hospital: Other specialty	0-1 dummy variable, = 1 if facility is located in, or operated by, an "other" specialty hospital (e.g. alcoholism, maternity, etc.)	.006 (.077)	.003 (.053)	.008 (.091)	<.001
Solo practice	0-1 dummy variable, = 1 if facility is a private solo practice	.05 (.22)	.07 (.26)	.04 (.19)	<.001

Halfway house	0-1 dummy variable, = 1 if facility operates a halfway house for substance abuse clients	.14 (.35)	.16 (.37)	.13 (.34)	<.001
Any hospital inpatient	0-1 dummy variable, = 1 if facility offers hospital inpatient substance abuse services	.07 (.25)	.03 (.16)	.10 (.30)	<.001
Any nonhospital residential	0-1 dummy variable, = 1 if facility offers nonhospital residential substance abuse services	.27 (.44)	.33 (.47)	.22 (.42)	<.001
Any outpatient	0-1 dummy variable, = 1 if facility offers outpatient substance abuse services	.83 (.38)	.76 (.43)	.88 (.33)	<.001
Methadone/LAAM	0-1 dummy variable, = 1 if facility dispenses methadone or LAAM	.09 (.29)	.10 (.30)	.08 (.27)	<.001
Accredited	0-1 dummy variable, = 1 if facility is accredited by JC/AHO or CARF or NCQA	.33 (.47)	.19 (.39)	.43 (.50)	<.001
Licensed by state	0-1 dummy variable, = 1 if facility is licensed by a state substance abuse agency	.90 (.30)	.88 (.33)	.92 (.27)	<.001
Admissions (log)	Size of facility, measured by log of annual admissions	4.90 (1.28)	4.69 (1.26)	5.08 (1.26)	<.001
Accepts cash or self-payment	0-1 dummy variable, = 1 if facility accepts cash or self-payment for substance abuse treatment	.93 (.26)	.87 (.34)	.98 (.15)	<.001
Accepts private health insurance	0-1 dummy variable, = 1 if facility accepts private health insurance for substance abuse treatment	.71 (.45)	.47 (.50)	.91 (.29)	<.001
Accepts Medicaid	0-1 dummy variable, = 1 if facility accepts Medicaid for substance abuse treatment	.54 (.50)	.36 (.48)	.68 (.47)	<.001
Accepts Medicare	0-1 dummy variable, = 1 if facility accepts Medicare for substance abuse treatment	.36 (.48)	.21 (.41)	.49 (.50)	<.001
Accepts state-financed health insurance	0-1 dummy variable, = 1 if facility accepts state-financed health insurance for substance abuse treatment	.37 (.48)	.21 (.41)	.50 (.50)	<.001
Receives public funds (not Medicare, Medicaid)	0-1 dummy variable, = 1 if facility receives public funds (not Medicare or Medicaid) for substance abuse treatment	.66 (.47)	.66 (.47)	.65 (.48)	.338

continued

Table 2: Continued

<i>Variable Name</i>	<i>Definition</i>	<i>Full Sample</i> <i>N = 10,513</i>	<i>MC Absent</i> <i>N = 4,681</i>	<i>MC Present</i> <i>N = 5,832</i>	<i>P Value</i>
Offers payment assistance	0-1 dummy variable, = 1 if facility offers payment assistance for clients receiving substance abuse treatment	.79 (.40)	.74 (.44)	.84 (.37)	<.001
Region: Northeast	0-1 dummy variable, = 1 if facility is located in CT, MA, ME, NH, NJ, NY, PA, RI, or VT	.23 (.42)	.17 (.37)	.28 (.45)	<.001
Region: South	0-1 dummy variable, = 1 if facility is located in AL, AR, DE, DC, FL, GA, KY, LA, MD, MS, NC, OK, SC, TN, TX, VA, or WV	.29 (.45)	.34 (.47)	.24 (.43)	<.001
Region: Midwest	0-1 dummy variable, = 1 if facility is located in IL, IN, IA, KS, MI, MN, MO, NB, ND, OH, SD, or WI	.25 (.43)	.20 (.40)	.29 (.45)	<.001
Region: West	0-1 dummy variable, = 1 if facility is located in AK, AZ, CA, CO, HI, ID, MT, NV, NM, OR, UT, WA, or WY	.23 (.42)	.29 (.46)	.19 (.39)	<.001
Metropolitan area	0-1 dummy variable, = 1 if facility is located within a metropolitan area	.77 (.42)	.80 (.40)	.75 (.43)	<.001
Population density—county (log)	Log of the number of people in the county per square mile	6.07 (1.92)	6.17 (1.96)	5.99 (1.88)	<.001
Population—county (log)	Log of the county population	12.61 (1.63)	12.76 (1.66)	12.48 (1.60)	<.001
Competition—county	Herfindahl index in the county	.26 (.28)	.25 (.26)	.28 (.28)	<.001
Medicare MC enrollees—county (log)	Log of Medicare managed care enrollees in the county	7.84 (3.27)	8.05 (3.30)	7.67 (3.24)	<.001
HMO enrollees—county (log)	Log of HMO enrollees in the county	10.70 (3.07)	10.82 (3.21)	10.60 (2.96)	<.001

*Summary statistics are sample means with standard deviations in parentheses. P values are for tests of differences in facilities with and without managed care.

enrolled in Medicare managed care, and (2) number of individuals in the county enrolled in an HMO. Note that we are also controlling for population size and density of the county.

When we control for observed covariates and use IVs to account for endogeneity, the impact of managed care on the number of services offered reverses sign and becomes negative and still significant. Specifically, managed care results in, on average, approximately two fewer services offered by SAT facilities. These results are shown in Tables 3 and 3A. Including covariates and adjusting for the endogeneity of MC improves our ability to measure the true underlying impact of MC on services. We estimate alternative IV specifications by using each instrument alone and then using both instruments together. Under all three specifications, the coefficient on MC is negative and significant. The magnitude does not vary much across the specifications. The coefficients of the other covariates also vary little across the alternative IV specifications. Importantly, F-statistics for the IV models are all well above 10.0, indicating that there is unlikely to be any bias due to weak instruments (Staiger and Stock 1997). Moreover, the model containing both instruments passes the standard test of overidentification (Davidson and MacKinnon 1993; Kennedy 1998; Greene 2003), adding reassurance that Equation (1) is specified correctly and that both instruments are valid.¹¹

Type of Service

The raw data displayed in Table 1 show that facilities with managed care are more likely to offer each specific service, with the exception of employment training, housing assistance, and HIV/AIDS education. However, as noted previously, facilities with and without managed care differ in important covariates that probably affect service offerings, and MC is likely to be endogenously determined. Thus, we turn to the IV models. Table 4 displays the findings for the alternative IV specifications. We report only the coefficients on managed care and suppress the coefficients on the control variables to focus on the key results.

Medical Testing. The IV bivariate probit coefficients are negative for all of the tests of medical diseases (i.e., hepatitis, HIV/AIDS, STD, and TB). All of these coefficients are significant except for one specification for hepatitis. Thus, while the differences in raw means indicate that managed care is associated with more testing for diseases, all of the IV specifications indicate that MC results in less testing.¹² This finding is consistent with the view that

Table 3: Total Services—IV Models (Structural Equation Results)

	<i>Medicare MC Enrolls (log)</i>		<i>HMO Enrolls (log)</i>		<i>Both Medicare MC and HMO Enrolls (log)</i>	
	<i>Coef.</i>	<i>P Value</i>	<i>Coef.</i>	<i>P Value</i>	<i>Coef.</i>	<i>P Value</i>
Managed care	− 1.957	.014	− 1.680	.061	− 1.828	.020
Control: Private and nonprofit*	.294	.066	.313	.050	.303	.055
Control: Public*	.667	.012	.726	.009	.695	.009
Focus: Mental health [†]	− .372	.040	− .367	.043	− .369	.041
Focus: General health [†]	1.907	.000	1.900	.000	1.904	.000
Focus: Mental and substance [†]	.878	.000	.865	.000	.872	.000
Focus: Other [†]	− .372	.168	− .367	.172	− .370	.170
Hospital: General [‡]	.191	.457	.178	.484	.185	.468
Hospital: Psychiatric [‡]	1.582	.000	1.580	.000	1.581	.000
Hospital: Other specialty [‡]	.686	.119	.678	.125	.682	.122
Solo practice	− 1.208	.000	− 1.179	.000	− 1.194	.000
Halfway house	.232	.201	.222	.221	.227	.209
Any hospital inpatient	2.511	.000	2.493	.000	2.503	.000
Any nonhospital residential	3.100	.000	3.097	.000	3.098	.000
Any outpatient	.982	.000	.963	.000	.973	.000
Methadone/LAAM dispensed	2.258	.000	2.282	.000	2.269	.000
Accredited	1.027	.000	1.002	.000	1.015	.000
Licensed by state	1.099	.000	1.084	.000	1.092	.000
Admissions (log)	.387	.000	.378	.000	.383	.000
Accepts cash or self-payment	− .859	.000	− .874	.000	− .866	.000
Accepts private health insurance	1.408	.000	1.312	.001	1.363	.000
Accepts Medicaid	1.019	.000	.997	.000	1.009	.000
Accepts Medicare	.524	.000	.515	.000	.520	.000
Accepts state-financed health insurance	.826	.000	.800	.000	.814	.000
Receives public funds (not Medicare, not Medicaid)	1.084	.000	1.085	.000	1.085	.000
Offers payment assistance	.924	.000	.923	.000	.924	.000
Region: South**	.000	.999	.042	.837	.020	.921
Region: Midwest**	− .870	.000	− .845	.000	− .858	.000
Region: West**	− .022	.918	.013	.952	− .006	.978
Metropolitan area	− .446	.011	− .447	.011	− .446	.011
Population density—county (log)	.245	.000	.247	.000	.246	.000
Population—county (log)	.126	.148	.127	.147	.127	.147
Competition—county	− .282	.333	− .267	.358	− .275	.343
Constant	3.910	.000	3.880	.000	3.896	.000
F-statistic (for instruments)	37.6		26.2		49.4	
Test of overidentification (statistic, p value)					.24	.624

*Excluded category is “private and profit.”

[†]Excluded category is “substance abuse.”[‡]Excluded category is “not a hospital.”

**Excluded category is “Northeast.”

Table 3A: Total Services—IV Models (Selection Equation Results)

	<i>Medicare MC Enrolls (log)</i>		<i>HMO Enrolls (log)</i>		<i>Both Medicare MC and HMO Enrolls (log)</i>	
	<i>Coef.</i>	<i>P Value</i>	<i>Coef.</i>	<i>P Value</i>	<i>Coef.</i>	<i>P Value</i>
Medicare MC enrollments (log)	.069	.000			.056	.000
HMO enrollments (log)			.054	.000	.040	.000
Control: Private and nonprofit*	-.252	.000	-.245	.000	-.247	.000
Control: Public*	-.695	.000	-.713	.000	-.694	.000
Focus: Mental health [†]	-.073	.221	-.065	.274	-.073	.221
Focus: General health [†]	.102	.472	.098	.493	.097	.497
Focus: Mental and substance [†]	.137	.001	.144	.001	.138	.001
Focus: Other [†]	-.098	.367	-.084	.440	-.091	.401
Hospital: General [‡]	.205	.025	.208	.023	.205	.024
Hospital: Psychiatric [‡]	.022	.842	.014	.903	.017	.879
Hospital: Other specialty [‡]	.063	.742	.081	.675	.062	.744
Solo practice	-.311	.000	-.314	.000	-.311	.000
Halfway house	.128	.020	.127	.021	.126	.022
Any hospital inpatient	.286	.000	.292	.000	.291	.000
Any nonhospital residential	.050	.310	.057	.249	.059	.227
Any outpatient	.239	.000	.248	.000	.248	.000
Methadone/LAAM dispensed	-.308	.000	-.300	.000	-.302	.000
Accredited	.299	.000	.298	.000	.300	.000
Licensed by state	.186	.002	.193	.001	.188	.002
Admissions (log)	.102	.000	.100	.000	.102	.000
Accepts cash or self-payment	.216	.011	.206	.015	.206	.016
Accepts private health insurance	1.016	.000	1.011	.000	1.019	.000
Accepts Medicaid	.259	.000	.255	.000	.258	.000
Accepts Medicare	.107	.006	.107	.006	.105	.007
Accepts state-financed health insurance	.297	.000	.296	.000	.298	.000
Receives public funds (not Medicare, not Medicaid)	-.013	.815	-.007	.907	-.015	.790
Offers payment assistance	.015	.742	.024	.591	.021	.647
Region: South**	-.494	.000	-.490	.000	-.470	.000
Region: Midwest**	-.281	.000	-.305	.000	-.273	.000
Region: West**	-.485	.000	-.429	.000	-.467	.000
Metropolitan area	-.022	.722	-.029	.643	-.057	.358
Population density—county (log)	-.038	.101	-.035	.146	-.042	.069
Population—county (log)	-.099	.002	-.072	.024	-.131	.000
Competition—county	-.156	.119	-.154	.128	-.146	.141
Constant	-.521	.133	-.941	.005	-.421	.219

*Excluded category is “private and profit.”

[†]Excluded category is “substance abuse.”[‡]Excluded category is “not a hospital.”

**Excluded category is “Northeast.”

Table 4: Effects of Managed Care on Individual Services—IV Models[†]

	<i>Medicare MC Enrolls</i> <i>(log)</i>		<i>HMO Enrolls (log)</i>		<i>Both Medicare MC and HMO Enrolls</i> <i>(log)</i>	
	<i>Coef.</i>	<i>Marginal*</i>	<i>Coef.</i>	<i>Marginal*</i>	<i>Coef.</i>	<i>Marginal*</i>
Medical Testing						
Blood alcohol test	-.474 (.156)	-.185 (.157)	.320 (.376)	.120 (.362)	-.025 (.953)	-.010 (.953)
Drug/alcohol urine screen	.577 (.037)	.172 (.063)	.575 (.033)	.171 (.057)	.581 (.020)	.173 (.039)
Hepatitis	-.267 (.399)	-.038 (.448)	-.569 (.007)	-.094 (.040)	-.447 (.071)	-.069 (.141)
HIV test	-.654 (.030)	-.221 (.041)	-.861 ($< .001$)	-.297 ($< .001$)	-.726 (.004)	-.247 (.007)
STD test	-.723 (.001)	-.127 (.014)	-.821 ($< .001$)	-.152 ($< .001$)	-.761 ($< .001$)	-.136 (.005)
TB screen	-.898 ($< .001$)	-.254 ($< .001$)	-.860 ($< .001$)	-.241 (.001)	-.886 ($< .001$)	-.250 ($< .001$)
Therapy/Counseling						
Family counseling	.341 (.114)	.081 (.140)	.395 (.047)	.094 (.068)	.230 (.271)	.053 (.290)
Group therapy	.082 (.653)	.007 .	.185 (.250)	.017 (.291)	.143 (.407)	.013 (.433)
Individual therapy	-.032 (.864)	-.001 (.863)	-.058 (.763)	-.002 (.759)	-.086 (.647)	-.003 (.640)
Pharmacotherapy	-.716 (.027)	-.247 (.046)	-.509 (.319)	-.170 (.359)	-.382 (.434)	-.126 (.463)
Relapse prevention groups	.605 (.017)	.175 (.035)	.719 (.001)	.213 (.004)	.643 (.006)	.188 (.017)
Aftercare counseling	.017 (.951)	.004 (.951)	-.109 (.682)	-.024 (.677)	-.114 (.650)	-.026 (.645)
Assessment						
Substance abuse assessment	.489 ($< .001$)	.019 (.014)	.593 ($< .001$)	.024 (.004)	.560 ($< .001$)	.023 (.008)
Mental health assessment	.525 (.085)	.125 (.065)	.508 (.123)	.121 (.096)	.452 (.179)	.108 (.150)
Transitional						
Assist obtaining social services	-.795 (.003)	-.298 (.001)	-.919 ($< .001$)	-.340 ($< .001$)	-.872 ($< .001$)	-.324 ($< .001$)
Discharge planning	.750 (.003)	.234 (.009)	.556 (.124)	.168 (.163)	.700 (.006)	.217 (.016)
Employment training	-.699 (.046)	-.265 (.049)	-.507 (.282)	-.191 (.293)	-.617 (.090)	-.233 (.097)
Housing assistance	-.650 (.031)	-.222 (.044)	-.234 (.623)	-.076 (.634)	-.451 (.221)	-.150 (.248)
Referral to other trans. services	-.170 (.451)	-.043 (.438)	.104 (.651)	.028 (.654)	-.089 (.694)	-.023 (.690)

continued

Table 4: *Continued*

	Medicare MC Enrolls (log)		HMO Enrolls (log)		Both Medicare MC and HMO Enrolls (log)	
	Coef.	Marginal*	Coef.	Marginal*	Coef.	Marginal*
Other Services						
Case management	.254 (.436)	.100 (.438)	.169 (.622)	.066 (.622)	.249 (.383)	.101 (.385)
Child care	-.599 (.028)	-.175 (.055)	-.537 (.115)	-.155 (.151)	-.569 (.047)	-.165 (.074)
Domestic violence	-.221 (.471)	-.072 (.485)	.060 (.836)	.019 (.835)	-.120 (.684)	-.039 (.689)
HIV/AIDS education	-.344 (.611)	-.126 (.601)	-.929 (<.001)	-.317 (<.001)	-.641 (.115)	-.227 (.087)
Outcome follow-up	-.874 (.001)	-.338 (<.001)	-.713 (.025)	-.279 (.019)	-.807 (.003)	-.313 (.001)
Transportation assistance	-.043 (.939)	-.015 (.940)	-.095 (.857)	-.034 (.858)	-.158 (.740)	-.058 (.744)
Acupuncture	-.716 (.035)	-.112 (.157)	.989 (<.001)	.101 (.005)	-.674 (.071)	-.103 (.214)

[†]Boldface entries are statistically significant ($p < .100$).

*Marginal effects measure the change in the probability that a given service is offered for a discrete change in MC from 0 to 1. Marginal effects are calculated for a typical SAT facility comprising the following characteristics: private and for-profit, primary focus is substance abuse, not affiliated with any type of hospital, not a solo practice, not a halfway house, no hospital inpatient services, no nonhospital residential services, offers outpatient services, methadone not dispensed, not accredited, licensed by the state, accepts cash or self-payment, accepts private insurance, accepts Medicaid, does not accept Medicare, does not accept state-financed health insurance, receives public funds (not Medicaid or Medicare), offers payment assistance, and located in a metropolitan area in the Northeast.

managed care is willing to reimburse only for those services that are “medically necessary” for SAT.

In contrast, we would expect MC to result in more drug and alcohol urine testing and more blood alcohol testing inasmuch as both of these services may be part of the utilization review and assessment process. The results, however, are mixed. While all IV specifications for drug and alcohol testing have positive and significant coefficients, none of the coefficients for blood alcohol testing are significant and two of them are negative.

Therapy/Counseling and Assessment. Therapy/counseling and assessment services form the “necessary” core of substance abuse treatment. As such, we do not expect MC to have much of an impact on these services, and the results in Table 4 confirm this view. Of the eight services belonging to these two categories, only relapse prevention groups and substance abuse assessment

services are significantly affected by MC in all IV specifications (and the magnitude of the effect on substance abuse assessment, 2–3 percent, is very small).

Transitional. It appears that MC has a negative impact on transitional services, though the results are somewhat mixed. All of the IV coefficients are negative for assistance obtaining social services, employment training, and housing assistance. However, only two-thirds of these coefficients are significant. Moreover, all of the coefficients for discharge planning are positive and two of these are significant.

Other Services. The IV coefficients for “outcome follow-up” are negative and significant in all IV specifications. The coefficients for acupuncture are positive and significant in two of the IV specifications and negative and significant in the third (this anomalous result is likely due to the very low incidence of acupuncture). The negative impact of MC on child care is significant in two specifications, while the negative impact of MC on HIV/AIDS education is significant in only one specification. In all other cases, the coefficient of MC in the IV models is insignificant. The finding that managed care reduces the likelihood of “outcome follow-up” is in contrast to the finding that managed care increases the likelihood of relapse prevention groups. Further study is required to determine the net impact on outcomes of these two findings.

Limitations

Our analyses are limited by the data available from the NSSATS data file. Managed care is measured as a binary variable due to lack of more detailed data available in 2000 NSSATS. Thus, we are unable to measure the intensity, strength, types, and mix of MC mechanisms at each facility. Another limitation is that we know only if a service is offered—we do not know if the service has been received, who receives it if it has, or the intensity and quality of the service. These shortcomings are the result of data limitations and cannot be overcome. However, using binary indicators of managed care and specific services is probably conservative because their relatively blunt nature could bias against finding significant results.

The NSSATS does not collect data on client characteristics. Given that client characteristics likely affect service offerings and are heterogeneous across SAT facilities, omitting client mix data may result in omitted variables bias. We attempt to mitigate this source of bias using proxies for client mix: types of payment accepted and ownership status. However, these proxies may

be endogenous to service offerings. Although this is an area for future research, our belief is that the benefit of including these proxies for client mix (i.e., mitigating potential omitted variables bias) outweighs the cost (i.e., exacerbating potential endogeneity bias).

We recognize that these NSSATS data limitations constrain our analyses. Offsetting these limitations, however, is the availability of data for study from almost the entire universe of SAT facilities, including data on multiple, specific service offerings. Thus, not only does the NSSATS provide a large dataset, but using it means that we do not have to generalize from a sample.

CONCLUSIONS AND POLICY IMPLICATIONS

We conclude that, on average, managed care significantly decreases the total number of different services offered by an SAT facility, *ceteris paribus*. This finding is derived from our IV models in which we not only control for relevant factors, but also adjust for potential endogeneity between MC and service offerings. The results based on the IV models can be interpreted as *causal*, subject to the above limitations, and are quite robust to alternative specifications. This finding raises policy concerns because a reduced range of services offered could result in unmet needs for those in SAT (McLellan et al. 1993; Milby et al. 1996; McLellan et al. 1997; McLellan et al. 1998; Gould, Levine, and McLellan 2000; Marsh, D'Aunno, and Smith 2000; Smith and Marsh 2002). This, in turn, could lead not only to worse treatment outcomes for SAT clients, but also to an increase in the negative externalities associated with drug abuse such as increased unemployment and crime (Jofre-Bonet and Sindelar 2001).

When we separately examine individual services offered, we find that MC consistently and significantly reduces the likelihood of offering STD tests, HIV/AIDS tests, and TB screens. This is a potentially important finding from a public health perspective inasmuch as onsite availability increases the use of such medical testing services (Umbricht-Schneiter 1994; NIDA 1999; D'Aunno 1997; Friedmann et al. 2000; Friedmann et al. 2001), which, in turn, could reduce the spread of these infectious diseases. In short, reductions in the availability of medical testing services may be harmful to public health.

Consistent with increased utilization review due to MC, we find that managed care significantly increases the likelihood of offering substance abuse assessment and drug and alcohol urine screening. However, we find mixed

evidence of the impact of managed care on services designed specifically to reduce relapse. While we find that MC significantly increases the likelihood of offering relapse prevention groups, we also find that MC significantly decreases the likelihood of offering outcome follow-up. Thus, the net impact of managed care on relapse is uncertain. An important area for future research is the degree to which managed care increases or decreases favorable long-term treatment outcomes.

ACKNOWLEDGMENTS

We thank participants of the Health Economics seminar at Yale's School of Public Health and also at the BU/MIT/Harvard Health Economics seminar for comments. We also thank Mario Garcia, Christine Lemak, Bill Cartwright, and Mark Schlesinger for their insights. Data and friendly advice from Cathie Alderks of SAMHSA's Office of Applied Studies are greatly appreciated.

NOTES

1. The percentage of substance abuse treatment facilities having contracts or agreements with managed care has risen from 32 percent in 1995 to 54 percent in 2000 (Substance Abuse and Mental Health Services Administration 1997; U.S. Department of Health and Human Services 2002b).
2. We use the term MCO in a broad sense to include not only a commercial or private nonprofit MCO, but also a public payer such as the state department of health or a state Medicaid program either administering its own program directly, or contracting with a commercial MCO.
3. The mix of multiple payers (private and public) in SAT may make the situation more complex (see Glazer and McGuire 2002).
4. We do not use alternative IV methods such as two-stage-least-squares (2SLS) because of the dichotomous nature of both MC and specific service offerings. Estimating dichotomous choice models using 2SLS can result in several problems, including predicted probabilities that are outside the 0-1 interval (Greene 2003).
5. Approximately 1.5 percent of SAT clients are age 65 or older, and just a fraction of the elderly seek SAT treatment.
6. About 11 percent of the total population in the U.S. is drug dependent and only a fraction of them seek SAT treatment for illicit drug dependence.
7. Other U.S. jurisdictions include the territories of American Samoa and Guam, the Federated States of Micronesia, the Republic of Palau, the Commonwealth of Puerto Rico, and the Virgin Islands.

8. Facilities were deemed ineligible for the survey if they were not providing substance abuse treatment as of October 1, 2000, or they treated incarcerated clients only.
9. Facilities are not missing data in a systematic fashion, so we do not expect any bias due to missing data.
10. The 2002 Area Resource File uses the InterStudy County Surveyor Database for the number of HMO enrollees in each county.
11. The test statistic is calculated as N times the uncentered R^2 from regressing the IV residuals on all the instruments, and is distributed as a chi-square with degrees of freedom equal to the number of instruments in excess of the number of explanatory variables.
12. Our medical testing results are somewhat inconsistent with those of Durkin (2002), who found that MC is associated with an increase in the likelihood of offering routine medical care and physical exams. There are two possible explanations for this discrepancy. First, Durkin uses a simple one-equation logistic model that does not account for the endogeneity between MC and service offerings. As such, the results may be biased. Second, it is possible that Durkin's results are no longer applicable today inasmuch as her study took place before the current period of growth in managed care.

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