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HEALTH CARE CARVE-OUT: A CASE
STUDY OF ONE HMO**

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Working Paper 6242

NBER WORKING PAPER SERIES

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Working Paper 6242
<http://www.nber.org/papers/w6242>

NATIONAL BUREAU OF ECONOMIC RESEARCH
1050 Massachusetts Avenue
Cambridge, MA 02138
October 1997

This paper is part of NBER's research program in Health Care. Any opinions expressed are those of the authors and not those of the National Bureau of Economic Research.

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NBER Working Paper No. 6242
October 1997
JEL No. I11
Health Care

ABSTRACT

In this study we examine a case study of a carve-out for mental health and substance abuse services between a local plan of a national HMO (N=120,213) and a local managed behavioral health care vendor (MBHC). This is one of the first studies which estimates the impact of an HMO carve-out on costs and patterns of MH/SA care. Three years of insurance claims data (1993-1995) were used for the analyses, with a new carve-out contract implemented in May 1994. The new carve-out arrangement included a new vendor, a change in the organizational structure of clinical services, and increased financial risk to the vendor for inpatient care. Descriptive and empirical analyses are reported on a continuously enrolled population (N=49,529). Results from the analyses showed the new carve-out arrangements had a significant impact on spending and utilization of services. Enrollees were 20% less likely to use MH/SA services after the implementation of the new carve-out, and inpatient MH/SA utilization dropped 50% under the new carve-out. Overall, MH/SA spending per enrollee dropped from approximately \$4.90 per month to \$2.20 per month. Outpatient MH/SA spending per user dropped 35% after the implementation of the new carve-out. Further research should be conducted to evaluate the impact on access and quality of care, given the substantial decrease in utilization and spending.

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I. Introduction

Insurance coverage and treatment of mental disorders and substance abuse (together known as behavioral health) are increasingly being separated from other insurance risks and managed by specialty firms. The specialty firms, known as managed behavioral health care (MBHC) companies, may contract directly with an employer or government payer, or contract with a managed care organization or insurance company. Both types of contractual arrangements have been referred to as *carve-out* contracts. In the first case the employer has the option to carve-out all behavioral health care for some or all enrollees.¹ By carving out, the payer eliminates competition aimed at avoiding enrollment of people who are mentally ill or suffering addictive disorders by requiring all enrollees, regardless of their choice of health plan, to enroll in a single MBHC plan. The consequence of this form of “carving out” behavioral health care is to reduce the extent to which those services are affected by incentives related to biased selection.

In the second type of carve-out, mental health and substance abuse (MH/SA) services are separated from the other risks after the choice of health plan is made. This type of carve-out arrangement will have no affect on selection incentives and is therefore thought to arise because of economies of specialization. It is posited that efficiencies arise from delegating management of MH/SA services to an organization which specializes in the treatment of those conditions. In addition to economies of specialization, this type of carve-out identifies a specific budget for behavioral health. Hodgkin, Horgan and Garnick (1997) have recently examined the decision by health maintenance organization (HMOs) to carve-out behavioral health. They point to a trend towards increased use of carve-outs by HMOs, for example, they report that in 1986 only 25% of HMOs used external vendors to deliver MH/SA care compared to about 54% in 1989.

Carve-outs are new institutions in the health care market place. Several studies of direct contracts between payers and MBHC firms have been reported in the literature (Callahan, Shepard, Beinecke, Larson, Cavanaugh, 1995; Ma and McGuire 1997; and Goldman, McCulloch, and Sturm, 1997). These studies all show strong reductions in total spending and complex changes in utilization of services. It is important to note that the specific terms contained in carve-out contracts can greatly vary.²

In this study we conduct a case study of one carve-out contract for MH/SA services between a local plan of a national HMO and a MHBC vendor. The enrollees are a collection of people from several different employers. This is one of the first studies which estimates the impact of an HMO carve-out on costs and patterns of mental health and substance abuse care. A unique aspect of this study is the comparison between the provisions in two carve-out contracts. Three years of information (1993-1995) on inpatient claims, outpatient claims, and eligibility files are analyzed. The new carve-out contract was implemented in the middle of the study period (May 1994).

The new carve-out arrangement included selection of a new vendor with a different organizational structure than its predecessor. The contract also contained an altered set of financial incentives. Thus, it will be difficult to attribute any changes we identify to a particular aspect of the contract. The new vendor's organizational structure affected the size and composition of the provider network. For example, new financial incentives placed the MBHC carve-out vendor fully at risk for inpatient claims which previously were paid by the plan to the hospital provider on a fee for service basis.

In the second section of this paper we will provide general background information about the managed care organization (MCO) and characteristics of the enrolled population. The third

section describes why a new carve-out contract was initiated and details of changes in contract features associated with the change in vendor. Hypotheses are proposed concerning the expected impact of specific provisions of the new contract. The fourth section describes the empirical implementation of our analysis. Descriptive analyses provide preliminary results showing a break in the time trend in utilization and spending by the MCO associated with the implementation of the new contract. Statistical analyses provide a more controlled examination of changes in utilization and spending associated with the new carve-out contract. The fifth and final section provides a discussion of the results and the lessons learned.

II. Background and Study Population

The MCO initiated its behavioral health carve-out program in 1990. It entered into a contract with a specialty vendor to manage the behavioral health care of all HMO and PPO enrollees. While a single vendor was used for both PPO and HMO³, the contracts varied in their structure and payment arrangements. The reason for limiting our analysis relates to some inconsistencies in data reporting during the study period for the PPO.

The study population consisted of 120,213 individuals enrolled as of January 1996. Enrollees over 64 years were excluded since they are eligible for Medicare. In order to account for potential changes in enrollment associated with the shift to a new MBHC vendor and the selection bias it might introduce, in this study we analyze the subset of continuously enrolled individuals. Individuals were defined as continuously enrolled if they were enrolled in the HMO from at least January 1, 1993 through January 1, 1996. The continuously enrolled population accounts for 41% (N=49,529) of the total population. Demographic characteristics between the continuously enrolled and total population were similar, however a few differences are worth

noting: 1) 8% of the continuously enrolled population were MH/SA users versus 6% in the total population, 2) the continuously enrolled population on average is older (33 years) than the total population (30 years). To study MH/SA users, all enrollees with a mental health or substance abuse diagnosis in any of the three study years were identified.⁴

There were 4019 continuously enrolled MH/SA users, 57% female and 43% male. On average the women were older (37 years) than the men (33 years). Approximately 9% of the MH/SA cohort were 18 years or younger. More woman than men sought mental health services, and conversely more men than women sought substance abuse treatment services. Insurance contract holders (employees) constituted over half (57%) of the MH/SA users, 21% of the MH/SA users were spouses and 22% were dependents. Finally, among the continuously enrolled, 58% the subscribers were only offered the HMO product, suggesting that selection was not a factor for this segment of the population.

III. Changes in Contract Terms

As the 1990 carve-out contract neared its end, the MCO engaged in a competitive procurement process to choose the MBHC vendor for the next contract period. A request for proposals (RFP) was issued in November 1993 that called for several significant departures from the previous contract. One reason given for using a competitive procurement was the perception that the initial vendor was ill-prepared to deal with the rapidly growing number of enrollees in the plan during the last years of the contract. Because of the increase in enrollment, the MCO and the initial vendor were forced to quickly recruit providers for their network.

The influx of new providers was thought to have been associated with elevated levels of utilization and spending. The increase in utilization of MH/SA care was attributed to the new

providers being unfamiliar with managed care and the inability of the vendor to educate the new practitioners and to monitor and control practice patterns. The correlation between hiring new providers and increased MH/SA utilization and spending is important to keep in mind when analyzing the data. In assessing any observed decrease in outpatient spending, one must consider the possibility that the reduction is partly due to a “return to normal use” versus a decrease attributable solely to the new contracting arrangements.

The RFP outlined an overhaul of the provider network infrastructure. The RFP required several key changes in the approach to MBHC including, 1) integrating all services under the control of the carve-out vendor, 2) altering payment arrangements, 3) changing the size and make-up of the provider network, and 4) instituting a more structured approach to utilization management. In this section we provide details on the new MBHC arrangements that combine to define the “experimental condition”. Key changes in the following areas; clinical payment, hospital payment, size of provider network, utilization review, and the number of facilities, are summarized in Table 1.

The MCO wished to integrate the MH/SA delivery system by having all components of care (inpatient, outpatient, and partial setting) with one vendor. In the baseline contract, only outpatient services and professional fees were included within the pure capitation payment. The MCO directly paid all facility charges which included all inpatient services via a negotiated per diem arrangement. The new vendor was 100% at risk (pure capitation) for all behavioral health claims costs (including facility based care). Pure capitation means that the MBHC vendor receives a fixed payment for each enrollee, typically per member per month (PMPM). The PMPM includes an administrative service fee and expected claims costs. The change in these payment provisions served to, 1) increase the control over resources by the vendor, 2) create

strong incentives to reduce facility based care relative to the initial contract, and 3) give the vendor flexibility to devote resources to alternatives to institutional care for MH/SA such as residential care and day hospital treatment.

The MCO's shift in contracting was predicated on the idea that an integrated delivery and payment system would rationalize resource allocation and result in better coordination of care and greater efficiency. Reliance on high powered incentive schemes such as pure capitation could also lead to under-utilization of services and reduced access to care. The MCO sought to limit such responses to the incentives by monitoring and requiring utilization reports to be regularly sent to them. Therefore, one requirement for the new vendor was for a sophisticated Management Information System.

Six vendors submitted proposals for the MH/SA carve-out contract. A new vendor was selected and began operation in May 1994. The organizational and financial changes from one contract to the next reflected the plan's directive that capitation for all services be the payment method and that more emphasis be placed on cost-effective care practices. In response to the increased financial risk, the vendor chose to sub-contract inpatient services to a hospital. This put the burden of managing the intensity of care on the hospital.

The major changes in management methods of the vendor included paying providers a salary, introducing a bonus plan, and treating patients in owned/rented clinics.

Under the old contract, providers were reimbursed via a discounted fee for service payment. The new vendor hired masters level providers (and a few Ph.D.) who were offered a bonus incentive plan based on volume of patients seen. All HMO patients were seen by an employed provider with two exceptions, 1) if the condition was so rare or unique that a specialty psychiatrist was needed, or 2) an overflow of patients forced the vendor to use contracted back-up providers.

Treatment was no longer primarily provided in private offices, but in five organized outpatient clinics, owned or rented by the vendor. This created central locations where patients were seen and where providers could be monitored, paid, and given information. It also created an environment where a provider's patient panel were from one MCO. There is some evidence which suggest that features such as these, along with patient demand, affect provider behavior in ways desired by the vendor (Langwell, 1990).

Similarities Between Contracts

No changes in benefit design occurred from one contract to the next. The number of reimbursable visits/days and cost sharing provisions remained the same. Almost all enrollees (99.5%) received care under the standard benefit package. The remaining half percent were offered separate benefit packages specially designed by their employer.⁶ The standard MH/SA benefit design package included free care for substance abuse detoxification and crisis stabilization services (inpatient, outpatient, or partial setting). Seven days of inpatient care were fully covered, and any additional inpatient days, up to the 30 day maximum, required a 20% cost sharing. For outpatient services, MH/SA care, a maximum of twenty visits per year were allowed, and they carried a co-payment of 50%. A maximum of two 30-day residential stays were allowed per year. The plan allowed conversion of partial days from inpatient days on a two for one basis, and the partial days were counted against the limited inpatient benefit.

The process of entering the system remained the same under both vendors. All patients were required to call a toll free line answered by vendor employees. An assessment was made on the phone and the patient was referred to the emergency room, inpatient, outpatient, or partial hospital setting. The baseline vendor worked closely with the MCO, utilizing an assessment tool (a decision tree) designed by the MCO to determine the appropriate level of care. The new

vendors' intake process relied on bachelor degree level workers (with related degrees in areas such as sociology and psychology) staffing a toll free telephone bank with supervisors (with advanced training RN, MS, or certified therapists) on duty to assist with difficult calls. At the initial clinic visit an assessment took place and a treatment plan designed.

Policy regarding approval of days/visits was similar for both vendors. Under the first contract, approval for substance abuse detoxification was 1-3 days, and inpatient mental health crisis stabilization approval varied from 3-5 days depending on diagnosis and the level of acuity. Up to five outpatient visits were initially approved, followed by a review of the treatment plan and patient progress. Additional blocks of four to six sessions were approved as necessary. Denials of requests for subsequent treatment were rare. Residential treatment was typically approved for 30 days at a time.

Under the new contract, no more than three inpatient days at a time were approved. All inpatient visits had to be pre-authorized and emergency visits were required to be approved within 48 hours of the visit. Up to five outpatient visits were authorized, followed by an evaluation. Concurrent review was done depending on the provider, as some providers were watched more closely than others. Residential treatment was approved for thirty days at a time. No patients enrolled in the HMO were covered for services received by a non-network provider.

Hypotheses

The new contract provisions lead us to expect a number of responses in spending on behavioral health care and the pattern of service utilization. The expansion of capitation to include inpatient services along with the pass through of incentives to hospitals places substantially more financial risk on clinical decision makers. This can be expected to result in fewer admissions, as the vendor seeks to divert admission to lower cost alternatives. The

capitation also serves to create an incentive for reduced costs per admission. The possibility that care will be directed to alternatives to inpatient care is based on an assumption that patients previously seen in a hospital setting can appropriately be treated in a less intensive setting. Previous studies (Callahan, et al., 1995) found that even a small amount of financial risk targeted towards inpatient MH/SA care reduced inpatient use and was accompanied by increased treatment in partial hospital and residential programs. This was especially true for substance abuse care (Frank, McGuire, Notman, and Woodward, 1996). These studies were done in populations that have historically made relatively heavy use of inpatient treatment. This was less the case here. Nevertheless, the new contract makes use of new high powered incentives towards inpatient care. Therefore, we expect a reduction in the number of inpatient admissions and expect that spending reductions will be more pronounced for this form of treatment.

We also expect a reduction in spending on outpatient care, due to a more systematic approach to utilization review and constraints on the size and employment relations represented in the provider network. Specifically, the higher proportion of providers who are employed/salaried and discounted rates for providers receiving fee for services are expected to reduce supply. Tighter utilization control is also expected to stem from the use of staff providers and a performance bonus plan. It is not clear whether number of episodes, cost per episode, or some combination will be affected by the new arrangements. Research by Goldman, McCulloch and Sturm, (1997) point to constant or increased numbers of treated cases but lower spending per episode. Huskamp (1997) reports reductions in both treated cases and costs per case.

IV. Empirical Implementation

The research design is a “before-after” comparison. The empirical strategy is to examine the data and test for a break in trend of utilization and costs that are associated with implementation of the new carve-out contract. The analytical strategy consists of two components. First, we report descriptive results on the trends in various types of MH/SA utilization and spending. Second, we use an expanded version of the “two part” statistical model (Manning, et al., 1981) to assess the changes in utilization associated with contract changes.

A primary task of our analysis is an attempt to estimate an impact of the altered contract features that is separate from other temporal changes in MH/SA utilization. Four steps are taken to control for trends in MH/SA utilization unrelated to contract changes. The first, mentioned above, entails studying the continuously enrolled population of enrollees. This reduces the influence of temporal changes in the composition of the enrolled population on observed utilization patterns. Second, we explicitly control for secular trends in utilization. Third, we use multivariate statistic models to control for other factors such as the types of illnesses treated that might change overtime. Finally, we account for general inflation by adjusting spending levels by the CPI medical care services component. All financial data are reported in 1993 dollars.

Data

The key variables evaluated are measures of spending and utilization of services. In this paper, adjusted charges plus cost sharing are referred to as “spending”.⁷ Other key variables for our analyses are utilization of services, i.e. tracking the overall pattern of use and tracking the pattern of use in the inpatient and outpatient settings. Table 2 lists the variables used in this analysis. Variables include, age, gender, family member code⁸, choice of plan⁹, and diagnoses. Several dummy variables were created from the available demographic information. The key

dummy variable in our analyses is the “POSTCO” variable which determines whether or not services occurred after the new carve-out. Another variable is the quarter (qtr) counter which allows us to control for general changes over time in the statistical analyses reported below.

Analyses

Utilization patterns and spending for all patients (medical and MH/SA) are reviewed over the three study years. The rates of use (proportion of MH/SA users compared to the overall population) are presented. We describe the following dimensions of spending: 1) MH/SA spending per enrollee, 2) MH/SA inpatient spending per enrollee, and 3) MH/SA outpatient spending per enrollee. Reviewing the spending data in all of these categories allows us to identify sources of savings and thereby interpret overall changes in spending.

Statistical analyses were done to evaluate utilization of services and charges. The data represent a panel of enrollees over time, five quarters before and six quarters after the new carve-out contract. January 1993 and November and December 1995 were dropped from the analyses. Panel data imply a more complicated covariance structure for estimation than simple regressions. For that reason, all estimates of variance use White’s approach to obtain robust standard errors.

The estimation strategy relies on a three part model. In the first stage we estimate a logit regression of the likelihood of using any MH/SA service. The second stage estimates a logit of the probability of using any inpatient services, conditional on using any MH/SA services in the quarter. The final step is to estimate spending regressions for individuals using MH/SA inpatient services, and MH/SA outpatient only services. Two ordinary least squares regressions are estimated for the logarithm conditional spending. Figure 1 depicts the structure of the empirical work.

For each of the three stages of estimation, utilization and spending are viewed as depending on five sets of factors: 1) demographic factors (age, gender, relationship to contract holder), 2) the contractual arrangements governing MH/SA care, 3) whether an individual had a choice of health plan, 4) a time trend, and 5) the type of illness being treated (for second and third stage models only). The specific measures used to represent each class of variable are defined on Table 2.

Regression equations for spending are done for the two components: spending for any inpatient use, and spending for services in the outpatient only setting. The covariates for the regressions are similar to the logit models, however two diagnosis covariates were added: *depdx* and *sadx*. These two dummy variables were added because patients with depression disorders and substance abuse problems are believed to be more costly. The key variable in all four equations is *POSTCO*. *POSTCO* takes a value of one when the new carve-out contract provisions were in force and zero otherwise.

V. Results

Two sets of results are reported in this section. We begin with some simple graphical displays of key changes in utilization and spending overtime. The second set of results reported are the results for the three part model of utilization and spending.

Descriptive Results

Figure 2 depicts the rate of MH/SA use per month. The figure indicates that there was little in the way of a systematic time trend in the rate of use of MH/SA care during the three years. Enrollees received MH/SA treatment before and after at a monthly rate of approximately 3.5 per 1000. Thus, there is no clear decline in the monthly rate of use of MH/SA care after the

implementation of the new carve-out. In contrast, Figure 3 shows a rather dramatic reduction in MH/SA spending per enrollee following the implementation of the new contract. MH/SA spending per enrollee per month before the carve-out averaged \$4.90 (range \$3.19 - \$7.37), after the carve-out the average MH/SA charge per enrollee per month dropped to \$1.30 (range \$0.70 - \$2.20). It is important to note that spending per enrollee was decreasing before the new carve-out. The first two quarters in 1993 experienced the highest average charge per enrollee, around \$6 per member per month, whereas the three quarters prior to the new carve-out leveled off at \$4.50 per enrollee, a reduction of 25%. Nevertheless, the reduction in spending at the time of the new carve-out represents a clear break in the pre-period time trend. The reduction from \$4.50 PMPM to about \$2 over a three month period is notable.

Figures 4 and 5 decompose the overall reduction in spending. Figures 4a and 4b report trends in the rate of use for inpatient and outpatient MH/SA treatment. Figures 5a and 5b reveal trends in inpatient and outpatient spending per enrollee. Figure 4a shows a reduction in the rate of inpatient utilization occurring at the time of the implementation of the new carve-out contract that closely tracks the overall decline in spending for MH/SA. The rate of inpatient use fell from about 5 per 10,000 enrollees per month to less than 2 per 10,000 enrollees per month. Figure 4b suggest little change in the rate of outpatient MH/SA care use. The rate of use remained steady at about 3.5 users per 1000 enrollees per month. The results suggest that some savings were achieved via altered use of inpatient care.

Figure 5a shows the trend in inpatient MH/SA spending per enrollee per month. Note that there is substantial month to month variation in spending. However, the downward trend in spending per enrollee is quite clear in the graph. Outpatient spending per enrollee per month is shown on Figure 5b. The monthly level of spending is considerably more stable than were the

inpatient spending data. The Figure shows a large discontinuity in spending on outpatient MH/SA care occurring at the time of the initiation of the new carve-out contract. Spending fell from about \$2.50 per member per month to \$0.75. These figures indicate that outpatient savings were obtained by either reduced number of visits per episode of care and/or lower prices paid per visit.

Multivariate Statistical Results

The results for the logit estimates of the probability of use of any MH/SA services, are presented on Table 3. The POSTCO variable (use after the implementation of the carve-out), is significant at the .01 level. The relative odds of receiving MH/SA services in the quarter after the new carve-out is .79 of the old contract level, meaning that enrollees were 20% less likely to use any MH/SA services under the new contract. This result is different from visual inspection of Figure 2 where the use in a month did not clearly decline.⁹

Employees and spouses were about 2.1 times more likely to use MH/SA services than dependents. The age of the enrollee also was significantly related to the probability of using MH/SA services. Enrollees between 19 and 39 were less likely to use services relative to enrollees over 40 (the reference group). Enrollees under 19 were 1.4 times more likely to use any MH/SA services than enrollees over 40. Individuals with no choice of insurance plan were somewhat less likely to receive services (91% as likely) than those who had a choice of HMO or a PPO. The estimated coefficient for the time trend (quarter counter) indicates a positive time trend in utilization holding constant other factors.

The results for the logit on the conditional probability of using inpatient services given some use of MH/SA in the quarter, are presented on Table 4. Once again the POSTCO variable is significant at the .01 level. The relative odds of receiving inpatient services after the new

carve-out is .54, in other words, patients were about half as likely to use inpatient MH/SA services after the implementation of the new carve-out. This is consistent with the results reported on Figure 4a. In this model, enrollees under 19 were less likely to use inpatient services relative to the over 40 group. Combining this information with the first model, enrollees under 19 were more likely to access the mental health and substance abuse system, but less likely to be admitted to a facility. Males were estimated to be 1.5 times more likely to use inpatient services in the quarter than females. This means that males were not statistically more likely to use MH/SA services than females, but once they began some treatment they were more likely to use inpatient services. The estimated coefficient is significantly different from zero at the 0.01 level.

Regressions were estimated for the natural logarithm of MH/SA spending for the individuals who use some inpatient care in the quarter and those who only use outpatient care. The results for individuals using some inpatient care are reported on the first column on Table 5. The overall fit of the inpatient spending model as measured by the R-square, was 0.13. The estimated impact of the new carve-out contract was not significantly different from zero at conventional levels. The number of cases used in the estimation was quite small (N= 334). The only precisely estimated coefficients were those for diagnoses of depression and substance abuse. The estimated coefficient indicates that cases of depression involving inpatient care were 190% more expensive to treat than other mental illnesses involving inpatient care. Similarly, substance abuse cases using inpatient care were 131% more expensive to treat than other MH/SA cases involving hospital care.

Regression results for the natural logarithm of spending for people using only outpatient MH/SA care are reported in the second column of Table 5. The estimated R-squared for the model was 0.05. The estimated coefficient for the new carve-out contract was -0.427. This

result suggests that spending on individuals using only outpatient care fell by about 35% under the new contract. This estimate was significant at the 0.01 level. The coefficients for indicators of diagnosis for depression and substance abuse were the only other significant factors in the model. Again, both coefficients suggest substantially higher levels of spending for patients with those illnesses.

Discussion

The new carve-out arrangements had a significant impact on spending and utilization of services. The overall effect of the carve-out is evident in several areas including, 1) a modest drop in utilization of all care, 2) a substantial reduction in inpatient use, and 3) a large decrease in outpatient spending per case. These reductions occurred in the context of a modest level of spending on MH/SA at baseline.

As hypothesized, utilization and spending for inpatient care were most strongly responsive to the new contract provisions. The accompanying reductions in outpatient utilization were surprisingly large. In general such reductions are inconsistent with a shift of treatment from inpatient to alternative settings. Further investigation of what happened to the care of people who were at risk for institutional treatment is warranted. The dramatic reductions in per person per month spending on MH/SA care to a level in the neighborhood of \$1.70 raises questions about the location of the market equilibrium level of spending and the access and quality of services that implies. Taken together the results suggest that both financial incentives and organization of clinical services can have a powerful effect on treatment patterns and costs.

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FIGURE 1

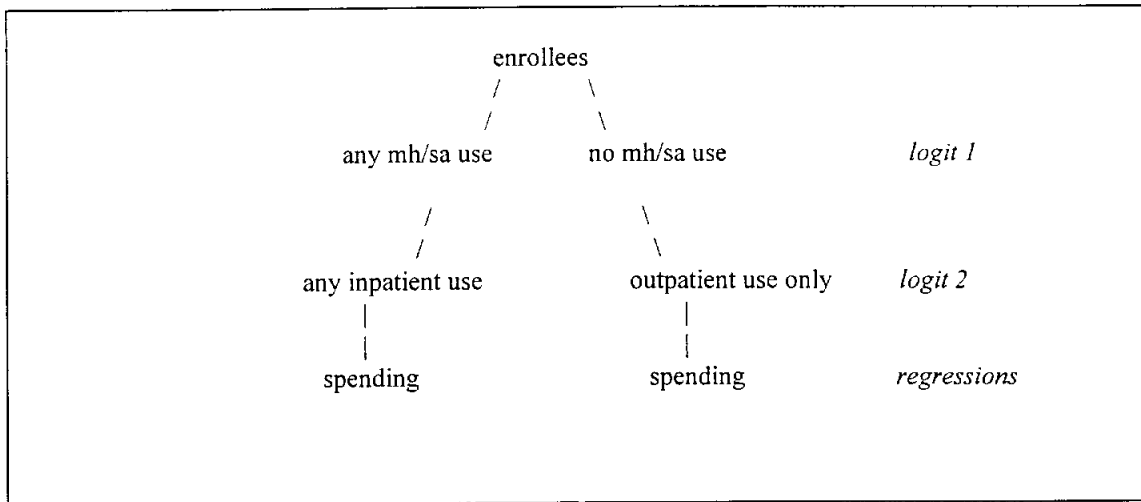


FIGURE 2
ANY MH/SA USE IN MONTH

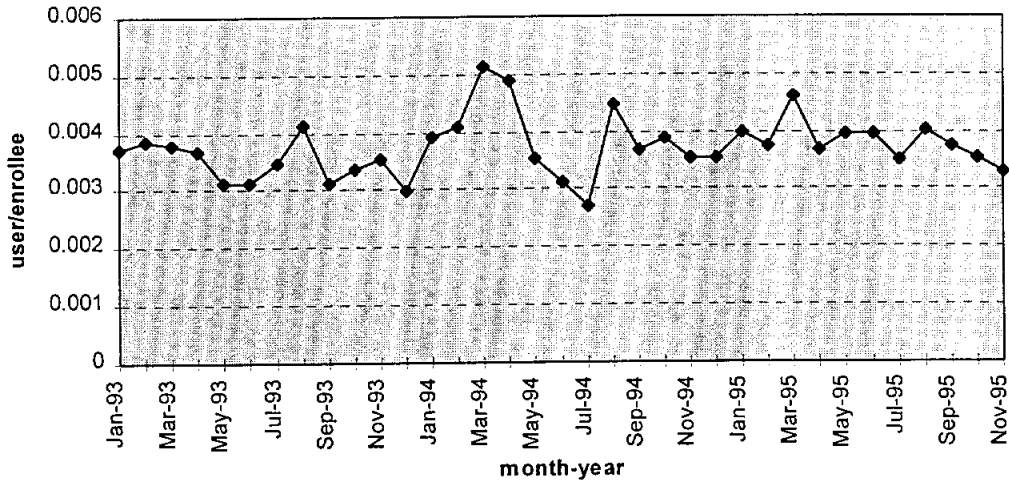


FIGURE 3
MH/SA SPENDING PER ENROLLEE

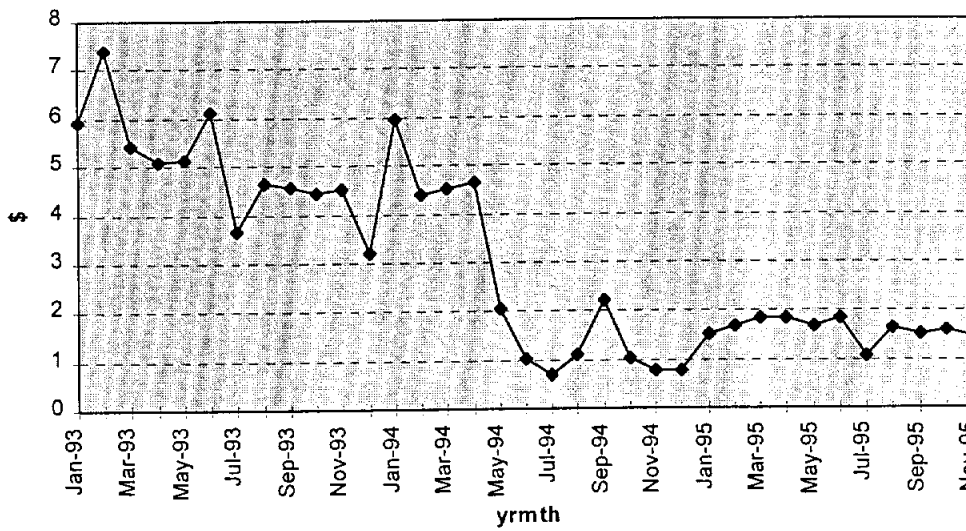


FIGURE 4a
ANY INPATIENT MH/SA USE IN MONTH (user/enrollee)

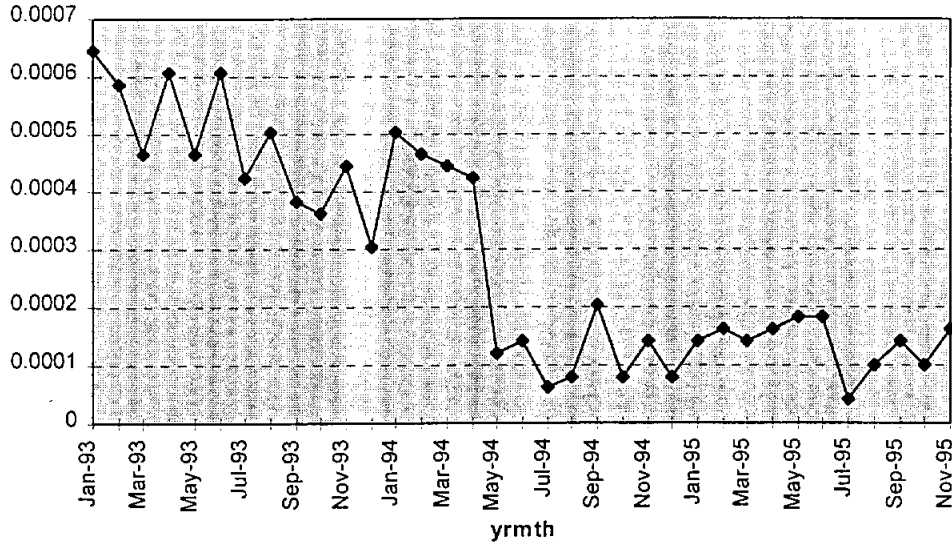


FIGURE 4b
ANY OUTPATIENT MH/SA USE IN MONTH (user/enrollee)

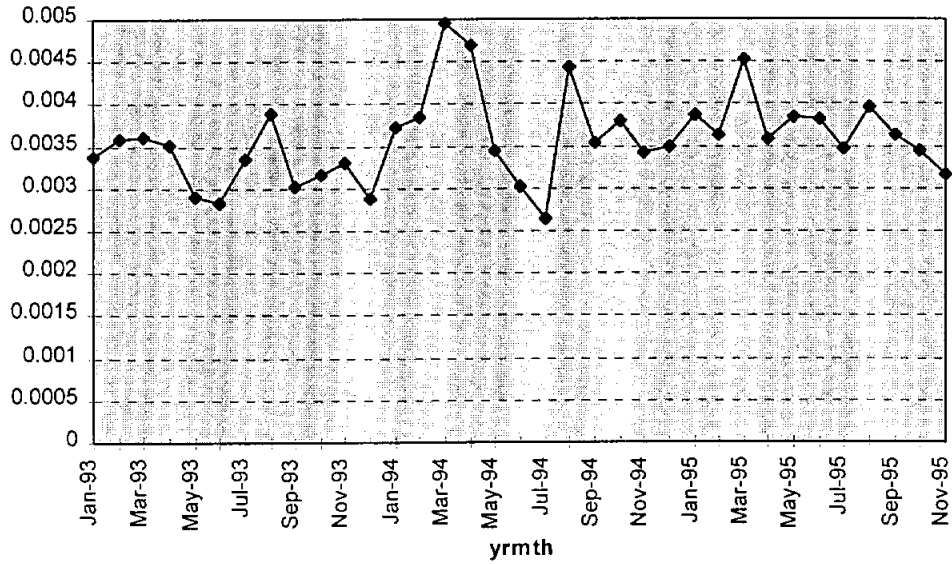


FIGURE 5a
INPATIENT MH/SA SPENDING PER ENROLLEE

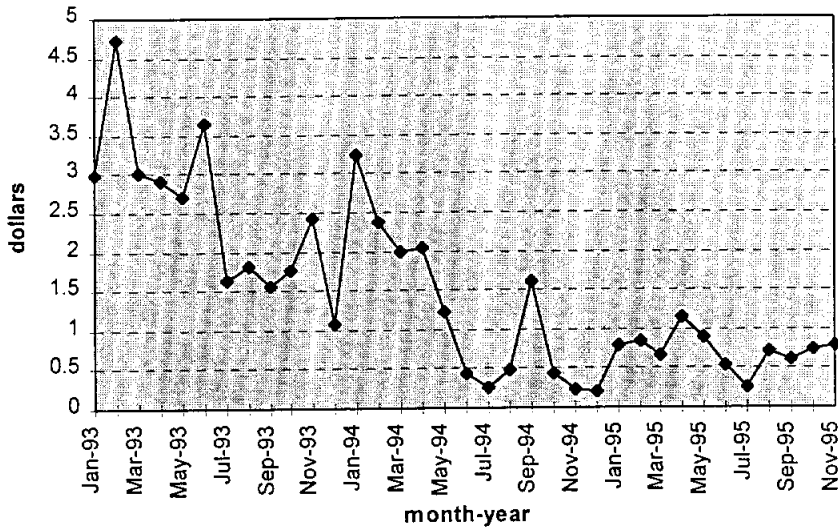


FIGURE 5b
OUTPATIENT MH/SA SPENDING PER ENROLLEE

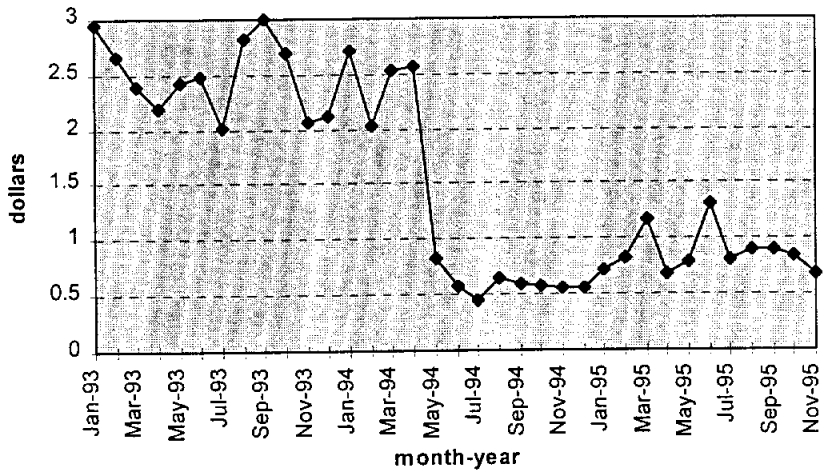


TABLE 1
MBHC Contract Features¹⁰

Changes	Initial Contract	New Contract
Clinical payment	<ul style="list-style-type: none"> • 100% contracted providers discounted FFS 	<ul style="list-style-type: none"> • Majority of providers employed/salaried by vendor • Bonus incentive plan for salaried therapists
Hospital payment	<ul style="list-style-type: none"> • MCO responsible for all inpatient costs. Insurance company pays hospital on per diem basis 	<ul style="list-style-type: none"> • Vendor 100% at risk for all components of care. • Vendor sub-capitates inpatient costs to hospital.
Size of network	<ul style="list-style-type: none"> • Reported rapid hiring due to growth of enrollees 	<ul style="list-style-type: none"> • Vendor absorbs original network, immediately cuts provider panel size and lowers FFS discounted fee for contracted providers
Utilization review	<ul style="list-style-type: none"> • “Loose” concurrent review 	<ul style="list-style-type: none"> • Concurrent review, some providers watched more closely than others
Facilities	<ul style="list-style-type: none"> • 2 general hospitals - per diem • 3 psych/SA hospitals -per diem • 2 free-standing SA partial programs 	<ul style="list-style-type: none"> • 5 owned/rented outpatient clinics • 1 general hospital -under contract • 1 psychiatric hospital (2 locations and 2 satellite locations) • 1 free-standing substance abuse facility under contract

TABLE 2
Study Variables and Definitions

Variable	Definition
male	dummy variable which =1 for male, =0 for female
spouse	dummy variable which =1 for spouse, =0 for employee or dependent
child	dummy variable which =1 for dependent, =0 for employ or spouse
employ	dummy variable which =1 for employee/subscriber, =0 for spouse or child
agegrp1	dummy variable which =1 for 18 and under, =0 for all other age groups
agegrp2	dummy variable which =1 for 19-29, =0 for all other age groups
agegrp3	dummy variable which =1 for 30-39, =0 for all other age groups
agegrp4	dummy variable which =1 for 40 and over, =0 for all other age groups
qtr	quarter - counter variable for quarter of time
imsq	dummy variable which =1 for any MH/SA inpatient use in quarter, =0 for outpatient use only
onlyhmo	dummy variable which =1 for patients offered only hmo product, =0 for patients offered hmo & ppo
msuserq	dummy variable which =1 for MH/SA use in quarter, =0 for no MH/SA use in quarter
rqtmscvl	natural log of MH/SA charges, adjusted for inflation
depdx	dummy variable which =1 for patients with a depression diagnoses (code 296) in the quarter, =0 for none
sadx	dummy variable which =1 for patients with a substance abuse diagnoses (dependence, abuse, psychoses) in quarter, =0 for none
postco	dummy variable which =1 if treatment received after the new carve-out, i.e. >quarter 5
ratmscov	average MH/SA charge per enrollee, adjusted for inflation
ratimscv	average inpatient MH/SA charge per enrollee, adjusted for inflation
ratomscv	average outpatient MH/SA charges per enrollee, adjusted for inflation
ratmscvm	average MH/SA charge per MH/SA user, adjusted for inflation
aomsm	any outpatient MH/SA use in month
aiomsm	any MH/SA use in month
aimsm	any inpatient MH/SA per month

TABLE 3
Logit Model Estimating the Probability of MH/SA Use in Quarter

Variable	Logit Coefficient (Robust Standard Error)	Odds Ratio
constant	-5.695 (.186)	
employ	1.033* (.165)	2.809
male	-.0434 (.052)	.957
agegrp1	.3475+ (.179)	1.415
agegrp2	-.7050* (.106)	.494
agegrp3	-.3516* (.064)	.703
postco	-.2260* (.066)	.797
qtr	.0468* (.066)	1.047
spouse	1.007* (.173)	2.941
onlyhmo	-.1156+ (.055)	1.122

Overall Chi-square	242.55
N	8550 ¹¹

*statistically significant at the 0.01 level

+statistically significant at the 0.05 level

TABLE 4
Logit Model Estimating the Conditional Probability of Using Some Inpatient MH/SA Services
in the Quarter

Variable	Logit Coefficient (Standard Error)	Odds Ratio
constant	-1.172	
employ	-.6781 (.374)	.507
male	.433* (.132)	1.543
agegrp1	-1.293* (.425)	.274
agegrp2	-.080 (.270)	.922
agegrp3	.078 (.150)	1.082
postco	-.607* (.228)	.544
qtr	-.098* (.037)	.906
spouse	-.459 (.385)	.631
onlyhmo	.242 (.134)	1.274

Chi-square	113.6
N	3637

* statistically significant at the 0.01 level

+ statistically significant at the 0.05 level

TABLE 5
MH/SA Spending Regression Models

Variable	Column 1 Regression model of the natural log of MH/SA spending for users of some inpatient services, given use of MH/SA services in the quarter Coefficient (standard error)	Column 2 Regression model for the natural log of MH/SA spending for users of outpatient-only services, given use of MH/SA service in the quarter Coefficient (standard error)
constant	10.754 (.747)	7.982 (.289)
postco	.093 (.487)	-.427* (.141)
qtr	-.053 (.073)	.001 (.022)
employ	-.528 (.660)	-.432 (.264)
onlyhmo	-.228 (.237)	-.127 (.074)
spouse	.07 (.687)	-.416 (.274)
male	.453+ (.240)	.033 (.077)
agegrp1	-.446 (.753)	-.562+ (.282)
agegrp2	-.908 (.510)	.013 (.161)
agegrp3	-.106 (.262)	.087 (.090)
depdx	1.07* (.269)	1.37* (.179)
sadx	.843* (.250)	.659* (.091)

Summary Statistic	Any-Inpatient Regression	Outpatient-Only Regression
R-squared overall	0.13	0.05
F	47.17	173.15
N	344	3033

* statistically significant at the 0.01 level
+ statistically significant at the 0.05 level