

Financial Risk, Plan Types, and Authorizations for Managed Alcohol Treatment Services

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Objective: To estimate the effects of a managed behavioral healthcare organization's (MBHO's) products/plans and financial risk on levels and amount of care authorized for patients with alcohol-related problems.

Study Design: Secondary analysis of 1995-1998 MBHO authorization files.

Patients: Individuals diagnosed as having an alcohol-related problem without comorbidities.

Methods: Episodes (n = 10,872) were constructed with 60-day clear zones. Multinomial regression equations were used to analyze the proportional distribution of care authorized within episodes at 5 levels: inpatient, residential, partial hospitalization, intensive outpatient, and traditional outpatient. Care equivalency hours were calculated to combine data across outpatient sessions and inpatient days. A linear regression equation analyzed quantity of care within episodes. Product/plan types, financial risk, state of residence, and participation in the MBHO's network were explanatory variables. Age, sex, diagnosis, and episode number were control variables.

Results: Most utilization management care hours authorized are inpatient and residential. Relative to other products/plans for managing care, utilization management leads to 50% more authorized hours. More financial risk does not predict fewer care units authorized but shifts hospitalizations toward residential treatment. Increasing age and higher-severity diagnoses predict more overnight care authorizations. Pennsylvania, which mandates minimum levels of care and follows American Society of Addiction Medicine criteria, has significantly more care authorized compared with 8 other states with data.

Conclusions: Other than in utilization management, MBHO financial risk does not predict less care authorization. The MBHO authorizes higher-level care for older adults, for those with more severe diagnoses, and for those with episodes of care beyond the second. Authorization data do not necessarily reflect utilization but can provide a useful, partial view of management strategies.

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The treatment delivery system for alcohol abuse and dependence continues to evolve as an aggregation of clinical, legislative, traditional self-help, insurance, and financial considerations. During the 1990s, the major effort to understand care delivery following the rapid ascent of managed behavioral care focused on mental health services. Relative to the part of behavioral healthcare that concerns substance abuse, mental health services are the predominant care delivered. In a study of 93 private employer-sponsored managed behavioral healthcare organization (MBHO) care plans covering more than 600,000 members, 31,200 (5.2%) used any mental health or substance abuse services, and just 1800 of these (5.7% of behavioral health; 0.3% of total members) used substance abuse services.¹ With such a low penetration rate, it is not surprising that alcohol and substance abuse services in general were de-emphasized relative to mental healthcare during the initial rush to understand managed behavioral care. But, substance abuse warrants attention because the problem is large and the services delivered are unique.

In reviewing managed treatment for alcohol-related problems, Weisner et al² noted that before managed care, the level and modality of care provided

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was often determined by type of coverage rather than by patient need or best practice. Costly inpatient care was often the standard, but for the average patient this was usually not justified by the outcomes^{3,4}; outcome advantages consequent to residential placements are still not established.⁵ In the early years of managed substance abuse care, savings were easily achieved when costly inpatient services were shifted to outpatient services with no detectable change in clinical outcomes. Mechanic⁶ noted that Xerox Corp managed down their average days of inpatient care from approximately 300 days per 1000 employees to 61 days per 1000 employees with apparently no poorer clinical outcomes. Inpatient conversion is still the greatest cost savings achieved by MBHOs. Other efforts to improve profitability have led to organizational changes that may have improved care, such as clearer provider credentialing standards, better patient tracking, required use of treatment plans, and specifying standards of care. Conversely, the industry's desire to maintain short-term profitability can also come about by restricting access to higher levels and quality of care.

The MBHO's opportunity for profit (and loss) is highest when it enters into "risk" relationships with payers because it receives a fee based on the entire population (capitation) of covered employees. Profits increase when fewer people seek care or when care is authorized to lower or less costly levels. In a middle arrangement, called "performance based," vendor and payer share risk for claims to limit MBHO profits and losses; it is sometimes referred to as "soft capitation."⁷ The least risk for the MBHO, and the lowest opportunity for profit, occurs when it is paid a simple administrative fee for managing the benefit. It is easy to examine care authorized as a function of plan or product type, but interpretation can be difficult because there is often an inverse relationship between MBHO risk and benefit richness (eg, more coverage, lower copay required, and lower deductibles). Because benefits vary, it can be difficult to determine when restrictions in authorized care for risk-based contracts are profit motivated or just managing care to the level warranted by the benefit. The richer benefits, which tolerate higher levels of care, are usually non-risk-based utilization management (UM) contracts.

At what point does the amount and level of care authorized encroach on the minimal adequacy of care? Mechanic and McAlpine⁸ suggest that treatment services may have become excessively "democratized," with too much care delivered according to an

inflexible formula that does not account for the variety and severity of patient clinical needs. Level of care to be authorized is reportedly decided during discussions between care managers employed by the MBHO and the provider or patient requesting care. Wickizer and Lessler⁹ reported that managed care companies will not usually deny inpatient care when it is deemed warranted, but they will often authorize fewer inpatient days than requested by the provider, especially on risk-type contracts when there is a conflict of interest between profitability and clinical indications.

There is little conclusive information about how treatment outcomes have changed during the growth of managed substance abuse care. The National Institute of Drug Abuse's 2 multisite national effectiveness studies conducted 10 years apart (Treatment Outcome Prospective Study [TOPS]¹⁰ in the 1980s and Drug Abuse Treatment Outcome Studies [DATOS]¹¹ in the 1990s) spanned the growth of managed care. Findings show that the amount of services delivered dropped substantially in the more recent study, but no differences in treatment outcomes or in key treatment indicators, such as criminality, were found. Patient satisfaction and treatment planning were actually higher in the newer study.¹⁰⁻¹² Renz et al,¹³ studying managed care directly, found no differences in the need for further episodes of substance abuse care based on plan type (state funded, privately paid, highly managed care, or traditionally managed care). The relationship between managed substance abuse care and outcome is still uncertain, but one way to approach a study of how MBHOs manage alcohol treatment is to examine differences in the way one large company authorizes services for different plans/products against their own financial risks.

... METHODS ...

This is an analysis of authorization patterns for alcohol treatment across several operating units of a large national MBHO between 1995 and 1998; it is restricted to alcohol-related diagnoses only (no comorbidity). The analysis identified control variables and then analyzed the levels and amount of authorization as a function of various explanatory variables, including plan type and MBHO financial risk.

Data Set

The MBHO under study does business with public and private payers in several states and offers a

variety of managed behavioral healthcare products, which can be grouped into 2 major types: UM and care management (CM). Although usually a health benefit, CM can also be integrated with an employee assistance program (EAP) in contracts. Across all plans, the financial risk of the MBHO varies in 3 broad categories: full risk, as occurs under capitated contracts; a risk-sharing arrangement between the MBHO and the payer in which risk varies as a function of adherence to performance corridors (eg, soft capitation); and no financial risk. For point-of-service (POS) contracts with insurers, financial risk is of all 3 types. Some MBHO business with insurers is restricted to preferred provider organizations (PPOs), most of which have performance-based risk. The Medicaid and health maintenance organization (HMO) business is mostly risk based. The analysis models each of these plan variables as mutually exclusive.

Data from 7 regional management units, which composed a quarter to a third of the MBHO's business during this period, were included. Six operating units were state specific: Pennsylvania (49%), Georgia (24%), Illinois (5%), Michigan (3%), Virginia (3%), and Utah (1%). One unit comprised business from 3 adjoining states (14%): Indiana, Kentucky, and Ohio. The criterion for choosing these regional units was to provide a geographically diverse set with claims, memberships, and authorization data of adequate compatibility to support a high likelihood of matching records. To protect confidentiality and ensure anonymity, files were stripped of identifying information, and identification numbers were randomly assigned.

These authorizations for alcohol-related services spanned 1995 to 1998. The data were grouped into episodes following procedures previously described.^{14,15} The end of an episode was defined as the date of an authorization for a treatment (session or day) after which the patient had no further care authorized for 60 days. Records starting in the first months of 1995 did not necessarily coincide with the beginning of new episodes of care, and records that ended in December 1998 did not necessarily coincide with completed episodes of care. To deal with these truncation problems, records starting in the first 2 months of 1995 and in the last 2 months of 1998 were eliminated based on the 60-day criterion for the separation of episodes.

Episodes of care with mental health comorbidities were excluded from the sample. Only episodes with alcohol psychosis, alcohol abuse, or alcohol dependency as the sole behavioral health diagnosis were

included (eg, *International Classification of Diseases, Ninth Revision*, diagnoses included 291 [alcoholic psychoses], 303 [alcohol dependence], and 305.0 [alcohol abuse]). Comorbidity exclusions are defined within the limits of a single episode of care, not the duration that a patient was in the membership file.

Sixty-three records with questionable utilization units for inpatient or outpatient care were deleted, and 29 episodes were deleted because of inconsistent coding of sex. Finally, episodes of care covered by 2 different plan types were discarded to allow for a straightforward analysis of the impact of plan type on authorizations. The original 17,259 episodes of care in the authorization file were restricted to 10,872 working episodes in which alcohol psychosis, alcohol abuse, or alcohol dependence codes were the sole diagnoses.

Estimation Equations

Regression equations were estimated to examine how managed care contracting affects treatments authorized for patients with alcohol-related problems. These procedures include (1) an analysis of the relative proportions of care intensity and (2) an analysis of the quantity of care.

Proportions of Care Type. A multinomial logistic regression model was estimated with STATA (STATA Corporation, College Station, TX) software to explain the proportions of care levels authorized to a patient during an episode. Five levels of care, based on the MBHO's own 6 medical necessity criteria, were developed: (1) acute/inpatient, (2) subacute/supervised residential, (3) partial hospitalization, (4) intensive outpatient, and (5) traditional outpatient. With traditional outpatient (the lowest level of care) serving as the base, separate equations were estimated for each of the higher levels of care to determine the tendency to choose these higher levels of care. To make levels of care quantitatively comparable, treatment equivalency "dosages" were calculated similar to those used earlier by Renz et al¹³: each day of detoxification, inpatient or residential care = 10 hours; each day of partial hospital care = 6 hours; each day of intensive outpatient care = 3 hours; and each traditional outpatient session = 1 hour.

A series of binary explanatory variables was created to distinguish different plan types and financial risk levels. For UM and CM/EAP plans, 2 binary variables were constructed for each: one indicated that the MBHO bore no financial risk and the second reflected performance-based arrangements between

the MBHO and its payers. For POS and PPO plans, 3 binary variables were constructed to reflect MBHO risk, including variables for full risk-capitated arrangements, middle risk performance based, and no risk. For all Medicaid services and in 99% of all HMO cases, the MBHO bore all the financial risk. For all the plan/product variables in the analyses, fully capitated HMO care served as the comparison base and was set equal to 1.0.

A binary explanatory variable was used to distinguish Pennsylvania-based services. Pennsylvania is unique because it has set mandated minimum levels of substance abuse care and follows American Society of Addiction Medicine criteria for placement. (In discussions with MBHO staff and through document searches, no other states with these characteristics were identified.) Another binary explanatory variable was created to explain authorization patterns for patients who had visited at least 1 provider outside the MBHO network during the episode.

Based on the criterion of selecting the model with the least colinearity, control variables were constructed for demographic characteristics and problem severity. Demographics included sex (female = 1) and 7 age group variables (<21, 21-24, 25-34, 35-44, 45-54, 55-64, >64 years), with the oldest group serving as the comparison base. For problem severity, 3 diagnosis variables were included, with alcohol abuse serving as the comparison base for the other diagnoses (ie, alcohol dependence and alcoholic psychosis). Three variables representing the number of serial episodes were also created. The first binary episode variable indicated a patient's first episode, the second a patient's second episode, and the third episode variable indicated all episodes after the second; the latter served as the comparison base for episodes.

In addition to estimating relative risk ratios, which are calculated directly by STATA, an adjusted proportional distribution of care hours authorized to patients with alcohol-related problems during an episode was constructed based on the multinomial logistic regression coefficients. The adjustment was made using the "method of recycled predictions," in which characteristics of interest are varied across the whole data set and the predictions are averaged. This yields simulated, not actual, distributions of care.

Quantity of Care. In addition to the multinomial logistic model, a linear regression model was constructed to explain the quantity of care during an episode. The quantity of care was defined by the total number of treatment hours calculated based

on the above equivalencies. The control and explanatory variables in the multinomial logistic regression and the quantity of care models are the same. For the quantity model, an iteratively reweighted least squares procedure was used to describe the central tendency of the data because of its ability to produce relatively smaller standard errors.¹⁶ Although this procedure produces biased intercept estimates,¹⁷ it did not affect the analysis because the intercept estimates had no practical use in this study.

... RESULTS ...

Three types of results follow: the highest level of care ever authorized by plan type, the proportions of care type authorized by plan type, and the quantity of care authorized by plan type.

Table 1 shows the highest level of care authorized to patients with alcohol-related problems during an episode of care. For example, almost half of the patients (47.2%) covered by fully capitated HMO plans were never authorized for care at a level higher than traditional outpatient services at any time during their care delivery. Of the remaining 52.8%, 20.0% were authorized for acute/inpatient care, some of which may have been detoxification. A similar distribution was noticed for CM/EAP and Medicaid HMO patients. By contrast, patients whose care is managed through UM no-risk and POS no-risk plans were on the higher end of the level-of-care scale. Almost 66% of the former and more than 57% of the latter were authorized for acute/inpatient care at least once during an episode of treatment. Relative to the no-risk POS plans, under performance-based arrangements, there is more use of supervised residential and partial hospitalization care as the highest level. For UM plans, especially no-risk plans, almost everyone (>90%) is authorized for some inpatient or residential care.

Analysis of the adjusted distribution of care hours authorized to patients with alcohol-related problems during an episode (**Table 2**) and the multinomial regression relative risk ratios (**Table 3**) provide additional ways to examine the authorization findings. The data reflect adjustments for age, sex, diagnosis, state of residence (Pennsylvania or other), whether there were out-of-network visits, and the episode number. Patients covered by UM plans with no financial risk were authorized to have more than 75% of their treatment time in inpatient or residential settings. There was also high inpatient and resi-

dential authorization for patients covered by POS no-risk and UM performance-based plans, which were authorized for 62% of the treatment time in such settings. Unlike UM, however, POS no-risk patients were authorized to a fuller range of treatment options, including partial hospitalization, intensive outpatient, and traditional outpatient settings.

Although a decrease in financial risk for the MBHO led to more authorization of inpatient and residential care for UM and POS patients, the same was not true for HMO, PPO, and CM/EAP patients (Table 2). Caution is warranted in generalizing from the risk-adjusted distribution of care for the latter 2 because few PPO no-risk and CM/EAP no-risk observations existed. A common characteristic of patients covered by PPO and CM/EAP plans was that they had their authorized treatment concentrated in a partial hospitalization setting. A similar tendency was observed for Medicaid and HMO patients. Participation in these plans led to more MBHO

active management outside the inpatient and residential settings. However, the financial risk of the MBHO in these latter plan variables was not clearly associated with the allocation of care to higher or lower levels. It seems that other than UM, there was more active authorization of a wider range of care levels. The actual relative risk (relative likelihood) ratios of being authorized for the 4 higher levels of care are shown in Table 3. The data in Tables 2 and 3 reflect the assigned hour equivalencies for care in the different settings described in the "Methods" section. The high likelihood of authorization of overnight care in UM is reflected in the unusually high relative risk ratios in Table 3 relative to other types of management. Due to the large number of episodes analyzed from this authorization file, most variables are strongly significant relative to their comparison level (Table 3).

As noted in the discussion of Table 1, it can be misleading to examine only the highest level of care ever authorized. Similarly, the distribution of *hours*

Table 1. Frequency Distribution of Highest Level of Care Authorized During an Episode of Alcohol Treatment for Each Plan Type

Plan Type	Level of Care, %				
	Acute/Inpatient	Subacute/Supervised Residential	Partial Hospitalization	Intensive Outpatient	Traditional Outpatient
Utilization management					
No financial risk	65.9	26.4	5.4	0.9	1.5
Performance based	40.0	29.9	28.7	0.1	1.4
Point of service					
No financial risk	57.1	9.5	6.7	2.9	23.8
Performance based*	20.0	40.0	20.0	0	20.0
Fully capitated	35.2	11.1	8.7	15.7	29.3
Medicaid					
Fully capitated	29.9	8.5	17.1	0.3	44.2
Preferred provider organization					
No financial risk*	20.0	10.0	10.0	0	60.0
Performance based	23.4	27.7	22.1	0	26.8
Fully capitated	34.3	12.4	5.8	13.9	33.6
Care management/employee assistance program					
No financial risk*	10.7	21.4	25.0	0	42.9
Performance based	23.5	2.6	2.9	17.6	53.4
HMO					
No financial risk	24.1	1.2	13.3	20.5	41.0
Fully capitated	20.0	11.5	20.3	1.1	47.2

*Low frequency, ie, fewer than 30 episodes.

Table 2. Adjusted Distribution of Care Hours Authorized to Patients With Alcohol-Related Problems During an Episode*

Variable	Level of Care, %				
	Acute/Inpatient	Subacute/Supervised Residential	Partial Hospitalization	Intensive Outpatient	Traditional Outpatient
Demographic Variables					
Age, y					
<21	9.7	37.6	34.3	3.8	14.7
21-24	13.8	26.8	41.5	5.5	12.3
25-34	19.2	23.7	42.0	4.1	11.0
35-44	24.0	20.8	40.4	4.0	10.8
45-54	23.6	23.1	38.7	3.4	11.2
55-64	30.1	20.9	36.1	2.9	10.0
>64	28.7	26.3	30.7	4.2	10.1
Sex					
F	22.8	22.3	39.6	3.2	12.1
M	22.7	23.0	39.4	3.9	11.0
Severity Variables					
Alcohol dependency	23.9	25.3	39.6	3.7	7.5
Alcohol psychosis	67.6	23.1	0.6	0	8.7
Alcohol abuse	12.7	8.4	43.5	4.7	30.6
First episode	21.8	22.1	41.1	4.0	11.0
Second episode	24.3	25.8	34.5	2.9	12.4
Episodes after the second	32.7	27.5	26.1	2.2	11.5
Explanatory Variables					
Residence in Pennsylvania	18.1	23.7	49.2	0.1	8.8
Outside Pennsylvania	31.0	22.7	25.1	5.6	15.7
Out-of-network provider	20.5	33.9	31.3	2.3	12.0
Only in-network providers	22.9	21.3	40.7	4.2	10.9
Plan type					
Utilization management					
No financial risk	43.5	34.6	20.7	0.9	0.3
Performance based	26.0	35.7	37.5	0	0.8
Point of service					
No financial risk	47.3	14.7	17.4	4.1	16.6
Performance based [†]	17.5	35.9	35.9	0	10.7
Fully capitated	22.6	13.3	44.9	8.5	10.7
Medicaid					
Fully capitated	26.0	23.9	39.9	0	10.2
Preferred provider organization					
No financial risk [†]	11.6	30.1	46.2	0	12.1
Performance based	17.0	31.8	35.6	0	15.6
Fully capitated	22.5	18.8	32.6	14.1	12.0
Care management/employee assistance program					
No financial risk [†]	14.9	32.1	44.5	0	8.5
Performance based	24.9	3.5	34.8	12.9	23.8
HMO					
No financial risk	27.7	2.6	42.3	13.0	14.5
Fully capitated	20.9	17.3	47.7	2.2	11.8

*Adjustment is based on multinomial logistic regression coefficients. Values summed across columns equal 100%.

[†]Low frequency, ie, less than 30 episodes.

authorized in Table 2 may lead to a biased understanding of the distribution of authorized *units* of care. Table 4 compares the 5 levels of care to show how the units of care, along with the percentage distribution of units, relate to the calculated hours and

distribution of care after applying the equivalency adjustments. For example, in Table 4, the summed distribution of outpatient *units* (partial hospitalization, intensive outpatient, and traditional outpatient) represents 75.1% of all authorized units across

Table 3. Relative Risk (RR) Ratios for Different Treatments Authorized to Patients With Alcohol-Related Problems (Multinomial Logistic Regression* Comparison Level: Traditional Outpatient Services)

Variable	Level of Care							
	Acute/Inpatient		Subacute/Supervised Residential		Partial Hospitalization		Intensive Outpatient	
	RR Ratio	P	RR Ratio	P	RR Ratio	P	RR Ratio	P
Demographic Variables								
Age, y								
<21	0.20	.00	0.94	.19	0.76	.00	0.52	.00
21-24	0.34	.00	0.76	.00	1.08	.11	1.02	.87
25-34	0.56	.00	0.79	.00	1.27	.00	0.81	.01
35-44	0.73	.00	0.70	.00	1.23	.00	0.84	.02
45-54	0.70	.00	0.77	.00	1.15	.00	0.66	.00
55-64	1.05	.29	0.80	.00	1.21	.00	0.63	.00
>64	1.00	—	1.00	—	1.00	—	1.00	—
Sex								
F	0.90	.00	0.88	.00	0.91	.00	0.73	.00
M	1.00	—	1.00	—	1.00	—	1.00	—
Severity Variables								
Alcohol dependency	9.99	.00	15.8	.00	4.38	.00	2.60	.00
Alcohol psychosis	27.6	.00	12.1	.00	0.05	.00	0.0 [†]	—
Alcohol abuse	1.00	—	1.00	—	1.00	—	1.00	—
First episode	0.62	.00	0.77	.00	1.61	.00	1.88	.00
Second episode	0.63	.00	0.82	.00	1.21	.00	1.21	.01
Episodes after the second	1.00	—	1.00	—	1.00	—	1.00	—
Explanatory Variables								
Residence in Pennsylvania	1.09	.00	2.07	.00	3.86	.00	0.03	.00
Outside Pennsylvania	1.00	—	1.00	—	1.00	—	1.00	—
Out-of-network provider	0.86	.00	1.60	.00	0.73	.00	0.44	.00
Only in-network providers	1.00	—	1.00	—	1.00	—	1.00	—
Plan type								
Utilization management								
No financial risk	132	.00	123	.00	23.5	.00	22.0	.00
Performance based	24.8	.00	41.7	.00	14.9	.00	0.08	.00
Point of service								
No financial risk	1.64	.00	0.56	.00	0.22	.00	1.59	.00
Performance based	0.99	.93	2.49	.00	0.87	.30	0.0 [†]	—
Fully capitated	1.17	.00	0.80	.00	0.97	.21	4.73	.00
Medicaid								
Fully capitated	1.55	.00	1.72	.00	1.01	.69	0.01	.00
Preferred provider organization								
No financial risk	0.54	.00	1.78	.00	0.99	.95	0.0 [†]	—
Performance based	0.61	.00	1.39	.00	0.55	.00	0.0 [†]	—
Fully capitated	1.01	.81	0.95	.35	0.56	.00	8.03	.00
Care management/employee assistance program								
No financial risk	1.06	.56	2.87	.00	1.42	.00	0.0 [†]	—
Performance based	0.50	.00	0.08	.00	0.27	.00	3.58	.00
HMO								
No financial risk	1.00	.96	0.10	.00	0.60	.00	5.86	.00
Fully capitated	1.00	—	1.00	—	1.00	—	1.00	—

*Pseudo $R^2 = .1482$; $\chi^2_{96} = 246268$; $P = .00$.

[†]No observations in the matrix cell. A value very close to zero was assigned to allow the model to run.

all plan/product types. The summed distribution of hours for those outpatient settings, however, represents only 46.7% of all treatment hours authorized. Even this ratio may seem high until one considers that inpatient and residential care usually precede outpatient care in an episode and that some authorizations will have been from episodes that the patient did not carry through for a full regimen of care.

With respect to authorization across diagnostic groups, patients with alcoholic psychosis codes were largely authorized to inpatient settings, and alcohol-dependent patients were more apt to be authorized to inpatient or residential care than were alcohol-abuse patients. **Table 5** shows that the summed hours of care authorized differ for the different diagnostic groups. For patients in the data set coded for dependency relative to those with abuse codes, more than twice the total amount of care is authorized within an episode (64 vs 23 hours). Nearly half the total care hours for patients with dependence codes are for overnight care, and those with abuse diagnoses receive almost 80% of their care hours in nonovernight settings (Table 2).

Other than diagnosis, other variables (episode variables) controlling for case severity were limited in their contribution to the explanatory power of the model because of the inherent truncation problem when dealing with limited-time studies vs lifetime studies. Part of the truncation problem stems from the fact that the first episode of care encountered

during the study period may not necessarily be the first in the patient's lifetime (or time with this MBHO). Despite this limitation, regression results suggest that subsequent episodes, after the first in the authorization file, were for slightly fewer hours (Table 5) but were generally for more overnight care. The adjusted distribution of care hours in the first episode had 43.9% of the care in inpatient and residential settings, whereas second or subsequent episodes both exceeded 50% of the care in those settings. Comparisons between the results from the full data set and the subset of only first episodes suggested that serial correlation does not significantly influence coefficients and *P* values. Therefore, the conclusions based on the first set of results can be considered as valid as those based on the latter.

Nearly half of the authorizations in the file were from Pennsylvania. Regression results (Tables 2, 3, and 5) show the extent to which patients in this state are authorized for significantly more inpatient, residential, and partial hospitalization care relative to non-Pennsylvania patients. The calculated quantity of care based on these distributions favoring more higher-level care was 68 hours for Pennsylvania residents vs 42 hours for those in the other 8 states ($t = 15.5; P = .00$). Part of this difference reflects the greater use of partial hospitalization in Pennsylvania and, compared with the other group of states, less use of intensive outpatient care.

Another explanatory variable distinguishes patients who were ever authorized to see a provider who does not participate in the MBHO's preferred network. Those who used non-network providers were authorized for less inpatient care but proportionally more residential care (Table 2). However, the total care hours authorized for patients who used nonnetwork providers are substantially less (60 vs 39 hours) (Table 5).

Demographic control variables included age and sex. The relative likelihood of patients younger than 21 years being authorized for inpatient care is about 5 times lower than that of those older than 55 years. The likelihood of receiving residential placements, however, did not differ for the very young vs

Table 4. Distribution of Care Units Authorized to Patients with Alcohol-Related Problems During the Study Period vs Distribution of Care Hours Estimated to Correspond to Those Units

Level of Care	Units of Care, Days/Sessions	Distribution of Units, %	Hours of Care	Distribution of Hours, %
Acute/inpatient	37,874	14.1	378,740	30.3
Subacute/supervised residential	28,807	10.7	288,070	23.0
Partial hospitalization	70,202	26.1	421,212	33.6
Intensive outpatient	15,993	5.9	47,979	3.8
Traditional outpatient	115,967	43.1	115,967	9.3
Total	268,843	100	1,251,968	100

Table 5. Quantity of Care Authorized to Alcohol Patients During an Episode (Iteratively Reweighted Least-Squares Regression)

Variable	Average No. of Care Hours	β	t	P
Demographic Variables				
Age, y				
<21	39	-1.5	-0.49	.63
21-24	48	2.8	0.82	.42
25-34	52	3.0	1.10	.27
35-44	58	7.9	2.96	.00
45-54	63	6.2	2.27	.02
55-64	69	8.5	2.90	.00
>64	50	0.0	—	—
Sex				
F	58	0.3	0.32	.75
M	57	0.0	—	—
Severity Variables				
Alcohol dependency	64	22.5	19.84	.00
Alcohol psychosis	54	4.9	1.21	.23
Alcohol abuse	23	0.0	—	—
First episode	58	8.5	4.27	.00
Second episode	53	5.1	2.32	.02
Episodes after the second	47	0.0	—	—
Explanatory Variables				
Residence in Pennsylvania	68	15.6	15.55	.00
Outside Pennsylvania	42	0.0	—	—
Out-of-network provider	39	-7.7	-6.26	.00
Only in-network providers	60	0.0	—	—
Plan type				
Utilization management				
No financial risk	71	22.9	13.99	.00
Performance based	82	22.5	15.62	.00
Point of service				
No financial risk	38	-10.6	-2.59	.01
Performance based	58	8.7	0.94	.35
Fully capitated	60	14.1	6.10	.00
Medicaid				
Fully capitated	40	-6.0	-2.74	.01
Preferred provider organization				
No financial risk	40	-7.8	-0.60	.55
Performance based	69	13.7	12.45	.00
Fully capitated	46	11.7	3.20	.00
Care management/employee assistance program				
No financial risk	64	24.4	3.10	.00
Performance based	43	7.3	3.43	.00
HMO				
No financial risk	31	1.5	0.31	.75
Fully capitated	47	0.0	—	—
Intercept	—	-3.9	-1.15	.25
Overall model	57	—	84.4*	.00

*F value.

those older than 64 years. The quantity of care regression results suggest that the youngest patients may receive authorization for the fewest mean number of hours of care, but this is not a significant finding (Table 5). Except for the age group of 35 to 64 years, who may be authorized to receive somewhat more total hours, there are relatively few significant differences in the total number of care hours authorized as a function of age. Generally, the proportional distribution of overnight care increases with increasing age. Those older than 55 years had half or more of their care hours provided in either inpatient or residential settings. More partial hospitalization hours are authorized for the younger group. Females are less apt to receive inpatient and residential care relative to males, but the total number of care hours authorized for the 2 sexes are about the same (58 and 57 hours, respectively).

The quantity of care regression (Table 5) also compares the various plan/risk variables with a fully capitated HMO. This part of the table suggests that POS no-risk patients are authorized for significantly less total care (38 hours; $P<.01$) than other groups. This probably reflects the large amount of traditional outpatient care, which has a lower weight in the equivalencies. Patients in UM plans, no risk and performance based, had more care authorized for a parallel but opposite reason (71 and 82 hours, respectively; $P<.001$).

... DISCUSSION ...

Because services are authorized in stages rather than all at once, these authorization data are most representative of how a benefit was managed only with fully completed episodes of care. If a patient never returns or never requests further care after an early visit or 2, authorizations end. Therefore, the data do not purely reflect decisions of the MBHO independent of patients' compliance with treatment, especially because stricter management of some plans may authorize fewer care units per authorization request. Also, the type of plan selected by patients can often reflect their age, wealth, and health. Consequently, plan variables and even risk vs no-risk comparisons are affected by factors other than managed care decisions. It is also possible that prematurely abandoning treatment may be more associated with one or more plan types, or MBHO

risk, even after all demographic and other factors were controlled.

The quantity of care regression suggests that even if UM is considered separately, the plan variables can lead to total care hours authorized that differ by 50% depending on the plan under which the care is managed. One purpose of managed care is to manage the benefit available to the patient, and some benefits are richer than others. So, part of these differences in care authorized may reflect the richness of the benefit being managed, but at some point a level of care inadequacy would be reached. But authorization data convey no information about outcome, and without outcome data, the issue of care adequacy cannot be addressed directly. The hours of authorized care for an uncomplicated episode of alcohol problem remediation (eg, no comorbidity) in the overall model was 57 hours. Most hours were for performance-based UM (82 hours, higher than the 71 hours for UM with no financial risk). The MBHO reviews the care requests against their medical necessity criteria and benefit allowances for all their plans/products. But in UM, unlike in the other options, the MBHO does not manage the network or the selection of the provider, so providers can choose to deliver care they deem warranted up to the benefit limits. The fewest hours of authorized care was under HMO plans, where 70% to 75% of care hours are on an outpatient basis. The 50% difference in HMO and UM for care hours authorized within episodes raises the question as to whether the concept of "medical necessity" or perhaps "benefit tolerance" more aptly describes the authorization strategy.

Comparing Pennsylvania with other states provides some interesting insights into the effects of regulation. Pennsylvania had almost 50% of the authorizations in this data file, so splitting the file in this way resulted in nearly equal cell sizes. Unless there is something about preauthorization patterns¹⁸ in Pennsylvania that differ from other states, the hour equivalencies in Pennsylvania for an episode of care are more than half again the number authorized in the other states ($t > 15$; $P = .001$). The results suggest that state policy or statutes may be able to stipulate and successfully achieve higher minimum levels of care. This difference may result from the state mandate for minimal care and adoption of the American Society of Addiction Medicine criteria.

The hour equivalencies used in this study merit further comment. Because different plans and vari-

ous demographic and control variables are associated with more or less inpatient and outpatient care, the only way that these data could be represented in single regressions was to settle on hour equivalencies among the various types of treatment. The equivalencies were borrowed from Renz et al,¹³ who, in turn, had referenced a paper by Filstead¹⁹ that was not available for review. It is not completely clear that inpatient or residential services really have a therapeutic dosage value 10 times that of an hour of traditional outpatient care, but one can imagine that the unavoidable reality of a constant daily presence in facility-based care could be weighted as such. The hour equivalencies for partial hospitalization and intensive outpatient services at 6 and 3 hours relative to an hour of traditional outpatient care seem more straightforward. Using these weights, Table 4 shows that three fourths of all units of care are outpatient in nature, and more than half the actual hours of care were taken in some form of residence. However, to really characterize the average full course of treatment for a patient who took the treatment process to an approved end would probably result in different proportions of care because outpatient services are used more at the end and overnight care at the beginning. It is not known what proportion of episodes in the authorization file represent completed care.

On that point, Renz et al¹³ used these same formulas and studied utilization data in a 2-year period beginning January 1990. By contrast, these are authorization data from 1995 to 1998. Renz et al¹³ found that actual hours of care within treatment episodes were 3 times greater than the hours found here. Their 2 managed care groups had treatment hours of 129 and 154 per episode, in sharp contrast to the 57 mean hours found in this study, which extended as high as 82 for a performance-based UM plan. Nearly 100 of the care hours used in the study by Renz et al seem to represent inpatient care (eg, approximately 10 days' worth). At least 3 factors may account for the differences in the treatment hours found in these 2 different types of studies. First, the study by Renz et al included all patients, many with multiple diagnoses. The authorization file data used here is restricted to alcohol-only diagnosis codes. Patients in this authorization file who had comorbid diagnoses were excluded, but those excluded were authorized to more than twice as many care days and sessions.²⁰ Second, a large part of the difference between these studies may reflect changes in inpatient conversion during the intervening years. It is documented that the level of

authorized inpatient services declined sharply through the 1990s, when managed care began to affect substance abuse services. For example, in the current study's authorization data, between 1993 and 1997, the average number of authorized inpatient days declined by 50%. Third, as noted earlier, part of the difference may be because of truncated treatment episodes in the authorization data (ie, care begun that was not completed, resulting in an end to further authorizations). Analysis of authorizations within all episodes may have caused the relative proportion of inpatient care to be overemphasized relative to outpatient if many patients were ending treatment prematurely against provider advice.

In summary, these quantitative analyses of authorization data provide a useful but partial view of MBHO management strategies for patients diagnosed as having alcohol abuse or dependence or alcohol psychosis. Three additional research papers are forthcoming from members of this research team at the Pacific Institute for Research and Evaluation, Calverton, MD. One describes episodes of authorized care, 1 is an analysis of care claims, and 1 is a prospective outcome study of managed alcohol treatment.

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