The Journal of Mental Health Policy and Economics
J. Mental Health Policy Econ. **3**, 35–44 (2000)

Capitated Payments for Mental Health Patients: A Comparison of Potential Approaches in a Public Sector Population

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Abstract

Background: Both private and public health care systems have embraced capitated reimbursement as a method of controlling costs.
Aims of the Study: This study explores the financial implications of using reimbursement models based on clinically based patient classification schemes to distribute funds for the treatment of mental health patients in the Department of Veterans Affairs (VA).
Methods: We identified 53700 veterans treated in VA specialty mental health outpatient clinics during the first 2 weeks of fiscal year (FY) 1991 for whom relevant clinical data were available. We calculated total utilization and costs for this sample during the remainder of FY 1991 using VA administrative databases and simulated hypothetical distributions of funds based on seven alternative capitation models. The resulting distributions of funds across service networks and facility types were compared to actual expenditures.
Results: Approximately 8% of overall VA budget was redistributed under a simple capitated scheme, and some individual networks and facility types experienced changes in funding of over 30%. Models based on clinical data resulted in only minor differences from average-cost reimbursement. Substantial variation in practice style was observed across Veterans Integrated Service Networks (VISNs), which was significantly associated with funding shifts under capitation.
Discussion: A simple capitated payment scheme would result in large changes in funding for some VISNs. Adjustments for case mix did not substantially affect patterns of redistribution. Patterns of redistribution appear to reflect large differences in practice style across VISNs. Although a capitated system will create incentives to reduce such variation, the effect of such shifts on patient well-being is unknown.
Implications for Health Policies: Any capitated system will create incentives to provide a uniform standard of care. In our analyses, the capitation rate was based on the average cost per treated patient in each category; however rates could be set higher or lower as policy makers deem necessary. The standard of care associated with the average cost is not necessarily the 'correct' level of care.
Implications for further research: Our analyses explore the implications of capitated systems for mental health patients in the absence of behavioral change. Further research is needed to determine how providers actually respond to the different incentives created by capitation and what impact these changes have on patient well-being. Copyright © 2000 John Wiley & Sons, Ltd.

Received 11 October 1999; accepted 28 January 2000

Introduction

Capitation has become an increasingly common method of paying health care providers[1] because it creates incentives to reduce costs. In contrast to traditional cost-based reimbursement, capitation breaks the link between payments and a provider's expenditures on an individual patient's care. Instead, they receive a fixed amount per patient based on the patient's characteristics and the costs of caring for this type of patient system-wide. If the actual costs of treating the patient are less than the capitated amount, the provider keeps the difference. However, if treatment costs are higher than the capitated amount, the provider incurs a loss. This puts the provider at financial risk. In the absence of behavioral change, in comparison to a cost-based scheme, the immediate effect will be to redistribute reimbursement from those providers whose costs exceed capitated payments to those payers whose costs are less than capitated payments. This creates incentives for providers whose costs exceed capitated amounts to more efficiently manage care. In addition, it may create incentives to engage in strategic behavior that is undesirable from a public policy perspective.

Under capitation, financial risk can arise for three reasons: (i) differences in case mix within payment categories; (ii) differences in the unit costs of producing services; and (iii) differences in treatment styles. Case mix can affect financial risk in two important ways. First, there may be systematic differences in case mix within payment categories between providers. Certain providers on average may treat a larger share of high cost patients. Secondly, there may be random variations in the case mix of patients within payment categories. As the number of patients treated increases, the financial risks associated with random variations in case mix will tend to be diversified, but risk associated with systematic variations will remain.[2,3]

Differences in unit costs may also lead to financial risk.

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Source of funding
Contract Grant sponsor: US Federal Government

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For example, if labor costs are higher in some areas than in others, providers in those areas may find it more difficult to keep costs at or below the capitated rate. Finally, differences in treatment styles can lead to financial risk. For example, providers who tend to use more inpatient services to treat a certain condition may have higher costs than providers who rely more on outpatient care.

Placing providers at financial risk creates incentives to increase the efficiency with which care is provided. However, it may also lead to strategic behavior. Providers may reduce their standard of care. They may also strategically select patients, seeking to attract patients who are likely to be profitable, and to avoid those who are likely to lose money.[4,5] This poses two major challenges for designing a capitated system. The first is to group together patients who have similar resource needs. A second, closely related issue is to assure an appropriate minimum standard of care.

The more finely tuned the patient classification system, the more accurately it should adjust for risk and be able to predict treatment needs. As a result, there should be less of an incentive for providers to selectively limit access or coverage for sicker patients. The problem is to identify appropriate risk categories. This challenge is particularly great for high cost chronically mentally ill patients, most of whom are treated in the public sector. In addition to higher average costs, these patients also have substantially higher variation in costs. In an effort to design capitation rates that accurately reflect patient treatment needs, researchers have tried to set capitation rates based on patient characteristics that reflect resource needs, such as diagnosis and functional health status, with limited success.[1,6–9]

In this study, we investigate the impact of introducing a capitated system for mental health patients in the Department of Veterans Affairs (VA) health care system using empirical simulations and readily available clinical data. Our basic unit of analysis are Veterans Integrated Service Networks (VISNs), which are independent geographically based service areas and represent the basic administrative unit of the Veterans Health Administration. The advantage of using VA data is that we are able to account for essentially all of the service use for a large, national sample of mental health service users. Using VISNs as our basic unit of analysis allows us to compare large, integrated public systems for delivering care which share similar missions, but who are located in different geographic areas with potentially different practice traditions. Using utilization and cost data from fiscal year (FY) 1991, we consider two basic questions. First, compared to resource allocation under traditional cost based reimbursement, to what extent would a simple, average cost based capitation system lead to redistribution of resources between VISNs in the absence of any behavioral responses? Second, what types of factors may explain any redistribution of resources that may occur under a simple capitated scheme? In particular, we assume unit costs are fixed, and focus on two types of possible explanation: differences in case mix and differences in treatment styles.

Background

Prior to 1983, the VA allocated its health care budget based on the number of occupied beds at each facility. This system created incentives for providers to keep as many beds occupied as possible, leading to dollars being spent inefficiently at some facilities, and limited access to and availability of services at others. In 1983, the VA adopted a reimbursement system for inpatient care based on diagnostic related groups (DRGs), similar to the Medicare reimbursement system, but dropped this program in 1988 because of complaints that it encouraged inappropriate treatment restrictions.[10] In April of 1997, VA adopted a new allocation methodology, called the Veterans Equitable Resource Allocation (VERA) system.[11] Under this system, all VA patients are divided into two classes: those with basic needs requiring routine care, and those with complex and typically chronic illness who need special care. Classification is thus based largely on past service use, not on general clinical need. Facilities are reimbursed a fixed amount per patient depending on which class the patient belongs to. There is no specific classification for psychiatric patients in this system.

When Medicare instituted a capitated reimbursement system based on DRGs in 1983, psychiatric specialty hospitals and specialty psychiatric units of general hospitals were exempt from the capitated system because of the large variation in costs for mental health patients compared to general medical patients.[12] In contrast to the DRG system, which addresses inpatient care only for specific episodes, this study is the first to apply an empirically based capitation system to all services (inpatient and outpatient, mental health and general medical) used by public sector mental health patients in a fixed period of time. Thus, all health care costs for these patients are included in the capitation model, not just costs associated with a single episode of inpatient mental health care.

Methods

Sources of Data

The data for this study come from three sources. First, a cross-sectional sample of outpatients was identified in a national survey of all patients treated in VA mental health clinics during a two-week period at the very beginning of FY 1991 (1 October 1990 to 30 September 1991).[13] Mental health clinicians throughout the VA filled out data sheets on each outpatient clinical encounter that occurred between 15 October 1990 and 26 October 1990, which record demographic characteristics, clinical diagnoses and a functional status score, the Global Assessment of Functioning (GAF).[14] Because individuals could have more than one visit during this period, evaluation records were unduplicated by taking information from the first visit. The cohort used in this study was restricted to those individuals from the original cross-sectional sample who had a valid social security number and at least one reported psychiatric or substance abuse diagnosis.

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The remaining patient data come from VA administrative databases. Data describing each veteran's use of psychiatric, substance abuse and medical/surgical services during the remainder of FY 1991 were gathered from the Patient Treatment File (PTF), a discharge abstract of all completed episodes of inpatient care in the VA, and the Outpatient Care File (OPC), a similar record of outpatient care received in the VA. Costs were computed by multiplying the number of units of service by the national average cost for that service from the Cost Distribution Report (CDR). The CDR is an accounting system that identifies total expenditures and unit costs associated with all VA inpatient and outpatient health care services. Using accounting procedures standardized across the entire VA, both direct and indirect costs are identified and distributed over each major type of health care service.[15] By using standardized unit costs, we eliminate financial risk associated with input cost variations for our analyses.

Finally, information on the number of long-term care beds at each facility was obtained from the VA annual inpatient census. From this data file, we calculate the number of psychiatric beds occupied for more than six months at each facility as of the last day of FY 1991, which we use as a measure of the delivery of long-term psychiatric services.

We use FY 1991 data instead of more recent data because of the unique access to clinical assessment data presented by the 1991 outpatient survey. Since the outpatient survey includes measures of diagnosis and functioning, we can use these measures prospectively to simulate reimbursement for these patients' care during the rest of FY 1991.

Patient Characteristics

The primary patient characteristics used as a basis for classification are: (i) patient diagnosis, (ii) level of functioning (GAF), and (iii) whether the patient received VA disability compensation and the degree of disability among those who did. Patient diagnosis was constructed using a diagnostic checklist filled out by clinicians during the outpatient encounter. From this checklist, we identified 12 mental health diagnoses: alcoholism, bipolar disorder, dysthymia, generalized anxiety disorder, major depressive disorder. organic brain syndrome, other substance abuse, panic disorder, personality disorder, post-traumatic stress disorder, schizophrenia and other mental health. In the survey, patients could have more than one diagnosis. In such cases, the patient was classified under the diagnosis with the higher average treatment costs.

Data describing the extent to which patients are disabled was obtained from the patient's VA compensation status, which was also available from the survey. Veterans who become disabled as a result of their military service are eligible for compensation for medical services. The level of compensation ranges from 0 to 100 percent, and is determined by the level of function lost due to disability. We grouped these levels into five categories: non-recipient, 0 to 30 percent, 40 to 50 percent, 60 to 80 percent, and 100 percent.

Capitation Models

Our starting point is a simple capitated model in which payment per person is equal to the average cost of treating patients in the sample (a uniform flat rate for all patients). We then consider six additional capitation models using different combinations of available data to classify patients. In these models, we assume reimbursement per patient is set equal to the average cost of treating a patient in each class—i.e. compared to cost based reimbursement, a budget neutral scheme is assumed which leaves total reimbursement unchanged and simply redistributes payments. Note, however, that capitated payments could be set below or above average cost depending on actual standards of care and the standard deemed appropriate by policy makers.

In the first capitation model we consider (I), the payments per patient are set equal to the average total cost of treating a patient diagnosed with any mental health disorder across the entire VA system, without sub-classification. In the next two models (II/III), providers are reimbursed based on the average costs of treating a patient with a particular mental health diagnosis or GAF score, respectively. The fourth model (IV) reimburses providers based on the average total cost of treating mental health patients based on the service connected status of the patient, a carefully assessed measure of disability. The fifth model (V) is based on a combination of service connected status and GAF scores. In this approach, we first grouped patients by level of service connection. Those patients who were not service connected were then grouped into three levels based on their GAF score: GAF scores of 1 or 2, from 3 to 5 and from 6 to 9. Models VI and VII expand models II and III by reimbursing outpatient care at the average total outpatient cost, and reimbursing inpatient care at the average total inpatient cost classified by mental health diagnosis or GAF score, respectively (following Frank, Goldman and McGuire).[7] These models treat patients who were hospitalized differently from those who were not, and thus introduce service use into the simulation. In each of the above models, providers would be reimbursed at the average total cost for the group in which the patient fell.

Data Analytic Procedures

Data analysis proceeded in several steps. First, we calculated average total treatment costs for the patients in our sample, stratified by each of the classification schemes described above. Each patient was then assigned a reimbursement amount for each of the models described above depending on the characteristics of the patient or the facility at which they were treated, as specified in each reimbursement model.

Total projected reimbursements were then summed by VISN and compared with the actual total treatment costs. For each scheme, we calculated the percentage change from actual expenditures for each VISN. As a measure of the overall effect of the capitation model, we calculate the percentage of total expenditures redistributed as a result of each model. We also ran regressions of the natural log of

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total costs on each of the classification schemes to determine the proportion of the variance in costs explained by each classification scheme.

Next, we examine reimbursement amounts by type of hospital. VA funds are distributed at the VISN level by a national funding model and are then further distributed to individual facilities at the discretion of the VISN administration. Nevertheless, we can investigate the effect of applying our capitated reimbursement models on the distribution of funds at the facility level by examining their consequences for different types of facility. To this end, we classified facilities into one of four groups depending on the number of psychiatric beds occupied for more than six months: those with no such beds, those with 1–20, those with 21–100 and those with more than 100. As in the VISN-level analysis, providers are reimbursed according to the average cost of treating patients in each facility type and then projected patient-level reimbursements under each model are compared with actual expenditures.

Finally, we look at the relationship between the percentage change from actual expenditures under the average cost reimbursement model with measures of case mix and intensity of services across VISNs. These measures include: (i) the average GAF score, (ii) the average number of outpatient visits per patient, (iii) the average number of inpatient days per patient, (iv) the percentage of patients diagnosed with substance abuse, and (v) the percentage of patients diagnosed with schizophrenia. This allows us to determine the relative impact of the intensity of services and differences in patient characteristics on the redistribution of funds that results from the capitation simulations. Previous studies have found substantial variation in the intensity of VA service delivery across VISNs,[16] but have not differentiated between the effects of clinical characteristics and practice style.

Table 1. Sample characteristics

Characteristic	*N*	%	Mean total expenditures ($)
Gender			
Male	51540	96.11	6733
Female	2087	3.89	7020
Race			
White	39755	74.03	6647
Non-white	13945	25.97	8039
Service connected disability			
None	23986	44.67	7362
0 to 30%	7834	14.59	4728
40 to 50%	4370	8.14	5534
60 to 80%	3337	6.21	6893
100%	14173	26.39	8151
GAF score			
1 to 3	4687	8.73	10240
4 to 5	17650	32.87	8041
6 to 7	25140	46.82	5946
8 to 9	6223	11.59	5936
Diagnosis			
Schizophrenia	15985	29.77	7443
PTSD	6696	12.47	5649
Alcoholism	5977	11.13	8463
Drug abuse	5662	10.54	11970
Major depression	3831	7.13	5984
Bipolar disorder	3478	6.48	6716
Other mental health diagnoses	12071	22.48	4548
Number of long-term MH beds occupied at treatment facility			
None	2413	4.49	5700
1 to 20	38298	71.32	6889
21 to 100	10501	19.55	6857
over 100	2488	4.63	10754

Results

Sample Characteristics

There were 53700 individuals included in the survey. The average age was 50.1 years. Other study group characteristics are reported in Table 1. The sample was overwhelmingly male, which is characteristic of the VA population, and predominantly white. Over 55% of the study group were service connected. The sample was moderately high functioning, as seen by GAF scores clustering in the 6 to 7 range (low values = poor functioning). The most common diagnoses were schizophrenia, PTSD and substance abuse. The majority (71.32%) of patients were treated at facilities with between one and 20 occupied long-term psychiatric beds.

Capitation Models

Table 2 shows the results of the capitation model simulations by VISN. The first column reports the actual total expenditures on the patients in our study group. The other columns report the reimbursements under various hypothetical capitation models. For each model, the first column reports simulated reimbursement levels, the second column reports the difference between this simulated reimbursement amount and actual expenditures, and the third column reports this difference as a percentage of total expenditures by VISN. The differences between the simulated reimbursement levels and actual expenditures are summarized at the bottom of the column by summing differences that are greater than zero. This gives an overall measure of the amount of funds that are redistributed across VISNs. This number is expressed as a percentage of total actual expenditures in the next to last row. The final row reports the *R*-squared statistic associated with each capitation model. This statistic represents the fraction of variation in actual expenditures that is explained by the classification scheme underlying each capitation model.

The simulations indicate that capitation would result in significant changes in the distribution of VA funds nationally across VISNs compared to actual FY 1991 expenditures, reflecting substantial variation in per capita expenditures across the system. At the same time, differences between the various capitation schemes that incorporate clinical data

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Table 2. Reimbursed health care costs for VA mental health patients, by VISN

		Average cost reimbursement			GAF-based reimbursement			Diagnosis-based reimbursement			Based on service connection		
	Actual expenditures	Reimb.	Change from actual exp.		Reimb.	Change from actual exp.		Reimb.	Change from actual exp.		Reimb.	Change from actual exp.	
VISN	$	$	$	%	$	$	%	$	$	%	$	$	%
1	38030679	31992890	−6037790	−15.88	31825310	−6205369	−16.32	31846539	−6184140	−16.26	32165269	−5865410	−15.42
2	14382230	12544857	−1837373	−12.78	12999285	−1382945	−9.62	12533068	−1849162	−12.86	12689767	−1692463	−11.77
3	28214385	22882100	−5332286	−18.90	23137524	−5076861	−17.99	24091805	−4122580	−14.61	22977111	−5237274	−18.56
4	20810015	25748494	4938479	23.73	25234559	4424544	21.26	25309971	4499956	21.62	25569384	4759369	22.87
5	11067346	8998657	−2068689	−18.69	9108425	−1958921	−17.70	9993673	−1073673	−9.70	9200768	−1866578	−16.87
6	11188785	13680202	2491417	22.27	13260745	2071960	18.52	12880267	1691482	15.12	13575277	2386492	21.33
7	18489149	19637257	1148108	6.21	20024871	1535722	8.31	18957510	468361	2.53	19530652	1041503	5.63
8	26535969	31123860	4587891	17.29	32362331	5826362	21.96	29252175	2716206	10.24	30897907	4361938	16.44
9	11675219	14388040	2712821	23.24	14320463	2645244	22.66	13787922	2112703	18.10	14298136	2622917	22.47
10	15757496	18172522	2415026	15.33	18053660	2296164	14.57	18441218	2683722	17.03	18169339	2411843	15.31
11	13230016	15236044	2006028	15.16	14995162	1765146	13.34	14793880	1563864	11.82	15344746	2114730	15.98
12	20649411	17464684	−3184727	−15.42	16840534	−3808877	−18.45	18719662	−1929749	−9.35	17351154	−3298257	−15.97
13	10261381	8711317	−1550064	−15.11	8508817	−1752564	−17.08	8817682	−1443699	−14.07	8731511	−1529870	−14.91
14	8289358	7064366	−1224992	−14.78	6991693	−1297665	−15.65	6981941	−1307417	−15.77	7176718	−1112640	−13.42
15	18897347	16749837	−2147510	−11.36	16454194	−2443153	−12.93	16775016	−2122331	−11.23	16991316	−1906031	−10.09
16	20918293	25026639	4108346	19.64	24548551	3630258	17.35	24752541	3834248	18.33	24957036	4038743	19.31
17	9645538	11115164	1469626	15.24	11024815	1379277	14.30	10319847	674309	6.99	11150284	1504746	15.60
18	9085821	10932948	1847127	20.33	10746232	1660411	18.27	10112561	1026740	11.30	10811905	1726084	19.00
19	11668850	9117798	−2551052	−21.86	9258605	−2410245	−20.66	9108585	−2560265	−21.94	9096498	−2572352	−22.04
20	12824594	16280281	3455687	26.95	16578256	3753662	29.27	16746350	3921756	30.58	16162231	3337637	26.03
21	18101931	17317509	−784422	−4.33	17674496	−427435	−2.36	18735603	633672	3.50	17435780	−666151	−3.68
22	26622069	22160245	−4461824	−16.76	22397341	−4224728	−15.87	23388022	−3234047	−12.15	22063069	−4559000	−17.12
Total	376345882	376345710	31180556		376345868	30988749		376345838	25827017		376345857	30306002	
Change as % of total			8.29			8.23			6.86			8.05	
R^2						0.0312			0.0698			0.0163	

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Table 2. Continued

		Mixed service connection/GAF model			GAF-based inpatient			Diagnosis-based inpatient		
	Actual expenditures	Reimb.	Change from actual exp.		Reimb.	Change from actual exp.		Reimb.	Change from actual exp.	
VISN	$	$	$	%	$	$	%	$	$	%
1	38030679	32243013	−5787666	−15.22	30799608	−7231071	−19.01	30729395	−7301284	−19.20
2	14382230	12858993	−1523237	−10.59	12965009	−1417221	−9.85	12922718	−1459512	−10.15
3	28214385	23014464	−5199921	−18.43	22292284	−5922101	−20.99	22272918	−5941467	−21.06
4	20810015	25367829	4557814	21.90	23046972	2236957	10.75	23137667	2327652	11.19
5	11067346	9203061	−1864285	−16.84	9488602	−1578744	−14.26	9614953	−1452393	−13.12
6	11188785	13426422	2237637	20.00	14028875	2840090	25.38	14066142	2877357	25.72
7	18489149	19636072	1146923	6.20	21085462	2596313	14.04	20958430	2469281	13.36
8	26535969	31174060	4638091	17.48	30952940	4416971	16.65	30503980	3968011	14.95
9	11675219	14315388	2640169	22.61	14892040	3216821	27.55	14944007	3268788	28.00
10	15757496	18291531	2534035	16.08	17488409	1730913	10.98	17474787	1717291	10.90
11	13230016	15291511	2061495	15.58	15114577	1884561	14.24	15179766	1949750	14.74
12	20649411	17190535	−3458876	−16.75	17546436	−3102975	−15.03	17782773	−2866638	−13.88
13	10261381	8684597	−1576784	−15.37	9520541	−740840	−7.22	9584719	−676662	−6.59
14	8289358	7162164	−1127194	−13.60	7682534	−606824	−7.32	7741977	−547381	−6.60
15	18897347	16824849	−2072498	−10.97	17942321	−955026	−5.05	18108701	−788646	−4.17
16	20918293	24826779	3908486	18.68	25086043	4167750	19.92	25073370	4155077	19.86
17	9645538	11114389	1468851	15.23	11935791	2290253	23.74	11920707	2275169	23.59
18	9085821	10727083	1641262	18.06	11755934	2670113	29.39	11673754	2587933	28.48
19	11668850	9116598	−2552252	−21.87	9699724	−1969126	−16.88	9670758	−1998092	−17.12
20	12824594	16345292	3520698	27.45	15400116	2575522	20.08	15307651	2483057	19.36
21	18101931	17464289	−637642	−3.52	16635729	−1466202	−8.10	16716011	−1385920	−7.66
22	26622069	22067014	−4555055	−17.11	20986058	−5636011	−21.17	20960815	−5661254	−21.27
Total	376345882	376345934	30355460		376346006	30626265		376346000	30079366	
Change as % of total			8.07			8.14			7.99	
R^2			0.0246			0.3859			0.3863	

were much smaller. The proportion of total VA expenditures redistributed as a result of capitation ranged from 6.86% in the diagnosis-based reimbursement model to 8.29% for the simple average cost reimbursement model.

In all of these schemes, the effects on some individual VISNs were substantial and consistent across simulations. Some VISNs were reimbursed as much as 30% more than their actual expenditures, while others were reimbursed over 23% less than their actual expenditures, depending on the model. In general, VISNs 4, 6, 9, 18 and 20 experienced the largest increases in reimbursed amount compared to actual expenditures, and VISNs 1, 3, 5, 19 and 22 experienced the largest decreases. VISNs with large decreases have a greater reliance on inpatient care and have more long-term hospital beds compared to the VISNs with smaller decreases. The *R*-squared statistics ranged from 0.0163 for the service connection model to 0.3863 for the diagnosis-based inpatient model.

Table 3 shows the results by type of facility. Overall, the proportion of VA funds redistributed between facility types as a result of the capitation models is much smaller than at the VISN level, ranging from 1.59% for the mixed service connection/GAF model to 2.56% for the GAF-based inpatient model. In absolute terms, the vast majority of funds continue to be received by facilities in the range of 1 to 100 occupied long-term beds under all of the schemes considered. However, the two individual facility types at the extreme ends of the continuum experience large percentage changes in reimbursement under capitated schemes compared to actual expenditures. Facilities with more than 100 long-term care beds, which typically have high costs, were reimbursed from 32% to 36% less than their actual expenditures as a result of our capitation simulations. Facilities with no long-term care beds and therefore low costs were reimbursed over 20% more than actual expenditures under most of the models.

Finally, to better understand the relationship between funding change, patient clinical characteristics, and patterns of service use, we ran a multivariate regression model of the percent change in funding at the VISN level ($N = 22$) under the single-class average cost model on the following: (1) the average number of outpatient visits per veteran, (2) the average number of inpatient days per veteran, (3) the average GAF score, (4) the percentage of veterans diagnosed with schizophrenia, and (5) the percentage of veterans diagnosed with substance abuse. Table 4 shows the regression results. The only variables with significant effects are the number of outpatient visits and the number of inpatient days per patient. These results suggest that differences in practice style are driving the changes in funding across VISNs under the capitation models.

Discussion

This study explores the implications of introducing a capitated reimbursement system for mental health users based on readily accessible clinical data in a national public sector health care system. We investigated the effects of seven simulated capitation models for reimbursing health care expenditures for VA mental health patients. Although we are not yet able to study directly the effects of the VERA system in the VA, these models give some idea of its likely effects. Compared to actual expenditures, the percentage of total VA expenditures redistributed across VISNs as a result of our models ranged from 6.86% for the diagnosis-based reimbursement model to 8.29% for the simple average cost reimbursement model of capitation. Although some of the more intricate models explained a larger proportion of the variance in patient-level costs, using functional or diagnostic measures resulted in only small changes from simple average cost capitation. The effects on individual VISNs were substantial and consistent across reimbursement models, with some VISNs experiencing an increase in funding of over 30% and others experiencing a decrease of almost 22% in some simulations. The proportion of VA funds redistributed across type of facility as a result of our capitation simulations was much smaller, ranging from 1.59% to 2.56% of total VA expenditures. However, facilities with more than 100 long-term psychiatric patients would be reimbursed over 30% less than actual expenditures, whereas facilities with no long-term psychiatric patients would be reimbursed over 20% more under most of our capitation simulations.

The impact of these changes on the actual availability of services within and across VISNs is difficult to predict. Presumably, VISNs or facility types that would lose funding under a capitated system would reduce services or cut programs, and those that would have increased funding would expand services. How this would be done or what programs would be cut or expanded would depend on administrative or political pressures within each VISN. The impact on specific patient populations would depend on the type of reimbursement scheme and how care is typically delivered for that population. For example, under a diagnosis-based capitation system, there is no reason to believe patients with a particular diagnosis, such as substance abuse or depression, would be negatively affected unless the style of practice where they receive care is substantially different from other parts of the VA. However, under a system in which outpatient care and inpatient care are reimbursed separately, patients diagnosed with substance abuse may be vulnerable since in the VA they tend to receive only outpatient services and have many visits. Thus, the capitation rate would be low, yet they use a lot of services.

The fact that we find such large changes in funding as a result of our capitation simulations even after controlling for patient characteristics suggests that either there are unobserved differences in case mix or that substantial variations in practice style exist between VISNs. The fact that the average number of inpatient days per patient and the average number of outpatient visits were significantly related to the percentage change in funding as a result of capitation, in contrast to diagnostic measures, suggests that variations in practice style are primarily responsible for the large cost differences across VISNs.

With the exceptions of the GAF-based inpatient and

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Table 3. Reimbursed health care costs for VA mental health patients, by facility type

Long-term psych. patients	*N*	Actual expenditures $	Average cost reimbursement: Reimburs. $	Average cost reimbursement: Change from actual exp. $	Average cost reimbursement: Change from actual exp. %	GAF-based reimbursement: Reimburs. $	GAF-based reimbursement: Change from actual exp. $	GAF-based reimbursement: Change from actual exp. %	Diagnosis-based reimbursement: Reimburs. $	Diagnosis-based reimbursement: Change from actual exp. $	Diagnosis-based reimbursement: Change from actual exp. %	Based on service connection: Reimburs. $	Based on service connection: Change from actual exp. $	Based on service connection: Change from actual exp. %
None	2413	13753297	16911028	3157731	22.96	16885416	3132119	22.77	16899278	3145981	22.87	16638483	2885186	20.98
Less than 20	38298	263825175	268403873	4578698	1.74	268434582	4609407	1.75	269050765	5225590	1.98	267232873	3407698	1.29
Between 20 and 100	10501	72010409	73594158	1583749	2.20	73095779	1085370	1.51	72733054	722645	1.00	74573557	2563148	3.56
100 or more	2488	26757001	17436650	−9320351	−34.83	17930091	−8826910	−32.99	17662741	−9094260	−33.99	17900944	−8856057	−33.10
Total	53700	376345882	376345710	9320178		376345867	8826896		376345838	9094216		376345857	8856032	
Change as % of total				2.48			2.35			2.42			2.35	

Long-term psych. patients	*N*	Actual expenditures $	Mixed service connection/GAF model: Reimburs. $	Mixed service connection/GAF model: Change from actual exp. $	Mixed service connection/GAF model: Change from actual exp. %	GAF-based inpatient: Reimburs. $	GAF-based inpatient: Change from actual exp. $	GAF-based inpatient: Change from actual exp. %	Diagnosis-based inpatient: Reimburs. $	Diagnosis-based inpatient: Change from actual exp. $	Diagnosis-based inpatient: Change from actual exp. %
None	2413	13753297	16663898	2910601	21.16	13570913	−182384	−1.33	13523910	−229387	−1.67
Less than 20	38298	263825175	266913505	3088330	1.17	272821198	8996023	3.41	272482902	8657727	3.28
Between 20 and 100	10501	72010409	74574202	2563793	3.56	72829566	819157	1.14	73135725	1125316	1.56
100 or more	2488	26757001	18194330	−8562671	−32.00	17124329	−9632672	−36.00	17203464	−9553537	−35.70
Total	53700	376345882	376345934	5998931		376346006	9632796		376346000	9553655	
Change as % of total				1.59			2.56			2.54	

Table 4. Regression model of the percentage change under average cost reimbursement compared to actual expenditures

Variable	Coefficient	Std error	*t*-statistic	*p*
GAF score	−0.067	0.100	−0.667	0.5143
% dx substance abuse	0.501	0.449	1.114	0.2816
% dx schizophrenia	0.586	0.475	1.234	0.2349
Outpatient visits	−0.013	0.002	−6.963	0.0001
Inpatient days	−0.031	0.006	−5.060	0.0001
Adjusted R^2		0.84		

diagnosis-based inpatient capitation models, the *R*-squared statistics reported in the last row of Table 2 are quite low. For four of the models, the *R*-squared statistics ranged from 0.016 to 0.070. Since the GAF-based inpatient and diagnosis-based inpatient simulations reimburse outpatient and inpatient care separately, they use actual utilization as a predictor of costs and thus predict costs more accurately, which explains the higher *R*-squared values of 0.3859 and 0.3863, respectively. These models would also create incentives to hospitalize patients to obtain the higher rates and thus would defeat the purpose of the capitated model. Note that although these models have considerably higher *R*-squared values, the proportion of VA funds redistributed as a result of the models is similar to that associated with other models. The reason for this is that although the models in which inpatient care is reimbursed separately explain more patient-level variance, the fraction of patients hospitalized does not vary substantially between VISNs, and thus there is little redistribution of funds. There is substantial variability, however, in length of stay, especially between facilities with long stay patient populations and those without such patients.

The *R*-squared values associated with our reimbursement simulations are similar to those found in other studies. The adjusted average per capita cost methodology currently used to reimburse Medicare managed care patients explains only 1% of actual costs,[17] while the more sophisticated ambulatory diagnostic groups (ADGs) and hierarchical coexisting conditions (HCCs) methodologies have explained 6% and 9% of actual costs, respectively, among Medicare fee-for-service patients.[18,19]

The *R*-squared statistic measures the proportion of patient-level variation in total costs that is explained by our capitation models. Since we examine reimbursement amounts at the VISN level, we are less concerned about low *R*-squared values than if we reimbursed providers at the facility or clinical program level. At the VISN level, risk is diluted across a larger pool of patients than at the facility or clinical program level, so random variations in case mix are less likely to affect the overall budget. However, concerns still exist because systematic differences in provider patterns of care could result in shifts in funds with unknown consequences for patient well being.

Some limitations of our analyses deserve comment. First, our data are from FY 1991, and VA has changed significantly since that time. However, although VA inpatient service use and costs have declined substantially in recent years,[20] variations in practice style across VISNs remain considerable.[21] To the extent that patterns of variation remain similar, we believe our analysis is still relevant. Second, the relatively low *R*-squared values could indicate that either our measures do not capture differences in case mix very well, or that similar patients are treated differently across VISNs. The fact that our models in which inpatient care is reimbursed separately explain more patient-level variance, yet do not lead to significantly different distributions of VA funds, is further evidence that length of stay is likely to be driving differences between VISNs.

This study demonstrates that capitated reimbursement models for mental health care based on available clinical measures perform weakly, but are on par with capitation schemes studied elsewhere. Differences in practice style are primarily responsible for the differential effects of capitated reimbursement models across VISNs. Capitated reimbursement will discourage such differences in practice style, yet questions still remain about the anticipated effect of the changes on patient well-being. A capitated system based on the average cost of treatment will result in everyone moving to a standard of care that can be efficiently provided at that rate. But is that the optimal level of care? Before implementing a system of capitated reimbursement, further research is needed to determine what standard of care the system should encourage.

ACKNOWLEDGEMENT

This work was funded by the federal government as part of our employment by the Department of Veterans Affairs.

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