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This study evaluates changes in patterns of acute psychiatric hospitalization under Massachusetts' Medicaid-funded Mental Health and Substance Abuse (MMHSA) carve-out program. The data consists of the Case Mix Database, for FY 1996 and FY 1997, compiled by the state's Division of Health Care Finance and Policy, on all acute hospital episodes in the state. Key comparisons involve hospital utilization during the nine months preceding the 1996 implementation of the current expanded carve-out program and the subsequent 15 months of its implementation. Secondary comparisons are made between patients funded by the state's two major Medicaid programs, its behavioral carve-out and its contracted HMOs, as well as with other cohorts. Key variables include demographic and diagnostic measures, length of stay and recidivism, source of referral, insurance, socioeconomic characteristics of zip code of residence, and transfers between programs.

Findings include lower than anticipated rates of transfer from the free-care program to the behavioral carve-out program and higher than average and increasing levels of recidivism for patients in the behavioral carve-out program. The final model, based on a Cox regression analysis, correctly predicts 62.9% of the rehospitalization experience, a statistically significant portion of which was attributable to type of insurance coverage. The study also shows that neither the carve-out nor the HMO model of managed care are clearly superior one another.

Managed care strategies for cost-containment and quality control in health care have been used for several decades now,

but it has only been in the last ten years that such initiatives have made significant inroads in the field of public mental health. This has largely been a result of the increased willingness of recent administrations to grant states waivers from the provisions of the Social Security Act which govern the Medicaid and Medicare programs, most typically, a waiver of section 1915b which protects the freedom of consumers in the selection of medical vendors.

In 1992 Massachusetts was the first state to receive such a waiver, permitting it to limit consumer choice (see Hudson, 1999). This enabled the state to contract with a private corporation for the management of its Medicaid program for mentally ill and substance abusing persons. Enrollees in the state's Medicaid program—MassHealth—were at that time given the option to join one of several traditional HMOs or to select a personal care clinician (PCC) who would coordinate their medical care. If the second option was selected, any required mental health or substance abuse care would be provided through the Massachusetts Mental Health and Substance Abuse Program (MMHSAP). This is a behavioral carve-out program contracted to a private corporation which in turn subcontracts with selected hospitals, community agencies, and practitioners for needed services.

The initial vendor responsible for managing the carve-out, Mental Health Management of America, Inc. (MHMA), lost its contract in 1996 to a partnership of Value Mental Health and Options, entitled the Massachusetts Behavioral Health Partnership (MBHP or "the partnership"), despite objections from many in the mental health service and advocacy communities. As extensive as the initial implementation of the program was, it was a partial effort. During the initial period, from 1992 to 1996, the Commonwealth continued to contract directly with many private acute psychiatric units for the care of its most seriously mentally ill citizens. However, on July 1, 1996, Massachusetts not only shifted the contract for the behavioral carve-out to MBHP but substantially expanded the program, including acute psychiatric units which formerly were financed by the state's Department of Mental Health (DMH) through its "replacement program." In addition, emergency outpatient services, previously offered by DMH, were folded into the new carve-out program. In exchange for the additional funds provided to MBHP, this organization

agreed to provide acute service not only to Medicaid recipients but also DMH recipients without Medicaid, as well as those receiving inpatient psychiatric care through the state's free care program. In effect, a parallel mental health system was formalized, one designed to provide acute services rather than continuing care services which the state mental health authority would be restricted to. Despite the magnitude of this change, and the efforts of DMH, as well as the mental health advocacy community, to evaluate this change, only minimal data has been forthcoming from the managed care vendor.

This article will report on the results of an analysis of the Commonwealth's annual casemix database, consisting of records of approximately 750,000 acute hospitalizations each year, for the purpose of assessing changes in the patterns of psychiatric hospitalization—their rate, frequency, length, and periodicity, as well as inpatient services provided and referral patterns upon discharge. Specifically, this study focuses on the FY 1996 and FY 1997 data (from 10/1/95 to 9/30/97) which covers the last nine months of the operation of the initial Medicaid managed care corporation, Mental Health Management of America (MHMA), and the first 15 months of implementation of its successor program, the Massachusetts Behavioral Health Partnership (MBHP). This study, thus, permits a comparison the hospitalization experience under the original and the expanded MMHSA Program.

Specifically, the study addresses the following questions: (i) How are the patterns of psychiatric hospitalization under the state's carve-out Medicaid program different than those in its long standing Medicaid fee-for-service program? (ii) Has the introduction of the expanded managed care program under Medicaid increased the availability of and access to psychiatric hospitalization? (iii) How do psychiatric hospitalization patterns differ under alternative managed care providers, i.e. the partnership versus those contracted HMOs which also serve Medicaid clients? (iv) To what extent are clients who formerly received support through the Commonwealth's free care pool able to access Medicaid? A key area of concern involves comparisons in recidivism rates with the initial vendor, Mental Health Management of America (MHMA), with competing financing options such as the Medicaid fee-for-service program, as well as with the Medicaid-

financed HMOs. However, to do so requires controls for the differing demographic and diagnostic profiles of the populations enrolled under the various plans. To achieve this, this study has used both traditional statistical adjustments as well as a Cox regression in its analyses.[1]

The Research Literature. Although there is a growing body of research on managed care in mental health, there are few clear patterns in the findings and many methodological problems limiting their generalizeability. Areas typically examined include rates of hospitalization, outpatient service use, social functioning, and costs. One of the few consistent findings from these studies is that levels of psychiatric hospitalization are clearly reduced, compared with fee-for-service arrangements (Finch, Lurie, Christianson, and Moscovice, 1992; Babigian, Mitchell, Marshall, and Reed 1992; Manning, Stoner, Lurie, Christinbason, Gray, and Popkin 1993; Reed, Hennessy, Mitchell, and Babigian 1994. See Mechanic, Schlesinger, and Alpine 1995). Measures of hospitalization include admissions, numbers of days hospitalized, length of stay, and occasionally, recidivism. While two of these studies used random assignment, they were nonetheless limited by the small percentage of eligible patients who could actually be included in the study.[2]

Findings on the impact of managed care on outpatient service use include few clear-cut improvements, and more typically, no change, declines, or ambiguous outcomes. In one review of these results, Mechanic noted that capitated programs provide "comparable or even improved access to mental health care when compared with the traditional system (1998, pp. 7–8). However, an earlier review concluded that "A substantial body of research suggests that the average use of mental health services in prepaid plans is significantly lower than that under unmanaged fee-for-service insurance." (Schlesinger, 1989). Most of these studies did not, however, control for self-selection of enrollees. A study of repeated outpatient service requests among users of the City of Baltimore EAP program found considerably heightened levels of recidivism under the managed care option, compared with the fee-for-service alternative. However, controls for diagnosis and similar variables were not used (Fishel, Janzen, Bemak, Mryan, and McIntyre 1993). Another study found increased use of up-

to-date medications among fee-for-service users, compared with those in Medicaid plans. This study did not clearly identify the extent of managed care use among the Medicaid enrollees. One of the only studies to use random assignment produced mixed findings, indicating greater use of outpatient services, but services which were less intensive than those in the fee-for-service arrangement (Wells, Marguis, and Hosek, 1991).

Findings on the impact of managed care on social functioning include even fewer clear-cut improvements or declines, and more results involving no differences or an ambiguous mix of outcomes. The Monroe-Livingston study reported improvements on many psychosocial measures over a two year period, including greater independence and less use of supervised living arrangements (Reed, et al, 1994). Others have interpreted the Monroe-Livingston study as having equivocal findings (Mechanic, et al, 1995). This study was limited by the very small proportion of eligible clients from whom data was successfully collected, despite its use of random assignment. In contrast, the Medical Outcomes Study (MOS) patients treated under the prepaid option developed greater limitations in both physical and role functioning (see Mechanic, et al, 1995). A key study which produced results involving no difference or mixed findings include the RAND project.

While most studies show declining costs under managed care (Chandler, Meisel, Hu, McGowen, and Madison, 1998; Mechanic, 1998; Luft, 1987; Miller and Luft, 1994), some other reports indicate that when total outpatient and inpatient costs are considered together, differences between fee-for-service and capitated programs tend to disappear (Reed, et al. 1994). Mechanic summarizes several of the earlier studies and observed that, " . . . studies of most types of medical care suggest that the savings emerge primarily through substituting less expensive forms of treatment (typically outpatient services) for most costly (typically inpatient) treatments." (1995). Concerns have also been expressed that managed care programs reduce costs by displacing them to families and the community, including the social service and criminal justice systems (Mechanic, 1998). Furthermore, there are additional costs associated with the enhanced coordination of services (Frank & McGuire, 1998, p. 46).

The initial formal evaluations of the Massachusetts' Medicaid-funded MHSA Program found that it reduced costs and maintained access to and quality of services (see Callahan, Shepard, Beinecke, Larson, and Cavanaugh, 1994, 1998; Beinecke, Goodman, & Rivera, 1995). These studies only focused on the first two years of the program, and many of the trends identified did not hold up in the third and fourth years. Unfortunately neither of these studies provided data which was directly relevant to the quality of services, as the studies relied on service providers rating their quality in a time of diminishing resources and competitiveness for managed care contracts, a hardly convincing methodology. In addition, data has not been collected on consumer outcomes, other than recidivism rates. The only consistent increase in community services throughout the period appears to have been in medication utilization; while there were initial increases in crisis care, even this subsided by the end of the program (see Fendell, 1998; Hudson, Dormant, and Wieman, 1998). Thus, while there is some data to suggest that the program saved money, the data on service trends reveal a pattern of reduced utilization of most types of services, except medication prescription. Despite overall provider approval of MHMA, one of the most frequent complaints of the advocacy community has been its failure to share information. Perhaps this illustrates one of the central limitations of the privatization of the oversight of services, that policy decisions and resulting trends become increasingly inaccessible, crippling the ability of advocates to monitor the system.

The most recently published evaluations of the Commonwealth's Medicaid mental health program (MMHSAP) have focused on the third and fourth years of the work of MHMA, the initial vendor, and have been largely positive, though they have identified several areas of concern. In an informal case study, Sabin praised improvements in the contracting process (Sabin and Daniels, 1999). Similarly, Dickey and her colleagues, argued that MHMA did not let price dictate their selection of hospitals, and that quality considerations tended to dominant these decisions (Dickey, Norton, Normand, Azeni, and Fisher 1998). Based on an analysis of several public data bases, Dickey, et al. concluded that "Positive findings in our study outweigh negative ones. The approach to cost-containment was effective in reducing expendi-

tures for disabled beneficiaries, mental health care, primarily by limiting the price and utilization of inpatient hospital treatment." (1998, p. 120). In a survey of 98 provider liaisons with MHMA, Beinecke found that "Providers felt that the most positive changes were: (1) reductions in appropriate inpatient admissions and too long lengths of stay; (2) the utilization review process forced many clinicians to look at each client individually, . . . ; (3) changes were beginning to improve the integration of services; and (4) managed care was creating a greater continuum of care by increasing the variety and availability services and developing new specialized services." (1996, p. 383). In contrast, areas of concern of researchers and their interviewees included the finding that most the savings came merely in the initial stages of the program and only from one subcontract and could not be sustained (Sabin and Daniels, 1999, p. 40); that there was too little follow-up of discharged patients (Dickey, et al., 1998); that lengths of stay were being shortened too much, especially for children; and that recidivism was increasing (Beinecke, et al., 1996). In one of the more exhaustive case studies of the program, Fendell states that "One of the main reasons for concern about the private management of health care systems is the inherent incentive to distort care decisions to meet bottom-line goals." (1998, p. 35).

Most of these findings pertain to the initial vendor for the Massachusetts Mental Health and Substance Abuse Program (MMHSAP) — MHMA Inc.—whose contract was not renewed in 1996. Of the many gaps in the research to date, perhaps the most significant is that involving a study of the implementation period of the MBHP vendor, as well as its predecessor—the first and largest of its kind in the nation—so as to determine in a consistent manner the impact of the program on hospital utilization, selected outcomes, and costs, including the possible displacement of psychiatric patients to medical units.

Methods. This study is based on a secondary analysis of the Commonwealth of Massachusett's Case Mix database which is maintained by its Division of Health Care Finance and Policy (formerly known as the "Rate Setting Commission") (see Massachusetts Division of Health Care Finance and Policy [MDHCFP], March 1998). This division is responsible for implementing provisions in Massachusetts law which require that each acute

care facility annually report data on every discharge. Several major steps have been involved in this analysis: (i) data transfer and file preparation, (ii) aggregation and data transformation, (iii) computation of descriptive statistics; and (iv) use of bivariate and multivariate statistics to examine the key questions of the study. The selection of cases and transformation of the data resulted in a reduced data set of all patients who had one or more psychiatric episodes as well as all their associated medical episodes. This population consists of 40,542 individuals who experienced 105,701 acute care episodes, and these included 34,827 psychiatric stays and 70,874 medical stays of these same individuals.

The preliminary analyses relied on descriptive statistics for the initial review of the data and exploration of key bivariate relationships. This was done through the computation of subgroup means, cross tabulations, zero-order correlations, and survival analyses. Analyses of recidivism have focused on the subgroup of patients who are between 18 and 65 and who were discharged to the community, excluding those who died. In addition, because 30 day and 6 month recidivism rates are reported, all episodes for the final one or six months of the period were excluded so as to permit the possibility of readmission for those at the tail end of this period.

When questions concerned length of stay, recidivism, and referral patterns, the units of analysis involved hospital episodes. An exception is the final Cox regression which was conducted with the first recorded episode of each individual so as to assure independence of the observations, a fundamental requirement for the procedure. However, some of the questions investigated involved individuals rather than episodes. Typically either one of two procedures were used in these situations to generate unduplicated statistics on individual patients. In cases in which only basic descriptive statistics are required, a weighting factor was used which consisted of the inverse of the number of episodes for the particular individual.[3] In cases requiring computation of individual change scores, the data set was aggregated to the individual level after sorting by the patient identifier which was valid for 95% of all records of psychiatric episodes. These typically involved comparisons of diagnoses, severity ratings, insurers,

facilities, or doctors, between the first and last episode of the individual in a given period.

In several analyses an adjustment weight was used to control for the varied demographic and diagnostic profiles of each of the groups of patients receiving various types of insurance. This procedure in effect makes each insurance group comparable to the overall population, controlling for their different age, gender, and diagnostic profiles (see Lee, Forthofer, and Lorimor, 1989, p. 16).[4]

Finally, it should be noted that, in most cases involving preliminary descriptive statistics, tests of statistical significance have not been used. There are two principal reasons for this: (i) we are usually dealing with a population and not a sample, and (ii) because of the large number of cases, if tests of significance were used, most correlations and group differences would be significant, even when they are substantively negligible. Thus, it was decided to focus on the substantive interpretation of group differences, comparing them to the overall population experience whenever possible.

Reliability of the Data. Any analysis of administrative databases is inevitably confronted with questions about the reliability of the data, especially when it is obtained through multiple sources. Fortunately, several studies have been conducted, both by the author and by the Division of Health Care and Finance, which provide evidence of the data's reliability in several important areas. The reliability of data on demographic characteristics of patients, such as age, sex, and race, was investigated by the author through an analysis of the consistency of these fields across multiple hospitalizations of the same individuals. This analysis demonstrated a very high level of reliability or agreement among the three facilities (different for each patient) which provided information on these fields. While gender, age, and Veteran's status had nearly perfect agreement, agreement about patient's racial affiliation was also very high, at 0.93 (see Hudson, et al., 1998).

A parallel procedure was used to examine for agreement between separate facilities as to patients' diagnoses . The resulting Kappas reliabilities range from the slight (0-.19) to the substantial (.60 to .79), most typically falling in the Fair (.20-.39) to Moderate (.40-.59) range. Substantial reliabilities were found with Senile/

presenile organic psychosis (.67), as well as schizophrenia (.74), and moderately strong reliabilities were found with Affective disorders (.54), Adjustment reaction (.48), Alcohol dependence (.59).

Particularly important are variables involving the identification of the patient's insurer. The Division of Health Care Finance and Policy recently completed an analysis of these fields, comparing their own data with that of selected facilities and insurers, including Medicaid, for 1994 (MDHCAP, May 1998). This analysis indicated a good to very good level of agreement. The insurer with the lowest level of agreement was Medicaid, but even in this case, there were precise matches in 69.4% of the cases, and in almost all the remaining cases, 28.9%, there was agreement as to the general insurer, but not the specific plan.

The reliability of several other fields has yet to be investigated, however, it needs to be noted that a few of these lack face validity. These include the presence of a zip code for the employer, treatment procedures used, and the external cause of accident codes, especially those involving self-injury and suicide. All of these have extraordinarily low frequencies which may very well reflect under reporting. Nonetheless, research to date indicates that the key variables, especially the demographic, and to a lesser extent the insurance and diagnostic fields, typically have a good if not excellent level of reliability.

Results

This analysis focuses on the 40,552 individuals who were hospitalized in an acute psychiatric facility within the state in either 1996 or 1997, about 0.66% of the state's population. Of particular interest is the experience of those patients who received services from the Massachusetts Mental Health and Substance Abuse (MMHSA) Program's vendor, either MHMA (n = 805) or MBHP (n = 1,594), as well as those enrolled in the Medicaid HMO option (n = 679).

The Population. In each of the Medicaid carve-out programs, close to two-thirds are female (see table 1), which is considerably higher than the regular Medicaid program in which just under three-fifths (58.2%) are female. In contrast to the Medicaid program, the Commonwealth's free care programs redress this imbalance, as 61.8% of its hospitalized recipients were male.

Table 1

Selected Patient Characteristics, By Type of Insurance, FY 1996–1997

Patient Characteristics	*MBHP (N = 1,594)*	*MHMA (N = 805)*	*Other Medicaid Managed Care (N = 679)*	*Medicaid Fee-for-Service (N = 4,790)*	*Free Care (N = 2,746)*	*Other Government Program (n = 239)*	*All Other (31,920)*
GENDER							
Male	36.8%	33.1%	30.3%	41.8%	61.8%	54.8%	44.5%
Female	63.2%	66.9%	69.7%	58.2%	38.2%	45.2%	54.8%
AGE							
0–17	11.4%	8.6%	3.5%	16.5%	2.4%	4.6%	6.9%
18–64	77.5%	77.7%	79.4%	70.4%	86.6%	88.2%	69.8%
65+	11.1%	13.7%	17.1%	13.1%	11.0%	7.2%	23.3%
Mean	34	35	38	34	35	38	46
Median	34	35	37	34	34	36	41
RACE							
Am. Indian	0.6%	0.3%	0.2%	0.1%	0.0%	0.0%	0.2%
Asian	1.8%	2.1%	1.5%	1.3%	2.6%	0.4%	0.9%
Black	7.1%	8.3%	14.0%	11.3%	14.4%	8.3%	6.2%
Hispanic	19.4%	17.9%	17.3%	12.2%	8.8%	16.5%	4.0%
White	69.3%	68.8%	65.5%	73.0%	72.8%	73.0%	87.6%
Other	1.9%	2.6%	1.7%	2.1%	1.3%	1.7%	1.1%
EMPLOYMENT	4.3%	2.7%	3.0%	9.9%	7.0%	10.2%	11.5%

Source: Computed from FY 1996 and FY 1997 Case Mix Data Base (Feb. 1997), Division of Health Care Finance and Policy, Commonwealth of Massachusetts.

Unlike MMHSA's lead organizations (MHMA and MBHP) which had a disproportionate percentage of children represented on their caseloads (11.4% & 8.6%), only 3.5% of the HMOs inpatient caseload consisted of children. In contrast, only between 11% and 13% of these program's caseloads consist of persons over 65, considerably lower than the 23% for the remaining programs in the state, however, it is unexpected that the percentage should be this high since persons over 65 are technically not eligible for these particular managed care programs (see table 1). It should also be pointed out that particularly high proportions of the caseloads of the Medicaid managed care programs are persons of color, especially blacks and Hispanics.

A comparison of the diagnostic profiles of the various insurance cohorts reveals that patients under both MHMA and MBHP have a similar profile, clearly more severe than for those under the other plans. At least a fifth (20.0% to 23.2%) of these patients have the diagnosis of schizophrenia (either on a primary or secondary basis), and three-fifths (58.8% to 60.2%), have affective or bipolar conditions, compared to dramatically lower figures for each of the other insurance cohorts.

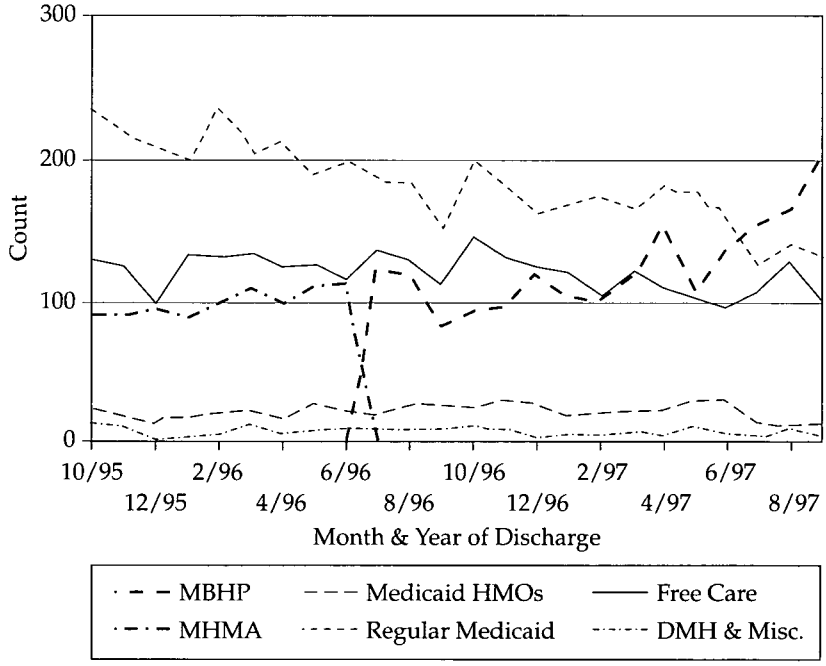
Service Coverage. Although two-fifths of a percent (0.38%) of the state's population are hospitalized each year in an acute psychiatric unit, the chance that any individual will be hospitalized varies considerably throughout the state. The highest rates are found mainly in central Boston, the Northshore, and the urban areas of central and western Massachusetts. The lowest levels of hospitalization are found throughout the Southeastern part of the state,[5] as well as the surrounding suburbs of Boston (see "Service Access" for discussion of socioeconomic correlates).

One of the goals of the state's expansion of the MMHSA Program in 1996 was that it would enroll the seriously mentally ill population whose hospitalizations were previously subsidized by the Commonwealth's free care program. In the first 6 months of the program there was no evidence of any changes in caseload size as would be expected if this mandate were successfully implemented. However, beginning in February 1997, a consistent upward trend in caseload bed day sizes was found resulting in an increase of about 50% in the monthly number of bed days. At the same time, the caseloads of the regular Medicaid, Medicaid HMO,

and free care programs all began to drop (see figure 1). When numbers of patients hospitalized are examined, similar increases were found in the MBHP caseload, but only negligible declines were found in the free care program. Rather, most of the corresponding declines were found in the state's regular fee-for-service Medicaid program. Thus, case transfers from this program are considerably more likely, yet the associated declines and increases may instead simply reflect the possibility that hospital coding departments are better able to differentiate these the two programs.

Admissions. One of the original goals of managed care was to provide preventative and early intervention services so as

Figure 1
Individuals Hospitalized per Month, By Type of Insurance



Note: Data represents unduplicated count of individuals, regardless of number of episodes.

to reduce reliance on more expensive emergency and intensive treatment services. In this respect, the Commonwealth's MMHSA Program appears to have done well as only a third (34.1% & 32.9%) of its psychiatric admissions were on an emergency basis, compared with 81.1% for the Medicaid HMOs, and between 44.2% (Other Government) and 69.2% (Free Care) for the other programs. Likewise, the MMHSA Program, compared to all other programs, received the lowest percentage of emergency room referrals and, along with the regular Medicaid program, the highest rate of physician referrals, as well as higher than average referrals from "Other" sources (which include Level 4 nursing facilities).

Accessibility. In recent years the pursuit of cost containment goals under managed care has led to widespread concerns about geographic and economic access of impoverished populations to services. With the use of increasingly restricted provider circles it would be expected that service facilities—inpatient units—will be located at increasing distances from patients' homes. This possibility was investigated in this study through the computation of straight line distances between the center point of the patient's home zip code and that of their hospital. The results of these calculations were broken down by time period and type of insurer. Median distances since mid-1996 were typically 4.6 miles, 10.7% greater than they were the year before. However, under the Medicaid managed care programs they ranged from 1.9 to only 3.2 miles, considerably less than most of the other programs. The MMHSA program (MHMA/MBHP) saw a similar 10% increase as was the overall experience. In contrast, the Medicaid HMOs became 57.9% more distant, though this was a increase from only 1.9 to 3.0 miles, hardly a cause of alarm. Thus, while managed care hospital services are becoming more geographically more distant, it would be difficult to argue that they have reached a point of geographic inaccessibility or that the trend was any more serious under the Medicaid program than in other areas.

When the MMHSA program was reorganized in 1996 it was agreed that the new vendor (MBHP) would assume responsibility for the seriously and acutely mentally ill who formerly were hospitalized either under the Department of Mental Health "replacement unit" or the state's free care program. It was possible to investigate the question of whether MBHP has been as-

suming responsibility for these groups since the state's case mix database contains a universal patient identifier—an encrypted social security number—which permits tracking patients not only between hospitals but between insurers. The analysis focused on that subgroup of patients who had at least one psychiatric hospitalization prior to the implementation of the new program, and one subsequent to it. Specifically examined were the designated insurers during the first of the hospitalizations during the Oct.1, 1995 to June 30, 1996 period and the first hospitalization under the subsequent period for which there is available data. In total 4,316 individuals qualified for inclusion in this analysis. The results, summarized in table 2, reveal that a scant 6.7% of the former free care psychiatric population were able to receive MBHP funding during their subsequent hospitalization. An even smaller number under "Other Government Funding", which would include the DMH replacement program, made the transition to MBHP funding. In contrast, about a seventh of the HMO population (13.6%) and over a fifth of the regular Medicaid caseload were able to make the transition. About four-ninths (44.8%) of the free care group continued on free care; about a third were able to switch to another, presumably private, form of insurance, assuming they became gainfully employed. A negligible number enrolled in the Medicaid HMO program.

An additional analysis of overall economic accessibility was conducted to determine the extent that acute inpatient psychiatric services, and especially those funded by the Medicaid managed care program, are targeted at low-income areas, particularly those with substantial poverty. This was done by aggregating the numbers of hospitalizations to the zip code level, converting them to population rates, and computing zero-order correlations with key indicators of socioeconomic conditions. Table 3 reports these results, and reveals that, as expected, Medicaid coverage rates are substantially correlated with both median family income and poverty rates. To a lesser extent, both the MBHP and HMO hospitalization programs also have the highest rates of coverage in the poorest communities. In contrast, the Commonwealth's free care program is only marginally targeted at these communities as the correlation with income was almost negligible (median family income,- 0.10; Poverty; 0.11; Extreme Poverty, 0.11).

Table 2

Case Transfers Between Insurers During Initial Implementation of the Massachusetts Behavioral Health Partnership (n = 7,460), FY1996–FY1997

	Primary Type of Insurance During First Hospital Episode, Oct.1, 1995-June 30, 1996						
Primary Type of Insurance During First Episode, 7/1/1996 to 9/30/1997	*Medicaid MHMA*	*Fee-for-HMOs*	*Medicaid Free Service*	*Government Care*	*Other All Progjram*	*Other*	*Total*
MBHP	67.5%	13.6%	21.7%	6.7%	*	1.5%	10.3%
	(226)	(8)	(139)	(16)		(44)	(436)
Medicaid HMOs	3.3%	49.2%	4.7%	*	0	1.0%	2.4%
	(11)	(29)	(30)		(0)	(29)	(104)
Regular Medicaid	15.2%	16.9%	49.1%	13.4%	*	3.6%	12.1%
	(51)	(10)	(315)	(32)		(109)	(522)
Free Care	*	0.0%	33%	44.8%	*	2.4%	4.8%
		(0)	(21)	(107)		(73)	(207)
Other Government Program	0.0%	0.0%	*	0.0%	*	0.3%	0.3%
	(0)	(0)		(0)		(8)	(15)
All Other	12.8%	20.3%	21.2%	33.1%	*	91.3%	70.1%
	(43)	(12)	(136)	(79)		(2,760)	(3,032)
TOTAL	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
	(335)	(59)	(642)	(239)	(18)	(3,023)	(4,316)

Notes: This table reports on a sub-sample, only those persons who had two or more episodes of acute hospitalization in FY1996–FY1997, at least one of which was prior to and at least one subsequent to the implementation of the MBHP program. Caution should be used in generalizing to all persons insured.

* Cells with counts of between 1 and 7; not specified per agreement with Division Health Care Finance and Policy.

Table 3

Zero-order Correlations of Hospitalization and Insurance Accessibility with Indicators of Socioeconomic Conditions (n = 473 zip codes)

	Indicators of Socioeconomic Conditions (1990 U.S. Census)					
	Median Family Income	*% Under Poverty Line*	*% Under 50% of Poverty Line*	*% of Age 259 High School Graduation*	*% of House-holds One Person*	*% Living in Urbanized Area*
Percentage of individuals (undup.) hospitalized in acute psychiatric facilities, 1996–1997	−.41**	.42**	.35**	.35**	.39**	.13**
Percentage of hospitalized receiving Medicaid	−.51**	.54**	.45**	.56**	.35**	.22**
Percentage of hospitalized on MBHP	−.35**	.40**	.29**	.51**	.17**	.26**
Percentage of hospitalized on Medicaid HMO	−.28**	.27**	.18**	.33**	.09	.06
Percentage of hospitalized receiving free care	−.10*	.11*	.11*	.09	.02	.05

Notes: The above represent Pearson r's computed based on aggregate zip code statistics, and weighted with relative population size of zip code.

* $\alpha < 0.05$ ** $\alpha < .01$

Length of Stay. There is a widespread belief that cost saving incentives under managed care contracts are leading to the curtailment of care. In particular, it is believed by many that the length of the stay for the typical psychiatric patient has fallen. This is, in fact, true as the median length of stay in Massachusetts institutions has fallen from 6.5 to 6.0 days just within the two year period of this study, or 7.7%. This represents a similar drop as that experienced under the MMHSA Program, or 6.8%, and considerably more than that under the Medicaid HMOs (3.4%). Other programs saw declines which ranged from a low of 2.7% in the free care program to 7.8% in "All Other", mainly private insurance programs.

It may be that such differences mask differential discharge practices since each program has a somewhat different profile of patients. For instance, the MMHSA programs serve a higher percentage of patients with schizophrenia and other forms of psychosis. For this reason, median lengths of stay were recomputed, adjusted for the differential age, sex, and diagnostic profile of each group.[6] The results of the recomputation of median lengths of stay, using these adjustments, reveals that the MMHSA Program saw the largest declines in median stay, from 7.5 to 6.2 days, a 17.3% decline, almost double that of the overall psychiatric population. Whether lengths of stay should be increased or shortened can not be determined from this particular data. However, data to be reported under "Outcomes" suggest that the shrinking length of stay is being accompanied by increasingly unfavorable outcomes.

Service Integration and Continuity of Care. A major critique of the traditional fee-for-service insurance plans is that they promote fragmentation of patient care. Patients are reported to "shop around" and frequently change doctors and facilities. Managed care has been held up as a solution to such fragmentation. This question was investigated in this study by comparing doctors and facilities between patients' earlier and later hospitalizations. To conduct this analysis, those patients who had two or more stays in either of the designated periods were selected for further analysis in which both the facility and assigned doctors were compared between the first and last hospitalization for each patient within the time period of interest. Finally, change rates had to be adjusted to account for the longer period (15 months) subsequent to the

implementation of the new program than that which preceded it (9 months), by multiplying the latter rate by 9/15.

Another analysis conducted involved rates that patients changed facilities between subsequent hospitalizations (see table 4). Just over a tenth (10.5%) of the patients in the MMHSA Program changed facilities, only slightly less than the 12.7% rate for all patients. However, this represented an increase of 3.3%, in contrast to the experience of patients generally which consisted of a 7.3% drop in facility changes. The Medicaid HMOs had, on the whole, the lowest levels of facility change, at .8% which was slightly up from 0% in the preceding period. Thus, while managed care appears to contribute to continuity of care in respect of facilities utilized, this benefit only marginally characterizes the MMHSA program, and is a benefit which appears to be disappearing.

Information on assigned doctors was available only for 1997. This data reveals that the MMHSA Program had the highest rate of doctor changes, at 47.0%, of all the types of insurance examined. The Medicaid HMOs had only a slightly lower rate at 45.8% which was identical as that of the regular Medicaid program, and also somewhat greater than the experience of all psychiatric patients in 1997, which stood at 44.2%. These represent rates of change of doctors, whether or not in the same facility, over the course of two or more hospitalizations during FY 1997 (see table 5).

Selected Outcomes. Recidivism rates were initially examined through the computation of percentages of patients who either were rehospitalized in designated periods of time, such as 30, 60, and 90 days, 6 months, and a year after discharge.[7] The 30 day recidivism rates declined slightly, from 16.8% to 16.2%, by 3.4%. Similarly, the rates declined slightly in the transition from the MHMA to the MBHP program, from 18.0% to 17.6%, or by 2.2%. In contrast, there were considerably larger declines in the Medicaid HMO program, from 22.9% to 18.9%, or 17.5%. The only cohort to see significant increases was "Other Government Payments", the small numbers in this group may lend themselves to considerable instability.

Table 6 reports the six month recidivism rates, broken down about time period and type of insurance. These reveals that the Medicaid managed care options, both the MMHSA Program and

Table 4

Percentage of Patients Changing Facilities, By Type of Insurance and Time Period

Type of Primary Insurance	*Oct. 1, 1995–June 30, 1996*	*July 1, 1996–Sept. 30, 1997*		*Change in Percentage (Col.3-Col.1)*
		Actual	*Adjusted**	
Massachusetts Behavioral Health Partnership (MBHP)	—	17.5% (525)	10.5%	3.3%
Mental Health Management of America (MHMA)	7.2% (209)			
Other Medicaid Managed Care	0.0% (40)	1.3% (75)	0.8%	0.8%
Medicaid Fee-for-Service	20.2% (420)	17.0% (542)	10.2%	−10.0%
Free Care	12.1% (157)	48.8% (223)	29.3%	17.2%
Other Government Payments[b]	0.0% (8)	0.0% (21)	0.0%	0.0%
All Other[c]	20.9% (2,706)	22.7% (4,998)	13.6%	−7.3%
TOTAL	20.0% (3,420)	21.2% (6,384)	12.7%	−7.3%

Notes: This table is calculated on the basis of the subsample of patients who have had at least two hospitalizations in each of the two designated periods. Change in facility is figured by comparing the first and last facility for each patient within each period.

* The "Adjusted" is calculated by multiplying the unadjusted figure by 9/15 to produce an estimate of the amount of changes which would have occurred had this second period been 9 months instead of 15. This is to assure comparability with the first 9 month period.

Table 5

Comparison of Hospital Utilization, By Type (Psychiatric or Medical) and Insurance, FY 1996–FY1997

	Type of Insurance						
	MBHP	*MHMA*	*Medicaid HMO*	*Medicaid Fee-for-Service*	*Free Care*	*DMH & Misc.*	*All Other*
MEDICAL STAYS OF THOSE WITH PSYCHIATRIC STAYS							
Mean Length of stay	9.2	11.1	4.7	5.4	5.4	4.7	5.3
% Changing facility	0%	2%	3%	16%	5%	1%	19%
% Changing doctor	6%		9%	16%	9%	11%	22%
PSYCHIATRIC STAYS							
Mean Length of stay	8.4	9.4	6.9	10.5	6.8	7.7	8.8
% Changing facility	4%	1%	0%	6%	2%	0%	7%
% Changing doctor	11%		8%	10%	6%	1%	9%

Notes: Computed on subsample of patients who had 2 or more psychiatric episodes during the 1996–1997 period, and if they had medical episodes, had two or more. Changes in facility, doctor, and severity level computed between first and last episode of each individual, and the results of all individuals were then aggregated.

* Severity Levels: 1–Minor; 2–Moderate; 3–Major; 4–Extreme (unavailable for FY 1996).

the HMOs have the highest rates of recidivism, just about 50% (48% and 49%, respectively). These are up substantially from the earlier period, by about 20%. Likewise, they are almost 20% higher than that of the overall psychiatric population, which stood at 41% in 1997. These same rates were then recomputed, adjusting for the differential age, sex, and diagnostic profiles of the various insurance groups. These rates for the MMHSA Program are only slightly lower, and those for the Medicaid HMOs, slightly higher.

Table 6

Six Month Recidivism Rates, By Time Period and Type of Insurance, FY1996–1997

Type of Primary Insurance	*Oct. 1, 1995–June 30, 1996*	*July 1, 1996–Sept. 30, 1997*[a]	*Percentage Change*
Massachusetts Behavioral Health Partnership (MBHP)		48% 47.3% (1,564)	20.0% 24.1%
Mental Health Management of America (MHMA)	40% 38.1% (1,450)		
Other Medicaid Managed Care	41% 39.5% (350)	49% 50.5% (393)	19.5% 27.8%
Medicaid Fee-for-Service	42% 41.9% (2,756)	47% 46.7% (2,077)	11.9% 11.5%
Free Care	26% 25.5% (1,415)	30% 30.4% (1,373)	15.4% 19.2%
Other Government Payments[b]	25% 25.3% (102)	35% 35.8% (100)	40.0% 41.5%
All Other[c]	36% 36.2% (12,440)	40% 40.0% (12,756)	11.1% 11.0%
TOTAL	37% 36.3% (18,513)	41% 40.6% (18,263)	10.8% 11.8%

Notes: This table represents percentage returning to an acute psychiatric facility (psychiatric unit or psychiatric ICU) in Massachusetts, within 6 months of discharge from one. It is computed based on all episodes of acute hospitalization in the Commonwealth, in the designated period, of adults aged 18–65, excluding those who were transferred to another hospital or died while in the hospital. The second figure in each cell is the same rate, but adjusted for age, sex, and psychotic diagnosis.

[a] To compute 6 month recidivism rates it was necessary to also exclude all cases with discharge dates less than 6 months from the end of the FY 1997.

[b] "Other Government Payments" excludes all Medicaid and Medicare, and CHAMPUS.

[c] "All Other" includes all Medicare, Non-managed care Medicare, and all forms of commercial insurance, both traditional and managed care.

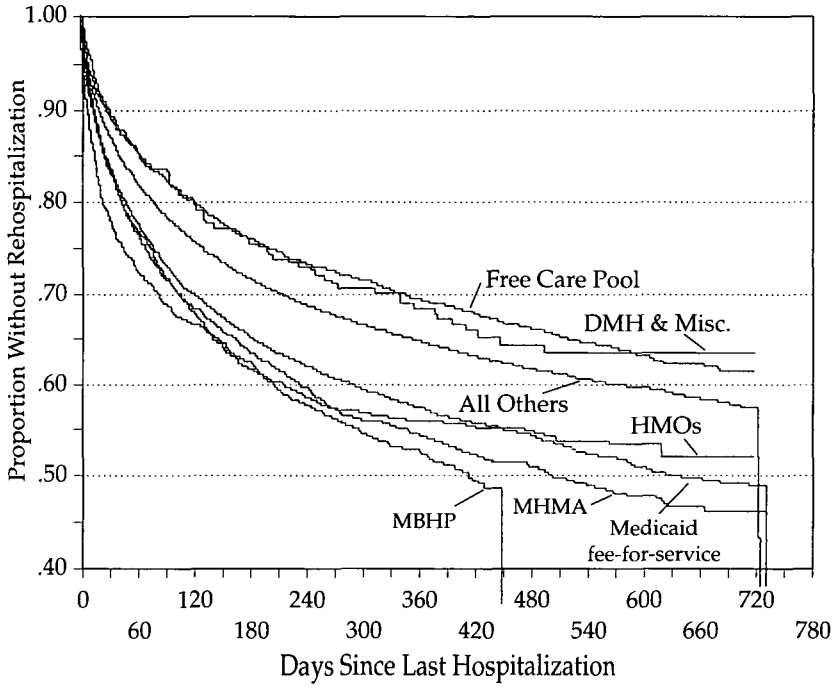
However, in both cases the patterns of increasing recidivism are even greater. An examination of similar tables (not included) for 2 and 3 months, and 1 year, reveal the disparities between the various programs exemplified in this table, increase over time, from very minor differences at the one month level, to even greater differences at the one year mark.

A more in depth examination of the differential recidivism rates was possible through a survival analysis in which the likelihood of remaining in the community (or non-rehospitalization) is plotted against time from discharge for each insurance group. This plot (see figure 2) clearly indicates that the experience of MBHP is slightly less favorable than that of MHMA, which covered substantially the same population, and considerably less favorable than all other groups, including free care. While the MBHP experience, according to this analysis represent an almost 55% rehospitalization rate after 15 months, all other groups have rates between 35% and 52% at this point. Since this program has the greatest declines in length of stay and the lowest continuity of care and referral rates, it should come as not surprise that the recidivism rates are among the least favorable of the programs examined.

An important indicator of improvement occurs when patients who have been diagnosed for a particular disorder no longer receive such a diagnosis during a subsequent hospitalization. Of course, some disorders spontaneously remit, and others are persistent even with the best treatments. Complicating the picture is the moderate level of reliability that clinicians have demonstrated in diagnosing mental disorders. Nonetheless, a comparison of diagnoses of the same patients between the first and last hospitalizations during designated periods of time reveals important trends.

Table 7 reports the results of this analysis which are in the form of percentages of patients whose diagnosis was no longer present during the final hospitalization during the designated time period. In all but one of the diagnostic groups—personality disorders—the rates became somewhat less favorable during the most recent time period, despite the fact that this period was longer than the first. As is well known, schizophrenia was found to be the most recalcitrant, with a 16% remission rate, whereas depressive disorder remitted in over four-fifths of the cases (81%)

Figure 2
Proportion Remaining Free of Rehospitalization, By Time and Type of Insurance



in the most recent time period. There appears to be few, if any, systematic differences in remission rates among the various insurance groups, other than a general decline in the rates over the two periods studied.

Another indicator of psychiatric outcomes involves changes in severity ratings which each hospital supplies (beginning in 1997) for discharged patients. These ratings consist of Mild (1), Moderate (2), Major (3), and Extreme (4), with a median at 1.4. Just about seven-tenths (69.1%) of all psychiatric patients had no reported change in the severity of their condition between the first and last hospitalization, with the median change score being .03, a very slight and probably negligible level of regression. While

Table 7

Changes in Selected Diagnoses among Patients with Multiple Hospitalizations, By Time Period and Type of Insurance

	Type of Insurance						
	MBHP	*MHMA*	*Medicaid HMO*	*Medicaid Fee-for-Service*	*Free Care*	*DMH & Misc.*	*All Other*
Oct. 1, 1995 to June 30, 1996							
Schizophrenia		20%	33%	16%	18%	100%	17%
Affective Disorders		24%	22%	24%	19%	43%	21%
Neurotic Disorders		51%	83%	63%	73%		57%
Personality Disorders		42%	43%	31%	43%	0%	39%
Conduct Disorder		50%		71%	100%		66%
Alcohol Abuse/Dependence		38%	75%	39%	25%		30%
Substance Abuse/Dependence		50%	100%	86%	67%		80%
Depressive Disorder		20%	0%	58%	100%		90%
July 1, 1996 to Sept. 30, 1997							
Schizophrenia	19%		15%	22%	22%	0%	16%
Affective Disorders	24%		12%	28%	21%	6%	20%
Neurotic Disorders	44%		75%	54%	51%	100%	56%
Personality Disorders	39%		30%	44%	40%	67%	48%
Conduct Disorder	75%			38%	100%		64%
Alcohol Abuse/Dependence	31%		41%	39%	23%	100%	28%
Substance Abuse/Dependence	57%		75%	46%	48%	100%	57%
Depressive Disorder	50%		0%	72%	33%	100%	81%

Note: This table is calculated using the subsample of individuals who have had at least two hospitalizations in either of the two periods. The two periods, thus, represent two overlapping samples. Each diagnosis is coded dichotomously (1—Present; 0—Absent), and diagnosis change is calculated from the first to the last hospitalization during each period in the following manner: From Present to Absent—1; from Present to Present—0. Those who did not have the condition at first hospitalization are, therefor, excluded from this analysis which does not take into account persons who did not have but developed the disorder. When averaged, 100% indicates that everyone who had the disorder at first hospitalization did not have it at the end of the period, and 0% indicates that all these people continued to have the diagnosis. Blank cells indicate there were no applicable individuals for this analysis.

14.1% were given less severe ratings at the final admission, the remainder (16.8%) saw increasing levels of severity (see table 8)

A comparison of these change scores in 1997 between insurance type revealed that the MBHP program had slightly higher levels of regression (.05) than was the case overall (.03), but not as high as the Medicaid HMOs (.14) or free care program (.08). Whether any of these levels of regression can be considered substantive can not be determined from this data. However, because they point in a similar direction as many of the other indicators, they must be considered a basis for concern.

Multivariate Analysis. A central question of this study has been whether the MMHSA carve-out program (including both MHMA and MBHP) have been more or less effective in reduc-

Table 8

Changes in Severity Ratings, By Type of Insurance

Type of Primary Insurance	*July 1, 1996–Sept. 30, 1997*
Massachusetts Behavioral Health Partnership (MBHP)	.05
	(496)
Other Medicaid Managed Care	.14
	(72)
Regular Medicaid	.00
	(517)
Free Care	.08
	(201)
Other Government Payments[b]	.00
	(20)
All Other[c]	.03
	(4,695)
TOTAL	.03
	(6,001)

Notes: All the above represent slight, probably negligible worsening. Numbers in the negative range would represent improvements, and 0, no change on average. This table is calculated on the basis of the subsample of patients who have had at least two hospitalizations in the designated period. Change in severity is figured by subtracting the first from the last severity rating for each patient within the period. Because higher numbers represent greater severity, positive numbers here indicate worsening. Data on severity ratings is not available for 1996 comparisons.

ing rehospitalization when compared with the Medicaid HMO and fee-for-service programs, as well as other options potentially available to this population. Simple comparisons of recidivism rates suffer from the problem of differential casemix which involves the problem of comparing populations with differing diagnostic and demographic profiles. In the descriptive stage of this analysis, this problem was confronted through adjustments for the differing age, gender, and diagnostic profiles of the various populations of interest. This procedures, however, only goes part way in confronting this problem since a limited number of variables can be statistically controlled for in this procedure. Current regression techniques, in contrast, can accommodate a far wider array of controls, and at the same time provide more in depth information on the contributions of each of these predictors in understanding variations in recidivism rates. Since traditional regression techniques can not be used for studies which use time-to-event data, as well as containing cases which have not experienced the terminal event (in this case, recidivism) by the end of the period of data collection, it was necessary to use techniques of Cox regression which represent a form of multivariate survival analysis.

This analysis reveals that when enrollees in the MMHSA Program are psychiatrically hospitalized in an acute facility, they are have a significantly higher than expected risk for rehospitalization. While those in the former MHMA program had a risk 19% higher than expected, those in the MBHP program experienced a 16% higher than normal risk (see table 9). This is after differences in diagnostic and demographic profiles, severity of condition, services provided, length of stay, employment, and distance to hospital are all controlled for. In contrast, in the residual fee-for-service Medicaid program had an 8% higher than expected risk, somewhat less than those in the carve-out program. The one group with a significantly lower than average risk were those in the state's free care program, who had a 16% lower than expected risk of rehospitalization. Those in the Medicaid HMO program also had a lower than expected risk, of (10%), however, this result was not statistically significant.

Among the control variables, it was found that psychotic diagnosis, and in particular, schizophrenia and affective disorders, significantly increase a patient's likelihood for rehospitalization.

Table 9

Acute Psychiatric Rehospitalization, Regressed on Selected Diagnostic, Treatment, Demographic, and Insurance Covariates, Using Cox Regression Analysis (n = 32,923)

Predictor	*B*	*S.E.*	*Wald*	*Sig*	*R*	*Exp(B)*
Schizophrenic Disorders Diagnosis	.67	.029	551.9	.00	.05	1.96
Affective Disorders Diagnosis	.24	.023	107.8	.00	.02	1.27
Neurotic Disorder Diagnosis	.06	.026	4.8	.03	.00	1.06
Personality Disorder Diagnosis	.29	.025	128.2	.00	.02	1.33
Alcohol Abuse/Dependence Diagnosis	.09	.025	13.7	.00	.01	1.10
Special Symptoms Diagnosis	.14	.066	4.7	.03	.00	1.15
Adjustment Reaction Diagnosis	.08	.027	8.1	.00	.01	1.08
Psychiatric Somatotherapy	.26	.055	22.1	.00	.01	1.30
Other Psychotherapy *(than individual)*	−.27	.086	9.6	.00	−.01	.77
Alcohol/Drug Detox or Rehabilitation	.14	.032	17.9	.00	.01	1.15
Employment (1–Yes; 0–No)	−.13	.033	16.4	.00	−.01	.88
Distance between Hospital & Home (miles)	−.0012	.00029	17.0	.00	−.01	1.00
Gender (1–Male; 0–Female)	−.10	.021	22.9	.00	−.01	.91
Length of Stay (days)	−.00056	.00023	5.8	.02	.00	1.00
RACE: OVERALL*			109.1	.00	.02	
TYPE OF INSURANCE		64.8	.00	.02		
MBHP (Medicaid carve-out, 1996-)	.15	.044	11.4	.00	.01	1.16
MHMA (Medicaid carve-out, -1996)	.17	.047	13.9	.00	.01	1.19
Medicaid HMO	−.10	.070	2.1	.14	−.00	.90
Medicaid Fee-for-Service	.08	.033	5.2	.02	.00	1.08
Free Care	−.16	.040	17.0	.00	−.01	.85
Other Government / DMH	−.08	.109	.5	.47	.00	.92

Notes: 32,923 cases included for analysis—first hospitalization per subject, aged 18–65, excluding persons with outcome of death. Forward entry used; −2 Log Likelihood = 211,489; Overall Chi-square = 1039.6 (df = 26; Alpha = .0000); Change in −2LL from previous block Chi-Square = 1014.8 (df = 26); Alpha =.0000).

* The following racial categories were coded dichotomously: White, Black, Other, American Indian, Asian, and Hispanic, but are excluded here for brevity as none of the individual categories had significant Wald statistics.

Those with schizophrenia are almost twice (1.96) as likely to return to an acute unit, while those with affective conditions has a risk that is 27% above average (1.27). Similarly, those with a personality disorder are a third (1.33) more likely than those without such a diagnosis to be rehospitalized. Among the treatment variables, both psychiatric somatotherapy and alcohol/drug rehab or detox both *increase* risk of rehospitalization (1.30 and 1.15), even after the controls for diagnosis, whereas the provision of non-individual psychotherapies, i.e. group and family therapy, diminish the risk by 23% (.77). Also, important in diminishing the risk of rehospitalization are employment (−12% or .88) and being male (−9% or .91). As would be expected, living a greater distance from the hospital also diminishes the likelihood of rehospitalization, by slightly over a tenth of a percent (.12%) per mile.

Among the predictors which had a very small or negligible impact on the likelihood of rehospitalization, were length of stay and race. Controls were attempted for a range of other diagnostic and procedure variables but the contributions of these were so small that these were excluded from the final model.[8]

The overall model is highly significant, with a probability of .0000 (χ^2 = 1039.6; df = 26). A final analysis was conducted for the purpose of assessing the predictive strength of the model. Predictions based on the model were generated for each case and these were then compared with the actual experience of rehospitalization. The model correctly predicted the overall rehospitalization experience for five-eighths (62.9%) of the patients. This figure, however, masks contrasting experiences in the ability of the model to predict rehospitalization among those who are rehospitalized versus those who are not. The sensitivity of model is 42.5%, which represents the percentage of the relapse predictions which were correct (see table 10). In contrast, the specificity of the model is 72.6%, which represents the percentage of predictions of non-relapse which were correct. It is, thus, clear that while the model has a moderately strong ability to predict non-relapse (72.6%), and only a fair ability (42.5%) to predict relapse, that considerable variation in the experience is yet to be explained by conditions not available for inclusion in the current model. Nonetheless, it presents the most comprehensive model available for examining the rehospitalization experience

of those under the Medicaid carve-out program, an experience which involves elevated rates of recidivism of patients in these programs, considering many of the differences in casemix in the various cohorts.

Discussion. Evidence concerning improvements in program accessibility and effectiveness under Massachusetts' Mental Health and Substance Abuse Program (MMHSAP) is mixed. By the last half of FY1997 there was a clear increase in both bed days and episodes of psychiatric hospitalization, at the same time that these decreased under the Commonwealth's free care program. Yet further analysis reveals other more likely explanations for this. When the numbers of individual patients hospitalized are analyzed over time, there were still significant increases in the current vendor's (MBHP) program participation, but negligible decreases in the free care program. Most of MBHP's increases are instead clearly associated with declines from the regular Medicaid fee-for-service program rather than transfers from the free care program. One explanation for this, in addition to that of case transfers, involves the possibility that only recently have hospital coding departments overcome some possible initial confusion concerning these Medicaid programs. An analysis of transfers of individuals between their programs revealed that while only 6.7% of free care patients transferred to MBHP it's the first 15

Table 10

Predictions of Rehospitalization, Based on Cox Regression Model (n = 32,923)

		Prediction of Rehospitalization		
		No	*Yes*	*Total*
Subsequent Hospitalization?	No	72.6% (16,198)	57.5% (6,194)	67.7% (22,302)
	Yes	27.4% (6,104)	42.5% (4,517)	32.3% (10,621)
Total		100.0% (22,301)	100.0% (10,621)	100.0% (32,923)

months of its implementation, 21.7% of the larger non-managed care Medicaid program did so.

Despite the marginal, if non-existent, ability of MBHP to pick up on the previously excluded indigent, there is some evidence that MBHP's services are partly targeted at poor communities. This is no doubt due to the strict financial eligibility rules under the Medicaid program. It should be noted, however, that while the correlation of MBHP hospitalizations with poverty is less than that of the Medicaid program overall, it is considerably better than that of the Medicaid-funded HMO program, and a lot better than that of the Commonwealth's free care program which is only marginally targeted at poor communities. The other and probably more important reason is the negative correlation between the rate of both mental hospitalization and of serious mental illness itself, on one hand, and poor socioeconomic conditions, on the other hand. This has been one of the most consistent findings in the social sciences (Hudson, C. 1988) and one which was found in this study to be at the −0.41 level (see table 3). Approximately 70% of the zip codes in Massachusetts have profiles which fit the pattern of either below average income and above average hospitalization rates, or the reverse.

The picture that the case mix data presents must be cause for concern. Both the continuing declines in lengths of stay, especially the 17% decline under the current vendor (MBHP), and the increasing recidivism rates are consistent with the finding that there is decreasing referral activity made at patient discharge under this program. Mental health professionals have hardly sufficient time to complete their intake assessments before discharge, let alone discharge plans. That 80% of patients over all are not referred—and 90% of those of MBHP's—is a matter of significant concern, if true. Further research using independent data sources will need to verify their figures, as these could reflect under reporting of discharge planning activities. Whether the trends identified in this study are substantive will only be determined over the course of the next five to ten years. Most the annual shifts of 1% or 2% and greater are certainly important if they accumulate over the course of several years. However, many such changes are unstable and do not progress in a straight line fashion. Thus,

considerable caution must be exercised in interpreting the trends identified here.

The high rates of non-referral are consistent with the particularly high and increasing recidivism rates identified, especially under the current MMHSA Program. That almost a half of patients (48%) are rehospitalized within six months under the MMHSA program, a figure which is up by 20% since the contract with MBHP was issued, should also be cause of concern. The worsening recidivism rates are also consistent with data on declining remission rates in respect to changes in diagnoses and very slight increases in the severity levels of patient conditions. While no systematic differences between changes in diagnoses could be found based on program participation, slightly greater than average changes in severity levels were found with the MMHSAP patients, but not nearly to the degree as in the free care and Medicaid HMO programs.

Another area examined involves continuity of care, in respect to patients' continuation with their same doctor and facility over the course of two or more hospitalizations. In respect to changes in facilities, patients under the current MMHSAP vendor (MBHP) changed facilities slightly less than average (10.5% vs. 12.7%, in 1997), compared with only 0.8% with the Medicaid HMO patients. This MBHP figure (10.5%) was up by 3.3% percentage points from the 7.2% figure under the initial MMHSAP vendor (MHMA), compared with overall declines.

One area in which the MMHSA Program has been true to some of the original ideals of managed care has involved the admission process. Considerably fewer patients are admitted on an emergency basis or from emergency rooms than in the other programs examined, such as the Medicaid HMOs. Instead, the patients' physicians have played a considerably more important role. If, in fact, physicians are intervening earlier in the process of decompensation, it could be that shorter hospitalizations are sufficient. However, the data on discharge planning, continuity of care, recidivism, and other outcomes clearly suggest otherwise.

A central issue confronting policy makers is whether the seriously mentally ill are better served in a speciality carve out program as exemplified by the MMHSA carve-out program, or through a more traditional HMO structure. Clearly the HMO

model assures better continuity of care within the psychiatric sector as well as between medical and psychiatric sectors. Yet most other indicators of quality of care, both in its process and outcomes, are no better, and in some cases worse under the HMOs. Both programs create multiple causes for concern. For this reason, it may be best to continue to offer patients both options, and instead focus efforts on upgrading the quality of services under both plans. Particular organizations, such as the state's mental health authority, should advise its clienteles as to their desired alternative, based on the needs of the particular subgroup under consideration. For the most seriously mentally ill, there are many reasons to work toward improved speciality services which include a comprehensive range of carefully linked programs and other resources, despite many problems in its current implementation. At this point, it would clearly be a mistake to promote either model as the superior alternative for all populations of mentally ill persons.

NOTES

1. Parts of this article are adapted from a preliminary report of the findings: Hudson, C.G., Dorwart, D.R., and Wieman, D.A., 1998.
2. For example, a person with four stays would have a weight of .25 assigned to each stay. Analyses were then conducted on the weighted episodes to produce weighted means, percentages, and other statistics reflective of the underlying population of individuals.
3. This was done first by determining the relative percentage of all patients who fell into the possible combinations the following categories: gender (male/female), age (0–18, 19–34, 35–49, 50–64, & 65+), and diagnosis (psychosis/non-psychosis). Similar percentages were calculated for each insurance subgroup. The percentage of the insurance subgroup was then divided into the corresponding overall subgroup percentage to determine the weight for any individual fitting the designated criteria. One of resulting 140 weights (20 demographic/diagnostic groups multiplied by 7 insurance groups) were then assigned to each patient, based on that patient's particular group memberships in respect to their insurance, gender, age, and diagnosis. The effect of using such weights is the disproportionate stratification of the sample.
4. These reliabilities wee evaluated through the use of the Kappa coefficient.
5. The low rates in the Southeastern part of the state may reflect a higher proportion of acute care provided on units in public mental health facilities which are not included in this database.
6. This was done by stratifying or by subdividing the overall population into 5 age groups, 2 genders, and 2 diagnostic groups (psychotic/not psychotic), or

20 strata in total. Relative percentages were calculated for each of the 20 strata, as well as the corresponding strata in each of the 7 generic groups based on insurance. Based on the relative size of these strata a weight was computed for each of the 140 possible combinations, and then assigned to each patient based on his or her personal characteristics and type of insurance. By using these weights, each insurance subgroup is made equal to the overall population in respect to its age, gender, and diagnostic (psychotic) profile.

7. In these analyses, only adults on psychiatric units, between the ages of 18 and 65, who did not die while in the hospital, were selected for analysis. In addition, all cases were excluded from a period of time, i.e. 30 days, at the end of the period of available data, for an analysis of the corresponding recidivism rate, i.e. 30 day. Otherwise, patients admitted during the final month would not have had the required 30 day chance to be rehospitalized, thus, artificially lowering the rates. The longer the period is, the more is the biasing effect, and the greater the cost of its correction through the exclusion of cases.
8. These include: age; the following diagnoses— senile/presenile organic psychosis, alcohol/drug induced psychosis, other organic induced psychosis, paranoid disorder, other nonorganic disorders, psychiatric disorder specifric to childhood, sexual deviations, physiological malfunction resulting from mental disorder, acute reaction to stress, specific nonpsychotic disorder due to organic conditions, disturbance of conduct, disturbance of emotions, hyperkinetic syndrome, specific delays in development, psychological factors associated with disease, mental retardation; and the following procedures— psychiatric testing/evaluation, psychiatric interviews, individual psychotherapy, and referral to psychiatric rehabilitation, none of which had an probability of less than .07.

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