How do Trends for Behavioral Health Inpatient Care Differ from Medical Inpatient Care in U.S. Community Hospitals?

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Abstract

Background: Inpatient care in the United States accounts for one third of the health care expenditures. There exists a well-established trend towards fewer inpatient admissions and shorter lengths of stay for all inpatient care, which can be attributed to cost containment efforts through managed care and advances in treatment technologies. However, different illnesses may not necessarily share the same pattern of change in inpatient care utilization. In particular, mental health and substance abuse (MHSA) care has experienced a particularly dramatic growth of specialized managed behavioral organizations, which could have led to an even faster decline.

Aims of the Study: This study contrasts the trends of MHSA inpatient care in U.S. community hospitals with medical inpatient care over the years 1988 to 1997. It also analyzes the trends for subgroups of MHSA stays by diagnostic groups, age and primary payer.

Methods: We use the National Inpatient Sample (NIS) from the Health Care Cost and Utilization Project (HCUP) to estimate both number of inpatient discharges per 1,000 population and average length of stay over the years and relate the two indices. Inpatient MHSA stays are categorized into subgroups by age, primary payer of the care, and diagnostic group. We use the Clinical Classification Software (CCS) to distinguish between affective disorders, schizophrenia and related disorders, other psychoses, anxiety and related disorders, pre-adult disorders, and alcohol-, substance- related mental disorders and other mental disorders. Trends of population adjusted discharges and length of stay were tested using a weighted least squares method.

Results: Population-adjusted MHSA discharges from community hospitals increased by 8.1% over the study period, whereas discharges for all conditions decreased. Within MHSA discharges, the 20-39 and 40-64 age groups experienced significant increase relative to other age group; the increase was particularly high for affective and psychotic disorders, which are only partially offset by a decrease for other diagnostic groups. Hospitalization for both MHSA and medical conditions displayed trends towards shorter lengths of stay, but with the decline for MHSA stays steeper (40%) than for all stays (21%). The reduction in length of stay not only applied to the privately insured, for which managed behavioral health care had the highest penetration rate, but held for all other payers as well, although the rate of decline is higher for private insurance than for other insurance. Inpatient stays with pre-adult disorders displayed the greatest percentage decline for both population-adjusted discharges and average length of stay.

Implication for Health Care Provision and Use: Different pattern of utilization emerged for MHSA inpatient care as compared to hospitalization for all medical care over the years 1988-97. The more rapid decline in length of stay for MHSA stays than for all stays may have been a result of greater incentive for cost containment and therefore more intensive care management, and advances in treatment technology, especially medication. However, the fast decline in length of stay may also have led to repeat hospitalization as a result of premature discharges for patients with affective or psychotic disorders. Some financial incentives, such as case-rates or DRG-type payments to hospitals could have contributed to such adverse effects. Increases in discharges for severe disorders could also be a consequence of shifts from long-term facilities (for which no comparable data are available) to community hospitals, although the largest absolute and relative increases were for affective disorders rather than schizophrenia or other psychoses, the two disease subgroups that make up the majority of the institutionalized patients. International comparisons, assisted by new data, may help disentangle the effect of institutional change and that of development in treatment technology or practice pattern.

Background

Inpatient care in the United States accounts for one third of the national health care expenditures.[1,2] Because of the high cost per service unit, inpatient care is a prime target for utilization review and other cost containment strategies. The pressure of cost containment, together with technical advances in medical care, such as the increasing use of less invasive surgical techniques or more effective medications, have led to a decline in admissions and length of stay for the last 15 years.[3,4] These general trends, however, need not apply uniformly to all conditions or treatments, as has been suggested for cardiovascular and obstetrical inpatient procedures.[3]

It is generally believed that inpatient care for mental health and substance abuse (MHSA) reasons has followed the general trend, probably with an even faster decline as the growth

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of managed care in the form of managed behavioral health organizations has been especially dramatic.[5] An earlier study of psychiatric inpatient care in the United States reported a large drop in the number of inpatient days between 1988 and 1994, although the decline was caused by change in mental health specialty institutions, not community hospitals, which actually saw an increase.[6]

Meanwhile, a declining trend is found for the expenditure of psychiatric care as a proportion of total inpatient care, and for the discharge rate and average length of stay of alcohol dependence syndrome inpatient care, in countries where managed care is unusual or not growing on a comparable scale.[7,8] The coincidence of the trends across countries suggests that part of the declines in inpatient utilization in the U. S. may have been caused by treatment advances, especially the availability of more effective or better-tolerated medications (atypical antipsychotics and new antidepressants, in particular). However, these studies were based on aggregate OECD data that do not allow us to comment on possible changes in the composition of MHSA inpatient care.

This paper studies the U. S. time trends in more detail. It provides a new comparison by contrasting mental health and substance abuse inpatient care in community hospitals with medical inpatient care over the years 1988-1997. It separately analyzes different diagnostic groups. The major indicators we examine include population adjusted discharges and average length of stay, which are also examined for patients of different age groups and insurance status. While beyond the scope of this analysis, it would be of interest to see whether similar results for specific conditions hold in other OECD countries whose aggregate trends regarding the share of inpatient behavioral care costs are similar to the US.

Data and Methods

Data

We use the National Inpatient Sample (NIS), a major product of the Health Care Cost and Utilization Project (HCUP), conducted at the Agency for Health Care Research and Quality (AHRQ), from 1988 to 1997 to estimate trends of mental health and substance abuse inpatient care as compared to inpatient care for any purpose in the U.S. The NIS is designed to approximate a 20 percent sample of U.S. community hospitals, defined by the American Hospital Association (AHA) to be "all nonfederal, short-term (with an average length of stay less than 30 days), general, and other specialty hospitals, excluding hospital units of institutions." The NIS is a stratified sample of hospitals based on the following five stratification parameters: (i) ownership/control; (ii) bedsize; (iii) teaching status; (iv) urban/rural location; (v) U.S. region. All discharge records within each selected hospital were included in the sample. Each year, the sample contains 5-7 million records and 800-1,000 hospitals.

Although the NIS sample was designed to represent the nation, the inclusion of hospitals in the sample is restricted by the non-universal participation by the U.S. states. The number of participating states varies across years, with the latest release of NIS (1997) containing data from 22 states. According to one of the technical documentations of NIS,[9] most of the estimates from NIS are consistent with estimates from the National Hospital Discharge Survey (NHDS); particularly, for estimates of interest in the current study, total discharges by age group and psychiatric diagnosis, and length of stay by payer and psychiatric diagnosis, no significant difference has been shown in the estimates derived from the two data sets. Therefore we believe estimates in this study are reliable estimates for the nation.

Excluded from the data are long-term institutions and alcoholism/chemical dependency treatment facilities. Specialty units within community hospitals, for example, units for psychiatric, rehabilitation and long-term care are generally included, although several states do not provide documentation to identify them. Only one state (South Carolina) explicitly excluded such specialty units from the data.

Methods

We study two major indicators of inpatient care utilization: number of discharges in a year per 1,000 population and average length of stay (ALOS). Length of stay approximates the intensity or content of care. On the one hand, increased admission rates may be associated with shorter stay durations because of better case-mix of the admitted patient pool. On the other, shortened length of stay may result in relapses and therefore more episodes of hospitalization as a result of inadequate treatment, especially if case-mix worsens. Trends in either indicator of utilization, and interaction of the two, may vary across different subgroups as a result of interaction between clinical need and developments in the financing and management of care. Therefore we examine both the overall and the group-specific trends.

We categorize inpatient stays into subgroups by age of the patients (0-19, 20-39, 40-64, and 65+), primary expected payer of the care (insurance status) and principal diagnosis at discharge. There are six types of primary payer as coded in HCUP NIS: Medicare, Medicaid, private insurance including HMOs, self-pay, no charge, and other insurance. Because of the much smaller sample size of the last three categories, we group the three into one category in order to produce reliable estimates and label it as "Other" payers.

We use the Clinical Classifications Software (CCS) developed by AHRQ to classify ICD-9 mental health diagnoses into several representative subcategories, including Alcohol-related mental disorders (CCS 66), Substance-related mental disorders (CCS 67), Affective disorders (CCS 69), Schizophrenia and related disorders (CCS 70), Other psychoses (CCS 71), Anxiety, somatoform, dissociative, and personality disorders (CCS 72), Pre-adult disorders (CCS 73; including attention deficit, disruptive disorders and other disorders) and other mental conditions (CCS 74). (For ICD-9 code grouped under each of the categories, see CCS program file, available at www.ahcpr.gov/ data/hcup/ccs.htm.) "Mental health and substance abuse (MHSA) stays" in this study refers to inpatient stays with a primary diagnosis at discharge that falls into any of the eight
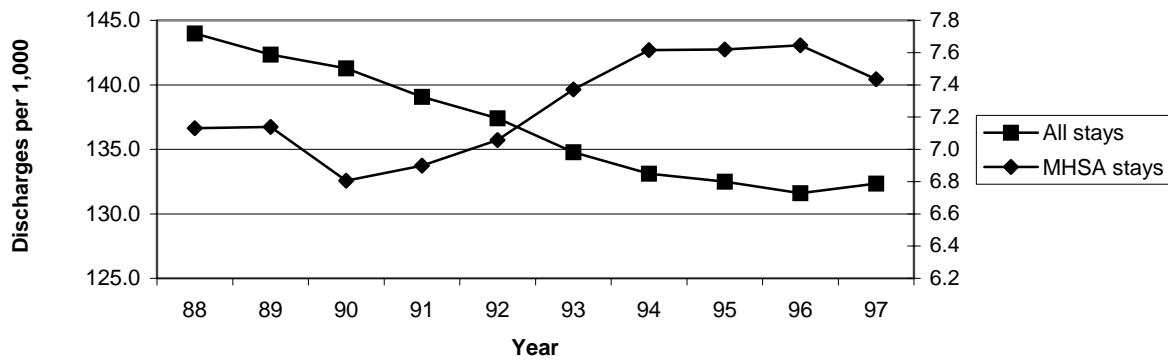
Y. BAO AND R. STURM

Figure 1. Discharges per 1,000 population: MHSA stays vs. all stays, 1988-97.

CCS diagnostic groups. For the purpose of subgroup analysis, we pool CCS 66, CCS 67 and CCS 74, since the three diagnostic groups showed similar trends and grouping them makes it easier to present the results.

To account for the complex design of the HCUP-NIS sample, the SUDAAN statistical package was used to estimate total number of discharges, average length of stay and their standard errors. Discharge per 1,000 population is calculated by dividing the estimated total discharges by the appropriate population estimates from the Census bureau. In order to test trend over years for both the overall and the subgroup estimates, we adopt a method of weighted least squares, with the weights being the inverse of the variance of each estimated statistics (either discharge per 1,000 or ALOS) in the time series, and a year index (from 1988 to 1997) as the independent variable.[10] Estimated coefficient of the time index provides an estimate for the average annual growth of each utilization index and its significance serves as a test for statistically significant trend over the study period. It's worth noticing that the estimated time trend and its statistical significance indicates whether the trend is consistent over the study period; indices with consistent trend in most of the earlier years but a changing pattern in later years may be tested as having insignificant time trend.

Results

Discharges

Throughout the study period, the total number of discharges in the country for all stays remained stable at around 35 million annually (discharge in 1997 reflects a .7% increase relative to 1988). Given that the U.S. population has kept growing during the study period, discharge per 1,000 population has *decreased* by 8% and the trend is statistically significant (p=.000). However, total number of discharges for MHSA inpatient care *increased* by 18% over the same period. Net of the population growth, there is an 8% growth of MHSA hospital stays per 1,000, and the trend of growth during the ten years is statistically significant (p=.000). **Figure 1** shows the trend of discharge per 1,000 for MHSA stays versus all stays.

Breaking the population into four age groups, **Figure 2** compares the trend of population adjusted MHSA discharges across age groups. The estimation shows a decrease in discharge per 1,000 population for the youngest and oldest groups (a decrease of 5.2% and 7.6%, respectively), but increase for the two middle groups. What is worth noticing is the 28.0% increase for the 40-64 group over the ten years,
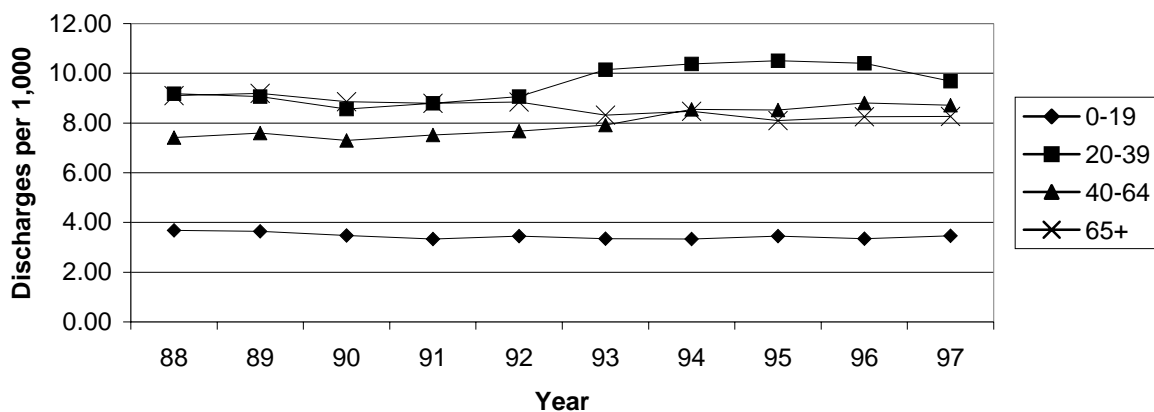

Figure 2. MHSA discharges per 1,000 population by age groups, 1988-97.

Table1. Discharges per 1,000 population at community hospitals in the U.S., 1988-97.

		1988	89	90	91	92	93	94	95	96	97	% change (97 vs. 88)	p-vale of trend test
All Stays***		143.86	142.22	141.17	138.96	137.28	134.67	133.00	132.39	131.48	132.23	-8.09	0.000
		(2.59)	(2.57)	(2.37)	(2.39)	(2.46)	(2.18)	(2.05)	(2.13)	(2.13)	(2.23)		
MHSA Stays													
All MHSA Stays***		5.50	5.52	5.20	5.31	5.49	5.82	6.08	6.10	6.14	5.94	8.11	0.001
		(0.28)	(0.25)	(0.26)	(0.25)	(0.25)	(0.24)	(0.25)	(0.28)	(0.30)	(0.26)		
By Age	0-19	2.28	2.25	2.08	1.95	2.08	2.00	2.00	2.13	2.04	2.16	-5.18	0.231
		(0.18)	(0.16)	(0.16)	(0.16)	(0.17)	(0.14)	(0.14)	(0.16)	(0.16)	(0.17)		
	20-39***	7.95	7.84	7.34	7.58	7.85	8.93	9.15	9.27	9.16	8.43	6.00	0.000
		(0.46)	(0.39)	(0.41)	(0.40)	(0.40)	(0.43)	(0.44)	(0.51)	(0.57)	(0.44)		
	40-64***	5.80	6.01	5.73	6.00	6.18	6.47	7.14	7.14	7.47	7.42	28.01	0.000
		(0.31)	(0.28)	(0.27)	(0.30)	(0.29)	(0.28)	(0.30)	(0.31)	(0.35)	(0.33)		
	65+*	5.78	5.93	5.66	5.64	5.75	5.27	5.46	5.12	5.30	5.34	-7.65	0.010
		(0.33)	(0.32)	(0.31)	(0.32)	(0.33)	(0.24)	(0.26)	(0.22)	(0.24)	(0.24)		
By Diagnosis at Discharge (CCS)	Affective***	1.64	1.64	1.64	1.72	1.81	1.88	2.02	2.12	2.18	2.23	36.32	0.000
		(0.09)	(0.09)	(0.10)	(0.10)	(0.10)	(0.09)	(0.10)	(0.10)	(0.10)	(0.10)		
	Alc-sub-other	2.55	2.59	2.27	2.27	2.26	2.49	2.57	2.53	2.47	2.17	-14.91	0.278
		(0.18)	(0.14)	(0.13)	(0.13)	(0.13)	(0.14)	(0.14)	(0.17)	(0.19)	(0.14)		
	Anxiety*	0.26	0.27	0.25	0.25	0.26	0.27	0.25	0.25	0.25	0.24	-8.18	0.081
		(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)		
	Other psychosis**	0.21	0.20	0.23	0.22	0.22	0.23	0.25	0.22	0.23	0.23	11.40	0.023
		(0.01)	(0.01)	(0.02)	(0.02)	(0.02)	(0.01)	(0.02)	(0.01)	(0.01)	(0.01)		
	Pre-adult	0.09	0.08	0.08	0.05	0.06	0.08	0.06	0.07	0.06	0.06	-31.50	0.104
		(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)		
	Schizophrenia***	0.75	0.75	0.73	0.80	0.88	0.88	0.93	0.91	0.94	1.01	34.68	0.000
		(0.06)	(0.06)	(0.06)	(0.07)	(0.07)	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)		

Notes: standard errors in parentheses; see text for details on mental health diagnosis classification;
Trends are tested by weighted least squares; significant trend at p<.10; **significant trend at p<.05; ***significant trend at p<.001.
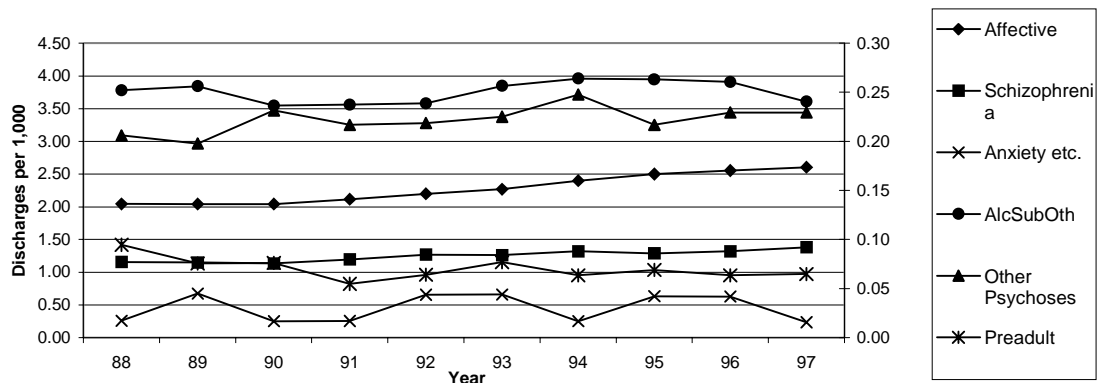
Figure 3. MHSA discharges per 1,000 population by diagnosis, 1988-97.
Note: Pre-adult disorder and Other psychoses are read from the right axis

with the most abrupt change taking place around years 1993 and 1994. The same pattern is observed for the 20-39 group, for which discharges per 1,000 had some significant growth around years 1992-1996 and then declined in 1997. Among the four groups, trend tests show significant growth for both the 20-39 and the 40-64 group (p=.000) and significant decline for the oldest group (p=.010).

A mixed picture emerged for number of discharges across psychiatric diagnostic groups. It increased significantly for schizophrenia and related disorders (+34.7%, p=.000 for trend test) and affective disorders (+36.3%, p=.000 for trend test), and less for other psychoses (+11.4%, p=.023 for trend test). Among the diagnosis categories that have seen a decline in discharges per 1,000 over the years, pre-adult disorder demonstrated the largest change (a 31.5% decrease, p= .104 for trend test) as compared to baseline. Discharges with anxiety and related disorders declined by 8.2% (p=.081); the group that contains alcohol-related, substance-related, and other mental disorders displayed a decrease of almost 15% (p=.278). Result of MHSA discharges by diagnosis (**Figure 3**) are consistent with that by age group, given that the 20-39 and 40-64 groups represent the high-risk population for affective, schizophrenia, and other psychosis disorders.

Table 1 shows the yearly estimates of discharges per 1,000 population and the test results for trend across years.

To get a complete picture of the utilization pattern of MHSA inpatient care, we also examine the trend in length of stay across years and relate the two measures of utilization.

Length of Stay

Throughout the study period, the average length of stay (ALOS) for MHSA stays and for all stays continued to decline (**Figure 4**). MHSA hospitalization, which used to last more than twice as long as all stays in 1988, was only longer by 62% in 1997, suggesting a faster decline in ALOS for MHSA stays compared to other somatic inpatient care. As indicated by the trend test, the length of MHSA stays, on average, declined by 0.6 day annually, with especially fast decline seen in the later years of the study period (after 1992). Overall, the 1997 level of ALOS represented an almost 40% decline as compared to the ALOS in 1988. The corresponding change for all stays is a decline of about 21%. Both series displayed significant trend towards shorter length of stay (p=.000).
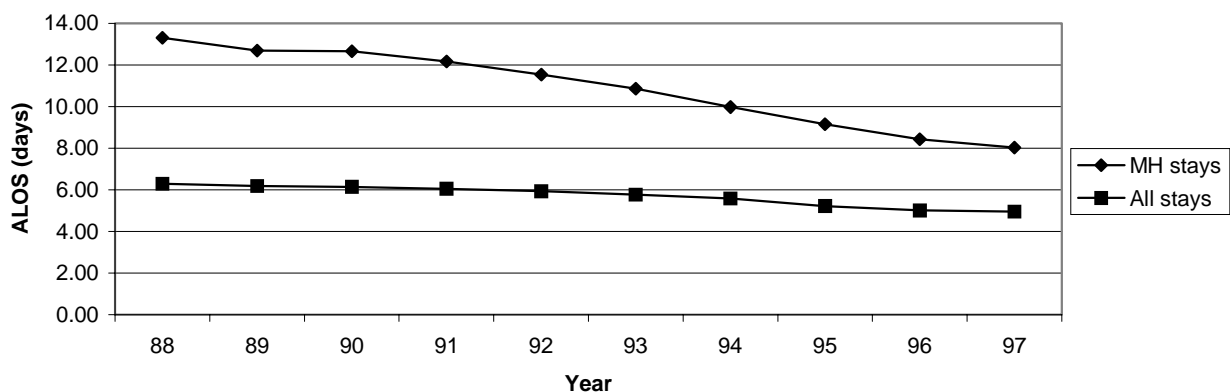

Figure 4. Average length of MHSA stays and of all stays, 1988-97.

Table 2. Average length of stay at community hospitals in the U.S., 1988-97.

		1988	89	90	91	92	93	94	95	96	97	% change (97 vs. 88)	p-vale of trend test
All Stays***		6.29	6.18	6.14	6.05	5.93	5.77	5.58	5.23	5.02	4.95	-21.30	0.000
		(0.05)	(0.05)	(0.05)	(0.05)	(0.06)	(0.06)	(0.09)	(0.05)	(0.05)	(0.04)		
MHSA Stays													
All MHSA Stays***		13.30	12.70	12.66	12.17	11.54	10.87	9.98	9.15	8.43	8.02	-39.69	0.000
		(0.36)	(0.30)	(0.33)	(0.36)	(0.29)	(0.46)	(0.31)	(0.32)	(0.31)	(0.20)		
	Medicaid***	13.05	13.20	14.03	13.17	12.14	11.77	10.54	9.49	8.58	8.57	-34.36	0.000
		(0.85)	(0.67)	(0.75)	(0.73)	(0.53)	(0.80)	(0.46)	(0.52)	(0.49)	(0.33)		
	Medicare***	15.57	15.03	14.75	14.48	14.28	13.98	13.11	12.06	11.63	10.65	-31.59	0.000
By Payer		(0.50)	(0.51)	(0.40)	(0.37)	(0.35)	(0.48)	(0.43)	(0.36)	(0.52)	(0.23)		
	Other***	8.97	8.39	8.01	8.22	8.07	7.78	6.95	6.97	6.29	5.93	-33.98	0.000
		(0.58)	(0.50)	(0.31)	(0.41)	(0.44)	(0.47)	(0.30)	(0.35)	(0.34)	(0.47)		
	Private***	14.39	13.54	12.63	11.78	10.41	9.14	8.17	7.26	6.47	6.27	-56.40	0.000
		(0.53)	(0.35)	(0.33)	(0.38)	(0.26)	(0.35)	(0.27)	(0.25)	(0.21)	(0.17)		
	Affective***	16.08	15.28	15.16	14.55	13.86	12.99	11.66	10.42	9.31	8.76	-45.56	0.000
		(0.50)	(0.36)	(0.46)	(0.41)	(0.32)	(0.42)	(0.33)	(0.30)	(0.24)	(0.17)		
	Alc-sub-other***	10.76	10.16	9.46	8.73	8.08	7.27	6.63	6.13	5.82	5.24	-51.29	0.000
		(0.57)	(0.39)	(0.35)	(0.34)	(0.31)	(0.29)	(0.22)	(0.26)	(0.37)	(0.28)		
By Diagnosis at	Anxiety***	8.90	9.22	9.35	9.70	9.31	9.44	9.07	8.46	7.78	6.10	-31.43	0.000
Discharge (CCS)		(0.55)	(0.68)	(0.48)	(0.83)	(0.66)	(1.56)	(1.54)	(1.50)	(1.05)	(0.35)		
	Other psychosis***	12.06	11.45	11.12	13.10	11.16	11.20	10.86	10.72	9.02	9.49	-21.37	0.000
		(0.52)	(0.53)	(0.55)	(1.22)	(0.60)	(0.56)	(0.68)	(0.54)	(0.35)	(0.39)		
	Pre-adult***	24.51	21.30	21.48	18.99	16.84	14.63	13.15	13.06	10.64	9.92	-59.52	0.000
		(3.18)	(2.67)	(2.72)	(1.74)	(1.63)	(1.41)	(0.90)	(1.35)	(0.84)	(0.93)		
	Schizophrenia***	16.36	16.57	17.67	16.87	16.04	16.56	15.35	14.10	13.09	12.41	-24.13	0.000
		(0.69)	(1.00)	(0.87)	(0.75)	(0.78)	(0.87)	(0.57)	(0.53)	(0.57)	(0.42)		

Notes: standard errors in parentheses; see text for details on mental health diagnosis classification;
Trends are tested by weighted least squares; *significant trend at p<.10; **significant trend at p<.05; ***significant trend at p<.001.
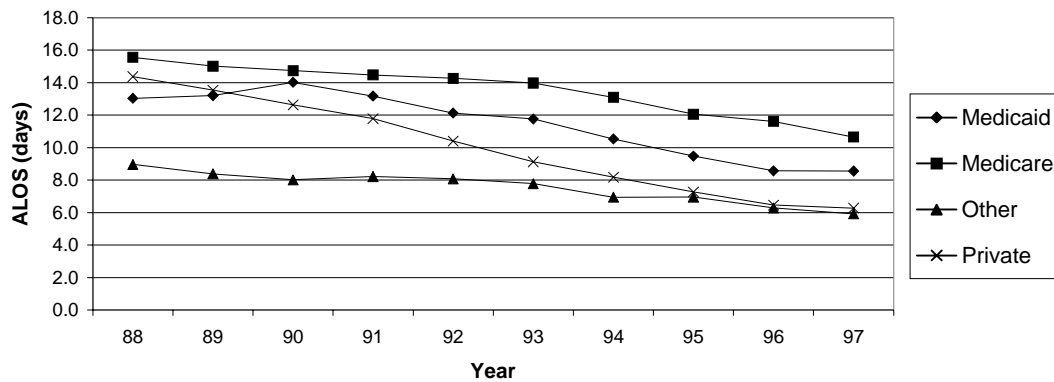
Figure 5. Average length of MHSA stays by primary payer of the stay, 1988-97.

Figure 5 shows how the trend in length of MHSA stays varies with how the care is financed. Despite a general downward trend towards shorter stay, inpatient stays with different payers display different trend slopes. Private insurance (including HMOs) has experienced the fastest decline. In 1988, ALOS with private insurance was about 1.2 days shorter than with Medicare, but about 1.4 days longer than with Medicaid. In 1997, the gap between Medicare and private insurance has widened to 4.4 days, and stays paid by Medicaid were on average 2.3 days longer than by private insurance. The rate of decline for private insurance, as indicated by the annual compound percentage change calculated from the mean, was greater in more recent years (an annual growth rate of –9.0% after 93) than it had been (-7.8%) in earlier years. Over the years, the data indicated a significant trend (p= .000) towards shorter stay regardless of different insurance status, although the slopes of decline estimated by the trend test are quite different, namely, -0.66, -.58, -.31, and -.93 for Medicaid, Medicare, other payer, and private insurance, respectively.

As shown in **Figure 6**, among the six diagnostic groups, pre-adult disorder started out with a much longer stay than all the other groups (almost 25 days, with the next longest stay at 16.4 days for schizophrenia and related disorders), and experienced the sharpest decline (60%) relative to the

baseline (with p=.000 for trend test). In 1997, stays with pre-adult disorders had an ALOS lower than schizophrenia and almost the same as affective disorder and other psychoses. Length of stay for other disorders also declined and was much shorter in 1997 than in earlier years. This includes a 46% decline over the decade for affective disorders and a 24% decline for schizophrenia. The trend tests suggest that the decline in ALOS is highly significant for each diagnostic group (p=.000). Results for the analysis of ALOS are shown in **Table 2**.

Discussion

Analysis of the HCUP (NIS) over the years 1988 to 1997 indicated that inpatient care for MHSA in community hospitals changed differently than medical inpatient care. Population adjusted MHSA stays increased while population adjusted all stays decreased. In terms of average length of stay, MHSA stays displayed a steeper decline than stays for all purposes. At the same time, trends are not synchronized among different subgroups of MHSA stays, either by age, payer (insurance status), or by diagnosis.

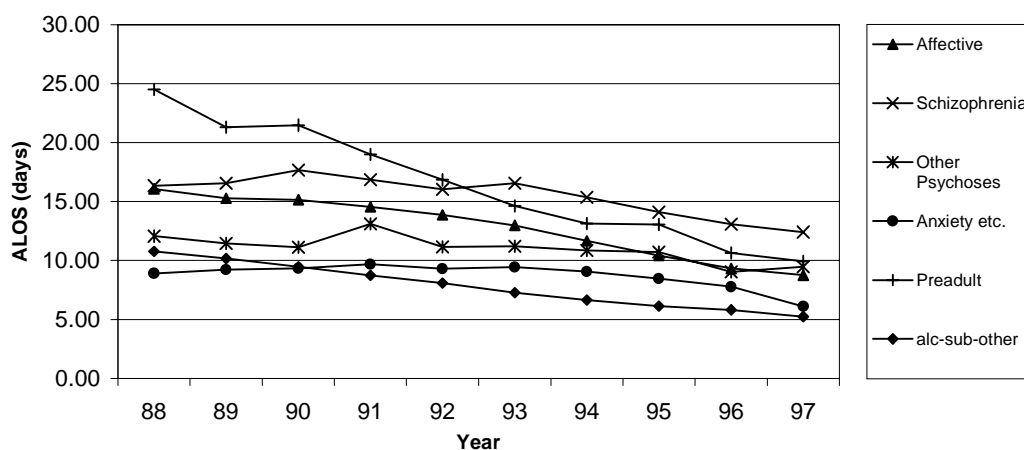Decline in length of stay during the study period seems to

Figure 6. Average length of MHSA stays by primary diagnosis at discharge, 1988-97.

be universal, which could reflect a trend towards earlier discharges conditional on casemix and/or more use of outpatient and other facilities for rehabilitation purposes as compared to years prior to 1988. The decline in length of stay was greater for MHSA stays than for medical stays. However, MHSA stays also started out with much longer average length of stay, which provided payers with additional incentive to cut inpatient days for mental health and substance abuse care. In addition, effective psychotropic medications that became available during the study period may have played a role in substituting outpatient care and medication for at least part of inpatient mental health care.

Following the same logic, managed care and scientific advances in treatment would suggest a similar pattern for the other indicator of inpatient care utilization: population adjusted MHSA discharges versus discharges for all stays. However, the opposite is found: population-adjusted MHSA discharges increased while population-adjusted total inpatient discharges declined. The increase was particularly high for affective and psychotic disorders, which more than offset a decrease for other MHSA diagnoses. The most likely explanation is a shift from long-term institutions to community hospitals, a factor documented for the early 1990s.[6]

Our analysis of the HCUP data provided some evidence for this hypothesis. The overall increase (from 1988 to 1997) of .4 (5.9-5.5) per 1,000 of MHSA discharges factors into the following: .57+.42-.39-.2=.4: the increase of Medicaid funded discharges contributed .57; the increase of Medicare funded discharges contributed .42; the decrease of discharges funded by private insurance contributed -.39; and the decrease in discharges funded by other payers contributed another –.2. (Results of MHSA inpatient discharge rate by primary payers are not shown in the table.)

Focusing on MHSA stays with affective, schizophrenia, or other psychosis disorders as the primary diagnosis (the three diagnostic groups that reported growth in discharges per 1,000 over the years), we see that the increased stays are financed by all primary payers, but with Medicaid and Medicare contributing much more (an increase of .37 and .36 per 1,000 from year 1988 to 1997,respectively) than private insurance (.13).

Since a large proportion of inpatient stays at long-term institutions are funded by public insurance rather than private, an increasing role of public insurance in funding treatment in the community setting may suggest a shift of patients from the long-term institution to community hospitals. However, at the same time, discharges with affective disorders at community hospitals experienced the same or larger increase, both in absolute and relative terms, than with schizophrenia and other psychosis, which are the two types of diagnoses most likely to be associated with previously institutionalized patients.

Therefore patient shift from the long-term institutions to community hospitals is unlikely to be the only explanation of the increased MHSA discharge. For affective disorders, it seems more likely that the increased discharges reflect repeat hospitalizations that might be a consequence of shorter stays (the correlation coefficient for the two time series: discharge per 1,000 and ALOS for affective disorder being –0.99).

Unfortunately, the data are limited to community hospitals, which is a major limitation of this study for disentangling different factors.

The trend in length of stay of MHSA inpatient care across primary payers (insurance status) confirms the widely held belief that care financed by private insurance would incur the largest decline in utilization because it has the greatest penetration of MBHOs. However, our results indicate that the decline in length of stay paid by other sources (Medicare, Medicaid and other insurance) was also significant, with the 1997 estimate representing a one-third reduction from that of 1988. The increasing adoption of managed behavioral care in the public sector (Medicaid and other public insurance) can certainly explain part of the story.[11] However, in addition to implications of financial incentives, the synchronized trend across insurance status revealed some general pattern of medical practice in treating mental health and substance abuse patients.

Studies on trends of psychiatric inpatient care in other developed countries have so far been scarce, but the current literature does provide evidence for this general treatment pattern despite diverse care financing or management mechanisms. Two studies of psychiatric hospitalization in Denmark[12,13] provided evidence of decreased admission for all mental health diagnostic groups except schizophrenia into psychiatric hospitals and departments, and of decline in length of stay, which suggested a "change in the psychiatric service system from mostly hospitalization to outpatient treatment and community psychiatric treatment". Findings of international comparisons of psychiatric inpatient care also support the notion of parallel patterns across industrialized countries in recent years.[7,8]

Conclusion

This paper focuses on the trend(s) in inpatient care in the U.S. over the years 1988 to 1997, a time of significant institutional change and change in treatment techniques in mental health and substance abuse care. MHSA hospitalization in community hospitals has experienced different changes than medical inpatient care, although heterogeneities also exist across different subgroups of MHSA stays.

Our findings suggest that further research using micro-level, longitudinal data on the interaction among managed behavioral care, nature of the diseases, and evolution of practice patterns for treating mental illness will be fruitful in informing policy. Furthermore, it would be important for health care planning to understand whether the more detailed trends that appear in the US data, such as the increase in number of discharges and declines in length of stay for affective disorders, also exist in other countries, and therefore cannot be entirely attributed to the development of managed care in the U.S. Such data for other countries have not yet appeared in the literature. With some additional investment in collecting new data, international comparisons might offer even more valuable perspectives to inform policy.

Y. BAO AND R. STURM

Acknowledgments

References

1. Heffler S, Levit K, Smith S, Smith C, Cowan C, Lazenby H, Freeland M. Health spending growth up in 1999; faster growth expected in the future, *Health Aff*, 2001; **20** (2): 193-203.
2. National Center of Health Statistics. *Health, United States, 1999* with health and aging chartbook. Hayattsville, MD: 1999.
3. Berstein AB, Hing E, Burt CW, Hall MJ. Trend data on medical encounters: tracking a moving target. *Health Aff*, 2001; **20** (2): 58-72.
4. Popovic JR, Hall MJ. 1999 National Hospital Discharge Survey. National Center for Health Statistics. *Advance Data* 2001; No. 319.
5. OPEN MINDS. *Managed behavioral health market share in the United States, 2000-2001* Gettysburg, PA: OPEN MINDS, 2000.
6. Mechanic D, McAlpine DD, Olfson M. Changing patterns of psychiatric inpatient care in the United States, 1988-1994. *Arch Gen Psychiatry*. 1998; **55** (9):785-91.
7. Sturm R., Bao Y. 2000. Psychiatric care expenditures and length of stay: trends in Industrialized countries. *Psychiatric Serv* 2000; **51** (3): 295.
8. Bao Y, Sauerland D, Sturm R. Changes in Alcohol-related inpatient care - an international trend comparison. *J Addict Dis*, 2001; **20** (2):97-104.
9. AHCPR. Comparative analysis of HCUP and NHDS inpatient discharge data. Technical supplement 13, NIS Release 5. Available at http://www.ahrq.gov/data/hcup/niscomp.htm. Accessed September, 2001.
10. Gardocki GJ, Pokras R. Utilization of short-stay hospitals by persons with heart disease and malignant neoplasms: National Hospital Discharge Survey, United States, 1977. National Center for Health Statistics. *Vital Health Stat.* 1981; **13** (52).
11. SAMHSA. *State profile on public sector managed behavioral health care and other reforms.* Rockville, MD: 1998.
12. Sogaard HJ, Godt HH, Blinkenberg S. Trend in psychiatric hospitalization and changes in admission patterns in two counties in Denmark from 1977 to 1989. *Soc Psychiatry Psychiatr Epidemiol* 1992; **27**(6): 263-9.
13. Munk-Jorgensen P, Lutzhoft JH, Jensen J, Stromgren E. Trends in psychiatric hospitalization in Denmark: a 10-year register-based investigation. *Acta Psychiatr Scand* 1992; **86** (1): 79-83.