
Inpatient Psychiatric Care of Medicare Beneficiaries With State Buy-In Coverage

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Administrative data were used to compare lengths of stay, Medicare payment, total and average daily costs, discharge destinations, rehospitalizations, and emergency room (ER) use of dually eligible and non-dually eligible Medicare inpatients admitted for a psychiatric diagnosis. Regressions controlled for State buy-in coverage as a proxy for dual eligibility, hospital type, and beneficiary sociodemographic and clinical characteristics. Measures of severity within diagnostic category were limited to comorbidities. Among disabled beneficiaries, dually eligible beneficiaries had lower costs and shorter stays. Among elderly and disabled persons, dually eligible beneficiaries had higher rates of rehospitalization, post-discharge ER use without admission, and discharge to destinations other than self-care.

INTRODUCTION

Medicare beneficiaries with psychiatric disorders have been identified as a potentially vulnerable subpopulation (Mumford and Schlesinger, 1985; Roybal, 1988; Blazer, 1996; Haber and Mitchell, 1997). This group includes the elderly, whose behavioral health care needs are disproportionately under-recognized, under-treated, and under-researched (German, Shapiro, and Skinner, 1985; Leaf et al., 1985; NIH Consensus Development Panel on Depression in Later Life, 1992; Faulkner

and Gray, 1996), and the disabled, about one-quarter of whom are likely to qualify for Medicare on the basis of chronic and severe psychiatric impairment (Social Security Administration, 1995). Concern has been voiced that Medicare and Medicaid coverage of psychiatric treatment is inadequate and that the structure of mental health benefits has a strong impact on access to care and the potential for cost-shifting (Mumford and Schlesinger, 1985; Roybal, 1988; Domenici, 1993; Blazer, 1996; Ettner, 1997a). A number of studies have documented the psychiatric utilization and expenditures of the Medicare population (Helbing and Latta, 1988; Freiman, Goldman, and Taube, 1990; Norquist et al., 1995; Cano et al., 1997; Rosenbach and Ammering, 1997; Rosenbach, Hermann, and Dorwart, 1997; Ettner and Hermann, 1998) and examined the impact of Medicare payment incentives on patterns of psychiatric care (Frank et al., 1987; Lave et al., 1988; Freiman and Sederer, 1990; DesHarnais, Wroblewski, and Schumacher, 1990; Wells et al., 1993).

Past research on psychiatric treatment patterns has generally been based on the entire Medicare population. Although in some cases the data were presented for groups defined by basis of Medicare eligibility (aged versus disabled versus end stage renal disease [ESRD]), little is known about the psychiatric service use of specific subgroups of interest and how it compares with utilization patterns among the predominant Medicare population. One at-risk group is beneficiaries who are dually eligible for Medicare and Medicaid.

Susan L. Ettner is with the UCLA School of Medicine. This article was prepared under Grant Number R29MH53698 from the National Institute of Mental Health. The opinions expressed are those of the author and do not necessarily reflect the views of the UCLA School of Medicine or the Health Care Financing Administration (HCFA).

Dually eligible beneficiaries are by definition indigent and include disproportionate numbers of women, minorities, and persons who are either very old or very young, unmarried, less well educated, and sick (McMillan et al., 1983; McMillan and Gornick, 1984; Thamer et al., 1996; Ettner, 1997b). Dually eligible beneficiaries have been shown to have higher overall utilization and costs, attributable in part to their higher medical morbidity and mortality rates and in part to their more comprehensive insurance coverage (McMillan et al., 1983; McMillan and Gornick, 1984; Haber and Mitchell, 1997). Yet less is known about differences in their patterns of treatment for specific conditions, such as psychiatric disorders.

Psychiatric disorders are likely to be particularly prevalent among dually eligible Medicare beneficiaries. Such disorders are generally associated with reduced employment and earnings and hence greater likelihood of qualifying for Medicaid (Mullahy and Sindelar, 1990; Frank and Gertler, 1991; Miller and Kelman, 1992; Ettner, Frank, and Kessler, 1997). Furthermore, poverty may contribute to poor mental health (Ezzy, 1993; Ettner, 1996). Past literature suggests that at least among the aged, dual eligibility is associated with higher rates of psychiatric admissions. Although Rubin, Wilcox-Gök, and Deb (1992) found no significant relationship between Medicaid coverage and utilization (hospital stays and physician visits) among a small sample of Medicare beneficiaries under age 65 who had a disabling mental disorder, McMillan et al. (1983) show that elderly dually eligible beneficiaries are hospitalized for mental disorders at more than twice the rate of Medicare-only beneficiaries. Temkin-Greener et al. (1992) showed that mental disorders were more likely to be the cause of the last hospitalization occurring in the year of death for dually eligible decedents than for Medicare-only decedents.

Although this evidence suggests that substantial numbers of Medicare beneficiaries are likely to be both dually eligible and mentally ill, no studies to date have examined differences in psychiatric treatment patterns to determine whether the resource use and access of dually eligible beneficiaries are similar to those of other Medicare beneficiaries with psychiatric disorders. The purpose of this study is to examine patterns of inpatient and followup care among Medicare beneficiaries admitted to general and psychiatric hospitals for primary psychiatric diagnoses during 1990. The analyses focus on differences in the care received by Medicare beneficiaries with and without State buy-in coverage. State buy-in coverage is used to approximate Medicare-Medicaid dual eligibility, as was done in previous studies (McMillan et al., 1983).

The analyses are based on Medicare administrative databases and to the extent possible control for confounding differences in other population characteristics between beneficiaries with and without State buy-in coverage. Aspects of psychiatric treatment examined in this study include the setting of care and total costs, charges, and Medicare payment associated with the hospital stay, along with the length of stay, costs per day, probability of discharge to self-care at home, time until rehospitalization for a primary psychiatric diagnosis, and probability of ER use for a psychiatric diagnosis that does not lead to a hospital admission.

METHODS

Study Cohorts

The study population was defined as all elderly and disabled Medicare beneficiaries who were admitted to a non-Federal psychiatric or general hospital (either to a

prospective payment system [PPS]-exempt psychiatric unit or other type of general hospital bed) for a primary psychiatric diagnosis (*International Classification of Diseases, Ninth Revision, Clinical Modification* [ICD-9-CM] code in the range 290-319) during 1990. Medicare beneficiaries with State buy-in coverage are compared with Medicare beneficiaries without such coverage. All analyses were performed separately for the elderly and disabled because of the very different clinical characteristics and utilization patterns of these two groups.

To ensure the completeness of the data, the hospital stays of the following beneficiaries were excluded: (1) those who had a primary payer other than Medicare, (2) those who participated in group health plans or had discontinuous Part A coverage for a reason other than death, either during the index stay or the followup period, (3) those who resided or obtained their inpatient treatment outside the United States or who had missing or unusable geographic information, or (4) those whose dates of service could not be reliably determined. These exclusions reduced the sample size by about 7 percent, from 476,756 to 441,529 hospital episodes. The sample was then further restricted to the first 1990 hospital admission of each beneficiary, yielding a final sample size of 300,322, which included 178,539 elderly and 121,783 disabled beneficiaries.

Sources of Data

The data sets used in the analyses were the 1989-91 inpatient standard analytic file and denominator files; 1990 Medicare cost reports, exempt units file, and provider of service (POS) file; the 1990 census; and the 1990 American Hospital Association (AHA) file. Years were chosen so that there would be 1 year of retrospective data and at least 1 year (and depending on the discharge date,

up to 2 years) of followup data for each stay. Inpatient claims from the standard analytic files were aggregated into separate hospital stays, identified through either discharge prior to readmission, a change of diagnosis-related group (DRG) for patients remaining in the same hospital, or a change of provider identification (ID) number for patients transferred to another facility.

Hospital stays were linked to (1) beneficiary characteristics during the year of admission from the appropriate denominator file, (2) hospital characteristics from the cost reports, exempt units, and POS files, merged by the Medicare provider ID, (3) area population characteristics from the 1990 census, merged by the beneficiary's ZIP Code of residence (or in a few cases, State of residence) in the year of admission, and (4) hospital affiliation with a health care system (e.g., hospital chain) from the AHA file. Finally, hospital stays were linked together longitudinally by beneficiary ID number to determine prior and subsequent hospitalizations (either in the same or different hospitals).

Outcomes

The dependent variables examined in this study are the total costs and Medicare payment associated with the hospital stay, length of stay (LOS), average costs per day, whether the beneficiary was discharged to self-care at home (versus all other discharge destinations), the number of days until rehospitalization in any hospital with a primary psychiatric diagnosis, and whether the beneficiary had an ER visit with a primary psychiatric diagnosis that did not lead to an admission during the year following discharge.

Medicare payment represents the amount Medicare actually paid the hospital for the stay, which depends on the payment methodology (the prospective payment sys-

tem [PPS] for general hospitals and the Tax Equity and Fiscal Responsibility Act [TEFRA] of 1982 methodology for psychiatric hospitals and exempt psychiatric units) and other factors. Costs represent actual resource use during the hospital stay. Although actual cost data were not available at the individual level, a proxy was constructed by (1) multiplying the beneficiary's routine and special care days by the hospital's routine and special care per diem costs, (2) multiplying ancillary charges within each cost center by the hospital's ratio of costs to charges (RCC) in that center, and (3) aggregating across all categories of costs. The cost analyses were limited to hospital stays for which RCCs could be obtained, either from the cost reports (general and psychiatric hospitals) or exempt units file (psychiatric hospitals and psychiatric units within general hospitals).

To get a better sense of whether hospital costs result from duration as opposed to intensity of care, LOS and costs per day were also examined. Beneficiaries who were admitted and discharged on the same day were defined to have a LOS of 1 day, because it was not possible to determine the times of admission and discharge. Because some hospitals may achieve shorter LOS by transferring patients to other facilities or releasing them to formal home care services, thereby shifting part of the costs of care, we also examine the probability that the beneficiary was discharged to self-care at home, versus all other destinations (including transfer to a hospital or nursing home, discharge to home care, and for a small number of persons, death before discharge).

Time until rehospitalization and ER use that does not lead to an admission are frequently used proxies for the quality of psychiatric inpatient care. Appropriate refer-

als for followup care and post-discharge monitoring by the hospital have previously been used as proxies for high-quality care for psychiatric inpatients (Dorwart et al., 1991). Shorter community tenure (i.e., days in the community before rehospitalization) may result from either worse quality of care during the initial hospitalization or the failure of the hospital to provide adequate post-discharge followup. Because of the variation in how psychiatric conditions are diagnosed and coded, rehospitalizations and ER visits for all primary psychiatric diagnoses were used, regardless of whether the diagnosis was the same as for the index hospital stay.

State Buy-In Coverage

The regressor of primary interest in this study is the indicator for whether the beneficiary has State buy-in coverage or not. Beneficiaries with State buy-in coverage comprise Medicare beneficiaries for whom States pay the Part B premium, which includes both the dually eligible (both the categorically eligible and medically needy) as well as other indigent beneficiaries, such as those eligible for the qualified Medicare beneficiary (QMB) program.¹ Medicaid beneficiaries with State buy-in coverage are likely to have higher resource use and worse utilization-based outcomes (e.g., time until rehospitaliza-

¹ QMB coverage is available to Medicare beneficiaries whose incomes do not exceed 100 percent of the Federal poverty level and whose assets do not exceed twice the threshold used by the Supplemental Security Income (Neumann et al., 1995); the QMB program pays the Part B premiums and cost-sharing requirements for eligible beneficiaries but does not cover the additional services required by the Medicaid program but not paid by Medicare, such as pharmaceuticals. States may also pay for Medicare Part B premiums but no other Medicare cost-sharing or other expenses for low-income Medicare beneficiaries with incomes up to 135 percent of the poverty level. More information on Medicaid coverage for low-income Medicare beneficiaries can be found on the web site of the HCFA (<http://www.hcfa.gov>).

tion) because they are in poorer health, and clinical need cannot be measured perfectly with existing databases.²

This group may also have higher costs as a result of more extensive insurance coverage, even though a very high proportion of Medicare beneficiaries have private supplemental insurance. According to 1994 Medicare Current Beneficiary Survey data, 67 percent of non-institutionalized Medicare beneficiaries have either individually purchased or employer-sponsored private insurance (Olin and Liu, 1998). However, medigap policies covering prescription drugs are less common, and medigap policies do not cover the differential between Medicare copayment rates for outpatient medical and mental health services or a number of other services used by the chronically disabled, such as homemaker services available under Medicaid waiver programs. Thus beneficiaries with State buy-in coverage, including Medicaid, still have somewhat more comprehensive insurance coverage even relative to Medicare beneficiaries with supplemental medigap coverage. Nonetheless, differences between beneficiaries with and without State buy-in coverage should be interpreted in the context that both groups have substantial insurance coverage.

Other Control Variables

The regression models also controlled for the setting of care and the sociodemographic and clinical characteristics of the beneficiary. Care setting was defined by whether the hospital was public, private not-for-profit, or private for-profit, in conjunction with whether the beneficiary was admitted to a psychiatric hospital, PPS-

² It is possible for the effect to go the other way, because higher income generally increases utilization, but the income effect is at least partially controlled in these analyses through the use of ZIP Code income measures.

exempt psychiatric unit of a general hospital, or general hospital bed. Beneficiary sociodemographic characteristics include age, sex, race (black, other, and unknown versus white), urban residence, and the average income of household heads in the beneficiary's ZIP Code of residence who are in the same age group, constructed from categorical data. The regression analyses use quartile indicators for the income measure.

Primary diagnosis and psychiatric comorbidities were based on the ICD-9-CM inpatient diagnoses coded for the hospital stay. All primary five-digit diagnosis codes in the range 290-319 were aggregated into the following categories: schizophrenia; bipolar disorder; other psychotic disorders; major depression; dysthymia; other depressive disorders; anxiety disorders; adjustment disorders; dementia; organic disorders other than dementia; substance disorders; personality disorders; disorders originating in childhood (e.g., mental retardation) and all other psychiatric disorders. Schizophrenia was chosen as the omitted category for the regression analyses because on average, it is one of the most severe and chronic types of psychiatric disorders. Secondary diagnoses in the range 290-319 were first classified in a similar fashion and then further aggregated into the following groups of disorders: psychotic, affective, personality, substance-related, disorders originating in childhood, and all other psychiatric comorbidities. The use of medical diagnoses was explored, but systematic undercoding in psychiatric hospital settings precluded their use.

Additional proxies for severity included the following: (1) whether the original basis of Medicare eligibility was disability (elderly only); (2) source of admission to the hospital (transfer from another facility; admission upon recommendation of the

facility's ER physician; admission at the direction of the courts or a law enforcement agency versus referral from a physician, clinic, or health maintenance organization [HMO]); and (3) whether the beneficiary was hospitalized for any primary or secondary psychiatric diagnosis during the previous year (controlling separately for the small number of cases in which the beneficiary had incomplete claims data for the year prior to the stay).

Estimation

First, descriptive data for the explanatory variables and outcome measures are presented separately for beneficiaries with and without State buy-in coverage. Data shown are proportions for categorical variables and means and standard deviations for continuous variables. Kaplan-Meier life tables that take censoring into account were used to calculate median lengths of stay and the probability of community tenure at 1 year after discharge (i.e., the probability that the person was not rehospitalized within 1 year). Statistical tests (chi-squared or ANOVA) of the differences are provided, although strictly speaking, they are not necessary because the analyses are based on entire populations, not samples. Because of the large population sizes, the cutoff used for type I error is 0.001 in all of the results shown. Only differences large enough to be of policy—not just statistical—significance are discussed.

Regression analysis is then used to derive the estimated effect of State buy-in coverage on the outcome measures, controlling for the other independent variables described previously. The model used depends on the distribution of the outcome. Cox proportional hazards models were used to estimate the times until discharge and rehospitalization, with death treated as a competing risk. Efron's (1977)

approximation was used for tied data. The probabilities of discharge to self-care at home and ER use were estimated using logistic regressions.³ Total charges, costs, Medicare payment, and costs per day were estimated using ordinary least squares regression. To take skewness in the distribution into account, we used a log transformation of the dependent variable and a "smearing" retransformation algorithm (Duan, 1983). Separate "smear" factors for beneficiaries with and without State buy-in coverage were used.

To facilitate interpretation of the Cox proportional hazards (logistic regression) estimates, risk ratios (odds ratios) and 99.9-percent confidence intervals are presented instead of the untransformed coefficients. The risk ratios shown in the tables are the hazard rates if beneficiaries have State buy-in coverage, divided by the hazard rates if beneficiaries do not have such coverage. Thus, a risk ratio of less than 1 would imply that beneficiaries with State buy-in coverage have lower failure rates, e.g., are less likely at a given point in time to be discharged or rehospitalized. Similarly, the odds ratio approximates the probability of the outcome if beneficiaries have buy-in coverage, divided by the probability if they do not. Thus, an odds ratio of less than 1 would imply that beneficiaries with buy-in coverage have a lower probability of the event.

RESULTS

Population Characteristics

Table 1 shows differences in population characteristics between beneficiaries with and without State buy-in coverage. All of the findings are consistent with the results reported in previous studies. Among the

³ The regression for ER use controlled for whether the beneficiary died before the end of the year following discharge.

Table 1
Characteristics of Medicare Beneficiaries Admitted to General and Psychiatric Hospitals for Primary Psychiatric Diagnoses, by Presence of State Coverage

Characteristic	Elderly Beneficiaries		Disabled Beneficiaries	
	With State Buy-In Coverage (N = 28,349)	Without State Buy-In Coverage (N = 150,190)	With State Buy-In Coverage (N = 55,649)	Without State Buy-In Coverage (N = 66,134)
	Percent			
Female	71	63	43	33
Race				
White	78	90	73	76
Black	18	6	19	18
Other	2	1	6	4
Do Not Know	2	3	2	2
Age Group				
65-74 Years or Under 35 Years	48	47	41	23
75-84 Years or 35-49 Years	35	39	38	45
Over 84 Years or 50-64 Years	17	14	21	32
Originally Eligible on the Basis of Disability	23	11	—	—
Source of Admission				
Referral	62	63	64	62
Transfer From Another Facility	8	5	*6	6
Emergency Room	26	27	*23	23
Criminal Justice System	1	1	*2	3
Do Not Know	*3	3	5	6
Urban Residence	79	80	86	82
Hospitalized for Any Primary Psychiatric Diagnosis During Previous Year	20	15	41	35
Primary Psychiatric Diagnosis				
Schizophrenia	12	4	44	37
Other Psychotic Disorder	10	8	4	3
Bipolar Disorder	6	6	11	12
Major Depressive Disorder	18	27	11	14
Dysthymia	1	2	*1	2
Other Depressive Disorder	2	3	*2	2
Anxiety Disorder	2	3	1	2
Dementia	17	16	<1	1
Other Organic	14	12	*3	4
Substance-Related Disorder	10	13	14	19
Adjustment Disorder	2	2	3	3
Personality Disorder	1	<1	1	1
Disorders Originating in Childhood	*<1	<1	1	<1
Other Psychiatric Disorder	*3	3	2	2
Psychiatric Comorbidities				
Any Psychotic Disorder	5	4	5	5
Any Affective Disorder	3	4	3	4
Any Organic Disorder	*8	7	*1	1
Substance-Related Disorder	7	8	16	17
Personality Disorder	3	4	8	7
Disorders Originating in Childhood	1	<1	7	3
Any Other Psychiatric Disorder	5	7	7	7
Average Income of Families Living in Same ZIP Code With Household Heads in Same Age Group				
	\$22,430	\$24,742	\$37,316	\$39,156
Standard Deviation	8,765	10,049	13,464	13,617

*Not significant.

NOTE: All differences by State buy-in coverage were significant at $p \leq 0.001$ in ANOVA or chi-squared tests unless designated not significant.

SOURCES: 1989-91 standard analytic file and denominator files, 1990 Medicare cost reports, exempt units file, and provider of service file (Health Care Financing Administration); 1990 census (U.S. Bureau of the Census); 1990 American Hospital Association file.

elderly, those with buy-in coverage were more likely to be in the oldest age group, while among the disabled, those with buy-in coverage were more likely to be in the youngest age group. Among all beneficiaries, those with buy-in coverage were more likely to be female and black, to have been hospitalized for a primary psychiatric diagnosis during the past year, to have a primary diagnosis of schizophrenia, and to live in ZIP Codes with lower mean household incomes. Those with buy-in coverage are less likely to have primary diagnoses of major depressive disorder and substance-related disorders.

Setting of Inpatient Care

Table 2 gives the proportion of beneficiaries with and without State buy-in coverage who are treated in each type of setting, broken down by hospital ownership and profit status (public, private not-for-profit, private for-profit) and then further by specialty (psychiatric hospital, psychiatric unit within a general hospital, general hospital bed). Surprisingly few differences were seen in the setting of care. Among the elderly, beneficiaries with State buy-in coverage were more likely to have been treated in public facilities, especially psychiatric hospitals, and less likely to have been treated in private not-for-profit facilities, especially general hospitals. No large or consistent patterns were observed among the disabled sample.

Unadjusted Differences in Dependent Variables

Table 3 provides descriptive statistics on the dependent variables, by whether the beneficiary has State buy-in coverage or not. Conclusions regarding differences in resource use differ for the elderly and disabled subsamples. Among the elderly, beneficiaries with State buy-in coverage have

higher total costs but slightly lower Medicare payments than those without. Among the disabled, the opposite pattern was seen. The total cost differentials were due exclusively to the differences in mean LOSs, because among both the elderly and disabled, mean costs per day were similar for beneficiaries with and without State buy-in coverage. Furthermore, the differences in LOS by State buy-in coverage are apparently driven by beneficiaries with long stays, because median LOSs were quite similar for beneficiaries with and without buy-in coverage, while mean LOSs were either much longer (among the elderly) or much shorter (among the disabled) for beneficiaries with buy-in coverage.

Among both the elderly and disabled, Medicare beneficiaries with State buy-in coverage clearly do worse after discharge than those without buy-in coverage. Their rates of discharge to self-care at home and community tenure rates at 1 year are lower, while their rates of ER use for a primary psychiatric diagnosis not leading to a hospital admission (one of the proxies for quality of post-discharge followup care) are higher. In results not shown in the tables, the lower rates of discharge to self-care at home were seen in conjunction with somewhat higher rates of transfers to other hospitals and, especially among the elderly, much higher rates of transfers to nursing homes. Substantially lower rates of discharge to self-care were also found among subsamples of the elderly stratified by source of admission. Thus, they cannot be attributed to the higher rates of admission through transfers from other institutions among beneficiaries with State buy-in coverage.

Effects of State Buy-In Coverage

Table 4 shows the results from multiple regression analyses that control for potential confounding factors, such as patient

Table 2
Frequency Distribution for Inpatient Care Setting, by Presence of State Buy-In Coverage

Characteristic	Elderly Beneficiaries		Disabled Beneficiaries	
	With State Buy-In Coverage (N = 28,349)	Without State Buy-In Coverage (N = 150,190)	With State Buy-In Coverage (N = 55,649)	Without State Buy-In Coverage (N = 66,134)
			Percent	
Public Hospital	23.8	13.4	27.6	27.8
Psychiatric Hospital Bed	8.6	2.8	13.8	15.9
Psychiatric Unit Bed	4.7	3.4	7.3	6.0
General Hospital Bed	10.5	7.2	6.5	5.9
Private Not-for-Profit Hospital	57.0	68.3	51.5	52.0
Psychiatric Hospital Bed	2.5	4.2	4.5	5.1
Psychiatric Unit Bed	23.7	26.8	25.8	24.2
General Hospital Bed	30.8	37.3	21.1	22.6
Private for-Profit Hospital	19.2	18.3	21.0	20.2
Psychiatric Hospital Bed	8.6	9.6	13.5	13.8
Psychiatric Unit Bed	5.0	3.8	3.8	2.9
General Hospital Bed	5.6	4.9	3.6	3.5

NOTE: The difference in frequency distributions by State buy-in coverage is significant at $p \leq 0.001$ in a chi-square test.

SOURCES: 1989-91 standard analytic file and denominator files, 1990 Medicare cost reports, exempt units file, and provider of service file (Health Care Financing Administration); 1990 census (U.S. Bureau of the Census); 1990 American Hospital Association file.

Table 3
Unadjusted Differences in Dependent Variables, by Presence of State Buy-In Coverage

Characteristic	Elderly Beneficiaries		Disabled Beneficiaries	
	With State Buy-In Coverage (N = 28,349)	Without State Buy-In Coverage (N = 150,190)	With State Buy-In Coverage (N = 55,649)	Without State Buy-In Coverage (N = 66,134)
			Dollars	
Mean Total Costs	\$7,666	\$6,929	\$6,775	\$7,755
Standard Deviation	11,757	7,935	8,715	12,860
Mean Costs per Day	406	424	379	370
Standard Deviation	225	200	186	178
Mean Total Medicare Reimbursement	4,179	4,334	3,944	3,833
Standard Deviation	4,602	4,733	4,299	4,492
			Days	
Mean Length of Stay	24	18	20	26
Standard Deviation	58	27	37	58
Median Length of Stay	12	12	13	14
			Percent	
Proportion Discharged to Self-Care	55	68	77	79
1-Year Community Tenure Rates	72	76	47	53
Proportion With ER Outpatient Visit Not Leading to Admission During Year Following Discharge	8	5	23	17

NOTES: All differences by State buy-in coverage were significant at $p \leq 0.001$ in ANOVA or chi-square tests. Median lengths of stay and community tenure rates were obtained using Kaplan-Meier estimates that take censoring into account. ER is emergency room.

SOURCES: 1989-91 standard analytic file and denominator files, 1990 Medicare cost reports, exempt units file, and provider of service file (Health Care Financing Administration); 1990 census (U.S. Bureau of the Census); 1990 American Hospital Association file.

Table 4

Multiple Regression Estimates of Effect of Having State Buy-In Coverage on Dependent Variables

Dependent Variable	Elderly Beneficiaries	Disabled Beneficiaries
Log of Total Costs	-0.01	-0.08
Standard Error	0.006	0.006
Dollar Change in Retransformed Outcome	-\$49	-\$575.00
Percent Change in Retransformed Outcome	-1	-8
Significance	0.23	≤ 0.0001
Log of Costs per Day	-0.01	0.02
Standard Error	0.002	0.002
Dollar Change in Retransformed Outcome	-\$4	\$6
Percent Change in Retransformed Outcome	-1	+2
Significance	≤ 0.0001	≤ 0.0001
Log of Total Medicare Reimbursement	-0.001	-0.03
Standard Error	0.01	0.006
Dollar Change in Retransformed Outcome	-\$3	-\$128
Percent Change in Retransformed Outcome	-0.1	-3
Significance	0.91	≤ 0.0001
Hazard Rate for Discharge From Hospital		
Risk Ratio	1.01	1.12
Confidence Interval	0.99, 1.02	1.10, 1.14
Significance	0.49	≤ 0.0001
Probability of Discharge to Self-Care		
Odds Ratio	0.59	0.89
Confidence Interval	0.57, 0.62	0.85, 0.93
Significance	≤ 0.0001	≤ 0.0001
Rehospitalization for Any Primary Psychiatric Diagnosis		
Risk Ratio	1.13	1.09
Confidence Interval	1.09, 1.17	1.07, 1.11
Significance	≤ 0.0001	≤ 0.0001
Probability of ER Outpatient Visit Not Leading to Admission During Year Following Discharge		
Odds Ratio	1.48	1.34
Confidence Interval	1.36, 1.63	1.28, 1.41
Significance	≤ 0.0001	≤ 0.0001

NOTES: All regressions control for a constant, the patient sociodemographic, insurance, and clinical characteristics shown in Table 1, and the hospital profit status, ownership, and specialty type shown in Table 2. Risk ratio = (hazard | State buy-in = 1) / (hazard | State buy-in = 0). Odds ratio = (probability | State buy-in = 1) / (probability | State buy-in = 0). ER is emergency room.

SOURCES: 1989-91 standard analytic file and denominator files, 1990 Medicare cost reports, exempt units file, and provider of service file (Health Care Financing Administration); 1990 census (U.S. Bureau of the Census); 1990 American Hospital Association file.

characteristics and the setting of care. After adjustment, the differences between beneficiaries with and without buy-in coverage in the measures of resource use during the index hospital stay narrowed. With one exception, differences were generally either statistically insignificant (based on the cutoff of $p = 0.001$) or too small to be of policy interest. The exception was that among disabled beneficiaries, those with State buy-in coverage had 8 percent lower total costs than those without buy-in cover-

age. Interestingly, Medicare payment was only 3 percent lower, so the disabled beneficiaries with buy-in coverage appear to have been relatively more financially remunerative for hospitals than those without (although mean payment levels were substantially below mean costs for both groups, suggesting that Medicare beneficiaries may generally be unprofitable). Again, the lower costs result from shorter LOSs; the relative risk of 1.12 for days until discharge implies that at any point in time,

the beneficiaries with buy-in coverage have a 12-percent higher probability of being discharged than those without such coverage.

Among both elderly and disabled, beneficiaries with State buy-in coverage still had a lower probability of discharge to self-care at home,⁴ higher probability of rehospitalization at any given point in time, and higher probability of ER use than beneficiaries without buy-in coverage after regression adjustment. The magnitude of these effects was substantial, particularly among the elderly; for example, aged beneficiaries with buy-in coverage were only about 60 percent as likely to be discharged to home and almost 50 percent more likely to have a subsequent ER visit that was related to a psychiatric condition and did not lead to admission.

DISCUSSION

This study tested the hypothesis that among elderly and disabled beneficiaries admitted to general or psychiatric hospitals for a primary psychiatric diagnosis during 1990, those with State buy-in coverage would have higher resource use than those without, due to greater unmeasured morbidity and/or more comprehensive insurance coverage. Based on 1989-91 Medicare administrative data, little evidence was found to support this hypothesis for the initial hospital stay. No significant differences in costs, payments, or LOSs were found among the elderly, and among the disabled population, total costs and LOSs were actually significantly lower for beneficiaries with buy-in coverage. These conclusions differ from results for the general Medicare population, suggesting that dually eligible beneficiaries are more expensive (McMillan et al., 1983; McMillan and Gornick, 1984; Haber and Mitchell, 1997).

⁴ Estimates were virtually identical when excluding patients who were admitted through transfers from other institutions.

Among both elderly and disabled beneficiaries, post-discharge treatment patterns were consistent with the hypothesis that those with buy-in coverage use more resources: They were less likely to be discharged to self-care at home and had higher rates of rehospitalization for psychiatric disorders and post-discharge ER use for psychiatric conditions not leading to hospital admissions. However, the findings of similar or lower inpatient costs are perhaps more striking than the results for post-discharge care, because although unmeasured severity of illness might explain the former, it should bias the estimates toward finding higher costs among beneficiaries with State buy-in coverage.

The results of this study should be interpreted in light of certain limitations. Medicaid eligibility per se could not be determined from the available databases, so any Medicare beneficiaries with Medicaid insurance who are not included in State buy-in programs (e.g., medically needy in certain States) would be missed by this definition. Furthermore, the hypothesis that Medicaid insurance (which covers a wider range of services) has a different impact from other types of State buy-in coverage could not be tested. Non-Medicaid patients with State buy-in coverage are not eligible for the full range of Medicaid benefits, thereby reducing the expected differences in resource use between beneficiaries with and without State buy-in coverage. Heterogeneity also exists in the population of patients without State buy-in coverage, with medigap coverage common, especially among the elderly. Although Medicaid is more generous in terms of covered benefits and cost-sharing requirements for outpatient mental health services than medigap, the high proportion of non-Medicaid beneficiaries who have medigap coverage should again reduce the differences in resource use

between beneficiaries with and without State buy-in coverage. However, neither of these biases can explain the lower costs found among disabled beneficiaries with State buy-in coverage, because at most, the heterogeneity in the definitions of the insurance groups should result in smaller increases in costs associated with State buy-in coverage.

Several other limitations arise from the fact that the study is based solely on Medicare administrative data. As a result, hospital stays paid entirely by Medicaid are not included in the analysis. Medicare imposes a 190-day lifetime limit on its coverage of psychiatric hospital stays. Thus, if dually eligible beneficiaries continue to use psychiatric hospital services after the Medicare benefits run out, the analysis will understate the differences in psychiatric hospital utilization between Medicare beneficiaries with and without State buy-in coverage. This bias will be a problem for the elderly but not the non-elderly disabled, because Medicaid only covers psychiatric hospital stays for persons under age 21 or over age 64. Furthermore, because the study is based on administrative data, severity of illness within diagnostic category cannot be measured. As was found in prior studies, beneficiaries with State buy-in coverage appear to be sicker. For example, they are more likely to have highly disabling conditions such as schizophrenia and (among the elderly) to have been originally eligible for Medicare on the basis of disability. If beneficiaries with buy-in coverage are more severely ill even after controlling for primary diagnosis, psychiatric comorbidities, and original disability status, then their utilization will appear to be higher than beneficiaries without such coverage, even if their health-adjusted utilization looked the same. Thus, inpatient use would be even lower for State buy-in patients relative to other Medicare patients

if severity could be perfectly controlled, while the differences in post-discharge outcomes might potentially disappear. Other differences in unmeasured population characteristics between beneficiaries with and without State buy-in coverage, such as the availability of support in the community, would also bias comparisons of any outcomes correlated with the characteristics.

Thus, the fact that resource use during the hospital stay was similar or even lower for the State buy-in group, yet their post-discharge use was higher and potentially indicative of inadequate outpatient followup (e.g., the higher rates of recidivism and inappropriate ER use), can be interpreted in several ways. One interpretation is that there are no true differences between the groups, but that unmeasured differences in characteristics such as health status artificially create these effects. For example, the lower rates of discharge to self-care, rapid rehospitalization, and inappropriate ER use could be explained if beneficiaries with State buy-in coverage are unobservably sicker or have poorer support in the community. Another explanation is low compliance among the patients. Beneficiaries with State buy-in coverage may be less willing or able to adhere to followup treatment plans, either because of limited education, unwillingness of providers to accept them as patients, or historical use patterns established in other contexts (e.g., the tendency of Medicaid beneficiaries to use ERs to provide primary care services). Neither of these explanations can account for the results for inpatient costs and LOSs, however.

An alternative explanation is that although State buy-in beneficiaries have greater clinical needs, providers do not take their vulnerability into account in determining LOSs, intensity of service use, or arrangements for post-discharge followup care. This explanation could poten-

tially account for the similar or shorter lengths of inpatient stays in conjunction with lower rates of discharge to self-care, higher recidivism rates, and higher rates of inappropriate ER use after discharge. Under prospective payment, hospitals have financial incentives to discharge patients as quickly as possible. Even psychiatric hospitals and exempt psychiatric units, which are paid under the TEFRA methodology, face incentives for cost containment.⁵ Thus, it is possible that rather than receiving more care during the initial hospital stay, as their greater morbidity would require, a disproportionate number of the State buy-in beneficiaries are instead transferred to other facilities or eventually readmitted.

Even if this conjecture were true, the determination of whether these patterns of care reflect cost-effective combinations of services or simple cost-shifting in response to payment incentives would be beyond the scope of this study. Yet these results, in particular the discrepancy between the low resource use of State buy-in patients in acute inpatient settings and their high resource use after discharge, suggest that further study of the differences in inpatient psychiatric treatment patterns between Medicare beneficiaries with and without State buy-in coverage may be warranted. Future analyses to clarify these issues should focus on the types of services provided to beneficiaries during the index hospital stay, the quality of the discharge planning process, possible barriers to continuity of care following discharge (including patient non-compliance and lack of support in the community), and differences in severity of illness between beneficiaries with and without State buy-in coverage.

⁵Separate analysis of beneficiaries treated in facilities paid under PPS versus TEFRA did not support the hypothesis that cost differences between the State buy-in group and the Medicare-only beneficiaries are larger in the TEFRA facilities because of their weaker incentives to contain costs.

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