
Medicare Interim Payment System's Impact on Medicare Home Health Utilization

Korbin Liu, Sc.D., Sharon K. Long, Ph.D., and Krista Dowling

The Medicare home health interim payment system (IPS) implemented in fiscal year 1998 provided very strong incentives for home health agencies (HHAs) to reduce the number of visits provided to each Medicare user and to avoid those beneficiaries whose Medicare plan of care was likely to exceed the average beneficiary cost limit. We analyzed multiple years of data from the Medicare Current Beneficiary Survey (MCBS) to examine how the IPS affected subgroups of the Medicare population by health and socioeconomic characteristics. We found that the IPS strongly reduced overall utilization, but that few subgroups were disproportionately affected.

INTRODUCTION

The Balanced Budget Act (BBA) of 1997 mandated that a prospective payment system (PPS) be implemented for Medicare HHAs by October 1999.¹ The BBA also required, however, that an IPS be imposed starting in fiscal year 1998. The IPS reduced per-visit payment rates and established an average beneficiary cost limit for Medicare HHAs. The latter provision introduced very strong incentives for HHAs to reduce the number of visits provided to

each Medicare recipient and to avoid individuals whose plan of care was likely to exceed the average beneficiary cost limit.

National program statistics indicate that total expenditures for Medicare home health services declined dramatically after the IPS was implemented, falling 50 percent from \$17 billion in 1996 to \$8 billion in 1999. Statistics also showed that utilization rates declined, both in use of the benefit by enrollees and in the number of visits provided to users. Although the program statistics provide a global account of the effects of the policy changes (McCall et al., 2001), national level information has not been available on changes in Medicare home health utilization by particular subgroups of Medicare beneficiaries (e.g., fair or poor health, highly disabled). This absence represents a significant gap in our understanding of the impact of the IPS, because vulnerable subgroups of Medicare beneficiaries could have been particularly affected by the IPS cost limits (Smith and Rosenbaum, 1998; Komisar and Feder, 1998; Lewin Group, 1998).

The newly available 1999 MCBS Cost and Use Files (Adler, 1994) enabled us to conduct an analysis of changes in Medicare home health use before and after implementation of the IPS. We compare utilization in calendar years 1996 (just prior to the IPS) and 1999 (when IPS was in full effect), and focus on the effects of the Medicare payment policy changes on subgroups of the elderly population, by health and socioeconomic characteristics. We address three questions in this article:

¹The Medicare HHA PPS actually went into effect October 2000.

The authors are with The Urban Institute. Research in this article was funded by Visiting Nurse Services of New York, Home Care Research Initiative, and the Robert Wood Johnson Foundation under Grant Number 034592, and Centers for Medicare & Medicaid Services under Contract Number 500-95-0055. The views expressed in this article are those of the authors and do not necessarily reflect the views of The Urban Institute, Visiting Nurse Services of New York, Robert Wood Johnson Foundation, or the Centers for Medicare & Medicaid Services.

- How has the use of Medicare home health changed after implementation of the IPS, in terms of likelihood of any use and number of visits used?
- Has there been a change in who uses Medicare home health as a result of the IPS, in terms of medical and functional conditions (e.g., cognitively impaired, highly disabled)?
- Were there differential effects for individuals who had prior use of hospitals and others who were not post-acute home health users?

Our analysis provides empirical information on Medicare beneficiaries who were most affected by the IPS. The following sections provide background on the Medicare home health benefit, data sources and methodology, and findings. Finally, we discuss policy and research implications.

BACKGROUND

Medicare Home Health Benefit

Medicare's home health benefit is intended to support medically-oriented services and must be prescribed (and recertified every 62 days) by a physician. Medicare provides home health benefits to enrollees who require intermittent or part-time skilled nursing care and therapy services, and who are homebound, defined flexibly to include individuals who can, on occasion, leave the home. There is no prior hospitalization requirement or limit on the number of visits a person may receive. Nor is there any copayment or deductible associated with home health visits.

Originally conceived as post-hospital care, the Medicare Part A home health benefit had evolved into more general home-based care requiring skilled services or supervision. The 1980 Omnibus Reconciliation Act, for example, rescinded a require-

ment that coverage for home health services require a prior hospitalization of at least 3 days and removed an existing annual limit of 100 home health visits. Nevertheless, application of eligibility and coverage requirements had acted to constrain Medicare home health spending prior to 1990.

A class action suit in 1988 against the Department of Health and Human Services (*Duggan v. Bowen*) prompted a clarification of those eligibility and coverage requirements. The new language clarified when patients' conditions constituted need for intermittent skilled nursing care, stipulated that need for skilled management and evaluation (not necessarily along with skilled nursing care) would qualify an individual for the benefit, and indicated that care needs could be chronic rather than being progressively improving. The impact of the clarification in eligibility and coverage rules was remarkable. Medicare home health use and expenditures began to increase dramatically in 1990. From 1990 to 1996, spending rose from \$4 to \$17 billion. A large portion of this increase was due to a 200-percent rise in the number of visits per home health user, but the number of beneficiaries using the home health benefit also increased (Komisar and Feder, 1998).

1997 BBA

In response to the soaring Medicare home health spending, Congress mandated in the 1997 BBA that Medicare home health services be paid under a PPS by 1999 (actually going into effect in October 2000). Congress also mandated that, until the PPS was developed, an IPS be imposed starting October 1997. The IPS established lower per-visit payment limits, as well as a per-beneficiary average cost limit on HHAs. The per-visit payment limits were

dropped to 105 percent of the national median cost per-visit from 112 percent of the national mean cost per visit. The per-beneficiary average cost limit is calculated by summing (from a base year's results) 75 percent of the agency's average costs per beneficiary and 25 percent of the average cost per beneficiary for agencies in its census region. An agency would be paid the lower of its actual costs, an amount based on the per visit limits, or an amount based on the per beneficiary limit. The per-beneficiary average cost limit, in particular, was expected to constrain Medicare expenditures for HHAs.²

Consistent with expectations, the number of visits per user declined from 78 in 1997 to 46 in 1999, while the number of users declined from 3.3 to 2.5 million over the same time period (McCall et al., 2001). Coincident with the decline in utilization, a sizable number of HHA providers were estimated to have closed after implementation of the IPS (U.S. General Accounting Office, 1998).

The dramatic decline in utilization, along with HHA closings, raised concerns about Medicare beneficiaries' access to Medicare home health services. Particular concerns were raised about residents living in rural communities where fewer alternatives existed when a local agency closes, and for subgroups of beneficiaries who were likely to incur costs higher than the IPS per beneficiary cost limits. Such users include individuals who report fair or poor health, are age 85 or over, have low incomes, and are enrolled in Medicaid (Komisar and Feder, 1998; Smith and Rosenbaum, 1998; Lewin Group, 1998). Higher cost individuals are also likely to include those with many dependencies in activities of daily living (ADLs), and those with multiple acute and

chronic conditions (e.g., diabetes, cardiovascular disease, stroke). Such characteristics portray individuals who are medically complex or functionally frail and who would likely require more than average amounts of Medicare home health services.

DATA AND METHODS

This section discusses data sources, the individuals included in our analysis sample, and variables that were examined. We also describe our estimation approach.

MCBS

The main data source for this analysis is the MCBS Cost and Use Files (Adler, 1994; Laschober and Olin, 1996). The MCBS is designed to provide information on a representative sample of the Medicare population, which includes disabled and elderly Medicare enrollees who live in the community or in facilities. Detailed information on medical use, sources of payments, and payment amounts are collected from personal interviews and augmented with Medicare claims data. The service use information is linked to beneficiaries' health and socioeconomic characteristics (e.g., sex, income, living arrangements, health status, disability level). Service use information is summed into nine categories of care: (1) inpatient hospitalization, (2) skilled nursing facility services, (3) outpatient hospital care, (4) physician services, (5) home health care, (6) long-term nursing home care, (7) prescription medicines and other medical services, (8) dental care, and (9) hospice care. Medicare Part A and Part B payments and other administrative information (e.g., State buy-in status) are also appended to the survey information.

The MCBS Cost and Use Files' sample includes continuously enrolled beneficiaries in a year as well as persons entering

² In addition to the new payment policies, the BBA also included other policies aimed at constraining home health spending (e.g., excluding venipuncture (blood drawing) as a sole qualification for home health services).

the Medicare Program or dying during the year. The Cost and Use Files are available approximately 2 years after the close of the field work. In this study, we used data from MCBS Cost and Use Files for each year between 1994 and 1999 to provide a context for the study. Information from 1994-1996 represents Medicare home health use before the IPS was implemented; information for 1997 and 1998 are transition years; and 1999 represents home health use after the IPS went into full effect. For the analysis of the impacts of the IPS, we compare Medicare home health use in 1996 (pre-IPS) with Medicare home health use in 1999 (post-IPS). This pre-post design assumes that any differences in home health use between 1996 and 1999 are due to the IPS. To the extent there were changes in other policies over the same time period that also affected the Medicare home health benefit (e.g., changes in Medicare fraud and abuse reviews), our estimates of the impacts of the IPS will capture those changes as well.

Analysis Sample

Our analysis sample from the MCBS includes all Medicare beneficiaries who were resident in the community, as opposed to institutions, for some part of the survey year. We excluded from the sample individuals eligible because of end stage renal disease and those in group plans (which generally do not report Medicare use). We also excluded individuals who were not residing in the 50 States or the District of Columbia. Finally, we excluded a small number of cases that were missing data for key variables in the analysis. Our final sample size is 56,596 Medicare beneficiaries across the 1994 to

1999 period. The sample size for the analysis of the impacts of the IPS using the 1996 and 1999 data is 18,428.

Model and Estimation Approach

To frame the multivariate analysis, we used a conceptual model in which Medicare home health use and intensity (i.e., number of visits) are a function of beneficiary characteristics that predispose or enable them to use home care services, and program policies. Beneficiary need is captured through measures such as age, sex, health status, functional limitations, and health conditions as suggested by prior research on the use of home health services (Benjamin, 1986; Kenney and Dubay, 1992; and Swan et al., 1995).³ Older individuals, individuals with fair or poor health status, and individuals with chronic conditions (e.g., heart disease, stroke, diabetes, Alzheimer's disease) are hypothesized to have higher levels of utilization of home health services, all else equal.

Individuals who have difficulty performing ADLs (Katz, et al., 1963) or instrumental ADLs (IADLs) (Lawton and Brody, 1969) are also hypothesized to be more likely to use home health services and to have a greater number of visits. We considered persons dependent in ADLs or IADLs if they reported receiving personal assistance because of those dependencies. Five ADLs (bathing, dressing, toileting, transferring, and eating) were examined, as were six IADLs (using telephone, doing light housework, doing heavy housework, preparing meals, shopping for personal items, and managing money). Beneficiaries

³We also estimated models controlling for the number of conditions. Because the coefficient for that variable was never statistically significant, we do not include that measure in the models reported here.

were classified by whether they had no disability, one or more IADL (and no ADL) dependencies, one or two ADL dependencies, and three or more ADL dependencies. We also control for the number of days the individual was residing in the community and whether the beneficiary died during the year.⁴

Beyond those health and disability measures we also control for whether the individual is a Medicaid enrollee. Medicaid enrollees are, by definition, low-income individuals and tend to have health care costs that are dramatically higher than those of other Medicare beneficiaries, even after controlling for health and socioeconomic characteristics (Liu, Long, and Aragon, 1998).

We also include variables that tend to be associated with availability of informal care, such as marital status, living arrangement, and having living children. Such factors are regarded as determinants of the amount of formal home health services used. We control for geographic variations in home health use by including census region, as well as urban versus rural status. We used the nine census regions because there is some similarity in the home health markets within these regions. For example, the U.S. General Accounting Office (1998) found a very high rate of HHA closures in Texas, Louisiana, and Oklahoma after the IPS was implemented. All three States are located in the West South Central census region.

Finally, we distinguish between beneficiaries who had a hospital stay during the year and those who did not. Although the timing of HHA use relative to the hospital stay during the year is indeterminable from the MCBS data, most individuals who have both hospital and HHA use in a year receive HHA visits after the hospital stay.

⁴We also estimated models excluding those who died or entered a facility from the analysis. The basic findings reported here were unchanged.

We estimated from analyses of Medicare claims data that 90 percent of individuals who used both HHA and hospital services over 1 year had HHA visits after the hospital stay.⁵ Although we recognize that not all individuals with hospital and HHA use in 1 year are post-acute patients, we refer to them as such in this analysis to distinguish them from individuals who received Medicare home health care clearly unconnected with a hospital stay. In the analysis, we refer to the latter group of individuals as community users.

Table 1 summarizes the characteristics of our sample members in 1996 and 1999. We present the percentage of cases for the 2 years combined, as well as for the 1999 post-IPS and 1996 pre-IPS periods separately. Between the two periods, there was no change in the share of the population with a hospital stay in the year and only minor changes in the socioeconomic characteristics of the sample. For example, there was a slight increase in the age of the population. Changes in health and disability status between the two periods were also small, although there was a decline in the share with no IADL or ADL dependencies (3.9 percentage points), and increases in the share of the population with arthritis (3.7 percentage points) and mental disorders (4.3 percentage points). The changes in geographic characteristics were negligible.

To allow the factors that affect receipt of home health care services to differ from those affecting the intensity or level of home health use, we estimate a two-part model. The first part of the model—whether the individual receives any home health visits—is estimated using logit regression. The second part of the model—the number of home care visits received by those receiving any visits—is estimated using ordinary least squares.

⁵The analysis of the claims data also showed that over 70 percent of the individuals with both HHA and hospital use over a year, received HHA care exclusively after the hospital stay.

Table 1
Characteristics of the Medicare Beneficiaries Post- and Pre-Interim Payment System (IPS):
1996 and 1999

	Total Sample	Post	Pre	Difference
			Percent	
Year is Post-IPS	51.4	100.0	100.0	100.0
Hospital Stay in Year	18.5	18.5	18.6	-0.1
Socioeconomic Characteristic				
Under 65 Years	12.8	13.8	11.6	2.2
65-70 Years	28.8	27.1	30.5	-3.4
71-75 Years	22.4	22.4	22.3	0.1
76-80 Years	17.5	17.7	17.4	0.3
81-85 Years	11.1	11.4	10.8	0.6
86 Years or Over	7.5	7.6	7.4	0.2
Female	55.7	55.6	56.0	-0.4
Non-White	13.0	13.2	12.7	0.4
Currently Married	54.0	53.7	54.3	-0.6
1 or More Children	87.3	86.9	87.6	-0.7
Lives Alone	30.8	31.2	30.5	0.6
Medicaid Enrollee	13.4	13.9	12.9	1.0
Health and Disability Status				
Health Status is Fair or Poor	27.2	27.7	26.7	0.9
No IADLs or ADLs	76.0	74.1	78.0	-3.9
IADLs Only	14.0	16.4	11.4	5.0
1 or 2 ADLs	6.1	5.9	6.2	-0.3
3 or More ADLs	4.0	3.6	4.4	-0.8
Alzheimer's Disease	2.4	2.2	2.6	-0.4
Arthritis	57.2	59.0	55.3	3.7
Cancer	18.4	18.3	18.6	-0.2
Heart Disease	15.4	15.4	15.3	0.1
Diabetes	16.5	16.6	16.3	0.3
Emphysema, Asthma, COPD	15.7	15.9	15.6	0.3
Mental Disorder	9.5	11.6	7.3	4.3
Stroke	11.8	11.9	11.7	0.3
Died During Year	3.7	3.3	4.2	-0.9
In Facility Part Year	1.0	0.3	1.7	-1.4
Days in the Community				
< 6 Months	2.3	1.8	2.8	-1.0
6 to 11 Months	2.1	1.7	2.6	-0.8
All 12 Months	95.6	96.5	94.6	1.9
Geographic Characteristic				
New England	3.1	3.1	3.1	0.0
Mid-Atlantic	17.6	17.0	18.2	-1.2
East North Central	19.3	19.2	19.4	-0.2
West North Central	6.8	6.8	6.9	-0.1
South Atlantic	21.1	21.3	21.0	0.3
East South Central	6.4	6.6	6.1	0.5
West South Central	10.9	10.9	10.8	0.2
Mountain	5.2	4.9	5.4	-0.5
Pacific	9.7	10.2	9.1	1.0
Lives in Urban Area	70.3	70.9	69.6	1.3
Sample Size	18,428	9,337	9,091	—

NOTES: IADL is instrumental activities of daily living. ADL is activities of daily living. COPD is chronic obstructive pulmonary disease.

SOURCE: Centers for Medicare & Medicaid Services: Data from the Medicare Current Beneficiary Survey Cost and Use Files, 1996 and 1999.

The number of home health visits is estimated with the dependent variable in logarithmic form because of the skewed distribution of visits. To account for the complex sampling frame of the MCBS, all the esti-

mates reported here have been produced using the survey estimation procedures in the statistical package STATA (StataCorp, 1999).

FINDINGS

The first section examines descriptive statistics on the use of Medicare home health services over time and by the characteristics of the sample in Table 1. The second section presents findings from the estimation of the two-part models. We examined the effect of the Medicare IPS both as a single term in a multivariate model with beneficiary characteristics, and in an interactive model with those characteristics. The former allows us to determine whether use of Medicare home health services changed as a result of the IPS. The latter allows us to determine whether the impact of the IPS on the use of home health services differed for particular subgroups of Medicare beneficiaries.

We estimated fully interactive models (i.e., models that interacted the post-IPS variable with all of the beneficiary characteristics) as well as models that focused on more limited sets of variables. Given that we found little evidence of significant interaction effects and we were concerned about sample size for the model of number of visits, we focus on the model with only health and geographic interaction terms. Including interaction with other characteristics did not change the basic findings nor did estimating models with very limited sets of interactions (i.e., interactions with functional limitations only).

Descriptive Statistics

Table 2 presents findings on Medicare home health use from 1994-1999 from our samples of MCBS respondents in those years. The percentage of individuals with any Medicare home health use increased from 8.7 percent in 1994 to 10.3 percent in 1996 during the period leading to the implementation of the IPS. In the phase-in period (1998), 8.7 percent of the sample

used the benefit and in the fully operational year of the IPS (1999), only 7.4 percent of the sample used Medicare home health services. Similarly, we see an increase in the number of visits per user in the pre-IPS period, followed by a decline in visit use after the IPS was implemented. For example, the average number of visits per user increased from 68.7 in 1994 to 72.1 in 1996. It dropped dramatically to 53.8 in 1998, and even further to 37.3 in 1999.

We also examined changes in the percent of users and number of visits between individuals with hospital stays and those without such stays. Among those with a hospital stay, the proportion of users declined from 38.4 percent in 1996 (just prior to the IPS) to 30.3 percent in 1999, while the average number of visits declined sharply from 65.2 to 34.6 between the 2 years. The share of beneficiaries without a prior hospital stay who used Medicare HHA services declined from 3.9 percent in the pre-IPS period to 2.3 percent in the post-IPS period. Although individuals with hospital stays had 10 times higher likelihood of using HHA (in both periods), their percent decline between the two time periods was smaller than that of the community user patients. However, like the post-acute patients, community users experienced a dramatic drop in average visits per user: home health visits dropped from an average of 87.4 in 1996 to 45.7 in 1999. Although they were much less likely to use home health care, individuals without a hospital stay who did use home health care had substantially more visits both before and after the IPS was introduced than did beneficiaries with a hospital stay.

Statistics on variation in the use of Medicare home health care by sample characteristics are presented in Table 3. The overall proportion of home health users in the full sample, covering both 1996 and 1999, was 10.3 percent in the pre-IPS period,

Table 2

Trends in Medicare Home Health Use: 1994-1999

Time Period	Total		Persons With a Hospital Stay		Persons Without a Hospital Stay	
	Percent With Any Visits	Average Number of Visits per User	Percent With Any Visits	Average Number of Visits per User	Percent With Any Visits	Average Number of Visits per User
Prior to Interim Payment System						
1994	8.7	68.7	33.6	63.3	3.0	82.1
1995	9.6	77.6	35.9	74.5	3.5	85.1
1996	10.3	72.1	38.4	65.2	3.9	87.4
Transition to Interim Payment System						
1997	9.5	70.1	36.0	64.1	3.4	84.8
1998	8.7	53.8	34.8	47.3	3.1	69.4
Post-Interim Payment System						
1999	7.4	37.3	30.3	34.6	2.3	45.7
Number of Observations	56,596	5,991	11,447	4,176	45,149	1,815

SOURCE: Centers for Medicare & Medicaid Services; Data from the Medicare Current Beneficiary Survey Cost and Use Files, 1994-1999.

Table 3
Variation in Home Health Use, by Sample Characteristics: 1996 and 1999

Characteristic	Percent With Home Health Visits	Average Number of Home Health Visits, by User
Year		
Pre-IPS	10.3	72.1
Post-IPS	7.4	37.3
Hospital Stay in Year		
Yes	34.3	51.3
No	3.1	71.7
Age		
Under 65 Years	4.0	87.9
65-70 Years	4.0	42.8
71-75 Years	6.9	51.4
76-80 Years	10.7	56.6
81-85 Years	16.2	56.5
86 Years or Over	26.1	62.5
Sex		
Female	10.3	60.8
Male	7.1	50.2
Race/Ethnicity		
White	8.6	53.4
Non-White	10.2	78.0
Marital Status		
Currently Married	6.3	47.5
Not Currently Married	11.8	63.0
Education		
Less than High School	12.0	65.3
High School or Above	7.1	49.4
Living Children		
No Children	10.3	73.5
One or More Children	8.6	54.2
Living Situation		
Lives Alone	11.1	56.2
Lives With Others	7.8	57.6
Medicaid Eligibility		
Yes	13.6	68.4
No	8.1	54.1
Health and Disability Status		
Good, Very Good, or Excellent	5.9	40.5
Fair or Poor	16.6	72.9
Functional Limitations		
No ADLs or IADLs	4.4	25.3
IADLs Only	13.7	39.2
1 or 2 ADLs	28.8	79.5
3 or More ADLs	45.8	112.6
Health Conditions		
Alzheimer's Disease	29.2	89.8
Arthritis	10.4	57.0
Cancer	11.1	50.1
Heart disease	13.7	57.1
Diabetes	14.5	74.1
Emphysema, Asthma, COPD	13.1	53.8
Mental Disorder	9.0	66.9
Stroke	19.9	61.7

See footnotes at the end of table.

Table 3—Continued
Variation in Home Health Use, by Sample Characteristics: 1996 and 1999

Characteristic	Percent With Home Health Visits	Average Number of Home Health Visits, by User
In Facility Part Year		
Yes	41.4	60.3
No	8.5	56.9
Days in the Community		
Less than 6 Months	31.6	35.7
6-11 Months	45.1	67.9
All 12 Months	7.5	57.8
Died During Year		
Yes	37.4	51.6
No	7.7	58.1
Geographic Location		
Lives in Urban Area	8.9	54.8
Lives in Rural Area	8.7	62.6
Census Region		
New England	11.8	57.5
Mid Atlantic	9.4	36.9
East North Central	7.9	49.1
West North Central	6.1	36.4
South Atlantic	9.6	58.9
East South Central	11.0	91.2
West South Central	8.8	98.3
Mountain	6.7	46.6
Pacific	8.9	45.6
Sample Size	18,428	1,904

NOTES: IPS is interim payment system. ADLs is activities of daily living. IADL is instrumental ADLs. COPD is chronic obstructive pulmonary disease.

SOURCE: Centers for Medicare & Medicaid Services: Data from the Medicare Current Beneficiary Survey Cost and Use Files, 1996 and 1999.

and 7.4 percent in the post-IPS period. The average number of visits per user declined from 72.1 to 37.3 between the two periods.

For the full sample, the likelihood of use increases with age, as does the number of visits per user. Females and non-white beneficiaries are both more likely to use home health and, among users, to have more visits. Use is also higher among those who are likely to have less informal care—those not currently married, those without living children, and those who live alone. Medicaid eligible beneficiaries are twice as likely to use Medicare home health services as Medicare-only beneficiaries, and have a higher number of visits per user.

Health and disability status are strongly associated with any home health use and number of home health visits. Individuals with fair or poor health are three times more likely to use home health, and aver-

age many more visits, than those in better health. ADL status is a very strong predictor of home health use and number of visits. Whereas 4.4 percent of individuals with no IADL or ADL dependencies received some home health visits, almost one-half of persons with three or more ADL dependencies did so. In addition, those with three or more ADL dependencies have the highest average number of visits (112.6 visits) of all the subgroups in Table 3.

Among the medical conditions, individuals with Alzheimer's Disease have the highest incidence of home health use (29.2 percent) and the highest number of average visits (89.8 visits). Dying during the year dramatically increased likelihood of using home health care, but those who did not die during the year had more visits on average. Finally, relatively small differences were found between urban and rural

Table 4
Two-Part Model Estimates of the Effects of IPS on Medicare Home Health Use: 1996 and 1999

Variable	Logit: Any Medicare Home Health Visits		OLS: Log Number of Visits Conditional on Having a Visit	
	Persons With a Hospital Stay	Persons Without a Hospital Stay	Persons With a Hospital Stay	Persons Without a Hospital Stay
Year is Post-IPS	**0.393	**0.751	**0.359	**0.518
65-70 Years	**0.849	**0.777	-0.214	-0.683
71-75 Years	**0.951	**1.694	-0.128	-0.325
76-80 Years	**1.370	**1.760	-0.101	-0.517
81-85 Years	**1.495	**2.215	-0.028	-0.583
85 Years or Over	**1.612	**2.565	-0.019	-0.574
Female	*0.237	0.077	0.087	0.115
Race is Non-White	-0.003	0.204	0.090	*0.327
Currently Married	-0.228	-0.247	-0.046	-0.100
Has 1 or More Living Children	-0.151	**0.352	-0.132	**0.423
Lives Alone	-0.016	**0.552	-0.078	0.251
Medicaid Enrollee	0.141	0.136	0.061	-0.127
Health Status is Fair or Poor	0.139	**0.535	**0.343	0.137
IADL Limitation Only	**0.617	**1.182	*0.228	*0.309
1 or 2 ADL Limitations	**1.142	**2.129	**0.718	**1.085
3 or More ADL Limitations	**1.666	**3.103	**1.029	**1.537
Alzheimer's Disease	-0.015	-0.096	0.078	0.199
Arthritis	0.136	0.017	-0.002	-0.005
Cancer	-0.085	0.062	0.075	-0.208
Heart Disease	-0.096	0.240	-0.010	0.028
Diabetes	*0.220	**0.603	*0.170	*0.306
Emphysema, Asthma, COPD	0.122	0.144	-0.115	0.018
Mental Disorder	-0.087	-0.176	-0.009	*-0.472
Stroke	*0.217	*0.381	-0.099	*-0.343
New England	**0.678	**0.462	*-0.432	-0.548
Mid-Atlantic	0.156	-0.056	**0.639	**0.104
East North Central	-0.162	-0.014	**0.415	**0.764
West North Central	-0.293	**0.939	**0.675	-0.361
South Atlantic	0.019	0.223	**0.368	-0.442
East South Central	-0.275	**0.616	0.116	-0.202
Mountain	-0.131	0.042	**0.440	*-0.745
Pacific	0.079	-0.133	**0.608	*-0.661
Lives in Urban Area	0.155	-0.117	0.119	-0.110
Number of Days Living in Community	**0.004	0.001	**0.004	**0.006
Died During Year	**0.907	1.041	-0.141	-0.214
Constant	-3.732	**6.239	**1.116	0.182
Sample Size	3,741	14,687	1,347	557
R-Squared	—	—	0.308	0.367
F-Test	**15.30	**51.20	**20.44	**13.52

*Significantly different from zero at the 0.05 level.

**Significantly different from zero at the 0.01 level.

NOTES: IPS is interim payment system. OLS is ordinary least squares. ADLs is activities of daily living. IADL is instrumental ADLs. COPD is chronic obstructive pulmonary disease.

SOURCE: Centers for Medicare & Medicaid Services: Data from the Medicare Current Beneficiary Survey Cost and Use Files, 1996 and 1999.

location and among census regions. Individuals in the East South Central and West South Central regions, however, received many more visits, on average, than users in the other regions.

Model Estimates

The first set of models is presented in Table 4. We estimate use of any Medicare home health visits, and the log of number

of visits conditional upon having a visit. We estimate the models separately for subgroups of the sample defined by whether the individual had a hospital stay during the year. This distinction allows for differences in the patterns of home health use for individuals who were likely to use Medicare home health for post-acute care and others who were community users.⁶

⁶ A formal statistical test for structural differences indicated that there are systematic differences in the factors affecting home health use for those with a hospital stay and those without.

Impact of the IPS

Table 4 presents our findings on the likelihood of receiving at least one Medicare home health visit for beneficiaries with a hospital stay during the year. For these post-acute Medicare beneficiaries, we find a reduction in the likelihood of using Medicare home health services in the post-IPS period, after controlling for health, sociodemographic, and geographic characteristics. Similarly, Medicare beneficiaries without a hospital stay were significantly less likely to have a Medicare home health visit in the post-IPS period.

These estimates translate into a 22-percent reduction in the likelihood of having any Medicare home health visits for post-acute individuals and a 30-percent reduction for community users, after controlling for other factors. Our estimate of the percentage change in the likelihood of having any home health visits is generated by first using our coefficient estimates to predict home health use assuming everyone in the sample is in the pre-IPS period and then assuming everyone in the sample is in the post-IPS period. The difference between those two predictions is the impact of the IPS, controlling for other factors. Clearly, the new IPS policies had a dramatic effect on access to Medicare home health care for both subgroups of beneficiaries.

Furthermore, the new IPS policies had a significant impact on the number of visits received by beneficiaries, regardless of whether they had a hospital stay or not. For post-acute beneficiaries, the average number of visits fell 30 percent with the introduction of the IPS, all else equal. For community users, the average number of visits dropped 40 percent as a result of the IPS.

Beneficiary Characteristics

Most of the socioeconomic and health characteristics in the model were also significant predictors of home health use and generally in expected directions for both subgroups of Medicare beneficiaries. For example, older age increased the likelihood of any home health use among all Medicare beneficiaries. Individuals age 85 or over were more likely to use home health than those under age 65 among beneficiaries in both the post-acute and community-user subgroups. Age did not play a role, however, in determining the number of visits among those using home health services for either subgroup.

Being female was associated with a greater likelihood of use among those with a hospital stay, but had no effect on use by Medicare beneficiaries without such stays. In contrast, there was no difference in the likelihood of using home health for beneficiaries who were non-white, but, among those with a least one visit, the level of use was significantly higher among non-white beneficiaries in the community-user subgroup.

The availability of informal care, as reflected by marital status, living children, and living alone, was also a significant predictor of use, but only for the community-user subgroup. In general, individuals with living children were less likely to use Medicare's formal home health services and tended to have fewer visits. Community users who lived alone were more likely to be users than individuals living with others. These findings are consistent with the notion that formal care, such as Medicare home health services, is particularly important for individuals with potentially weak informal care networks.

The health and functional status variables were highly predictive of any home health use and levels of home health use for both Medicare subgroups. For example, relative to individuals with no IADL or ADL dependencies, those with three or more ADL dependencies were much more likely to have a home health visit among the post-acute beneficiaries and even more so among the community-user beneficiaries.

The specific medical conditions had a mixed pattern of impact on home health use, but presence of a health condition tended to increase the likelihood of home health use and number of visits among users. For example, diabetes increased both likelihood of use and number of visits in both subgroups. Stroke increased the likelihood of use in both subgroups, but decreased the number of visits only in the community-user subgroup.

Another notable finding is that dying during the year is not associated with use of Medicare home health in the community user subgroup but, in the post-acute care subgroup, individuals who die during the year are more likely to use Medicare home health than are survivors. Number of days in the community was positively associated with likelihood of using Medicare home health for individuals in the post-acute subgroup, but not for those in the community-user subgroup. Number of days in the community was negatively associated with number of visits among users in both subgroups. A possible explanation for this finding is that individuals with shorter stays in the community were at a more critical stage in their home health care needs, thereby requiring more visits.

Finally, geographic region and living in an urban area played a role in access to home health services. For example, relative to individuals living in the West South Central region, which includes Texas, Louisiana, and Oklahoma, individuals in

New England are more likely, and individuals in the West North Central region are less likely, to have home health visits. Further, relative to the West South Central region, the number of visits among users is significantly lower in most of other regions.

Interactive Model

The analysis previously mentioned indicates that the changes introduced by the IPS had a significant impact on Medicare home health use. In Table 5, we consider whether those impacts varied for particular subgroups of Medicare beneficiaries. Specifically, we examine models in which we interact the post-IPS variable with measures of the beneficiary's age, Medicaid eligibility, health status, and geographic location. The interaction term provides an indication of the extent to which the IPS had a particular impact on individuals with a given characteristic. We focus on the interaction terms in our discussion.

We find very little evidence that the IPS differentially affected likelihood of home health use across subgroups of Medicare beneficiaries.⁷ Table 5 indicates an increase in access to care for Medicare beneficiaries in the Mid-Atlantic region, relative to the West South Central region. No differences were found for other beneficiary characteristics. For Medicare beneficiaries who did not have a hospital stay during the year, we found no evidence of differential IPS effects on any subgroup of Medicare beneficiaries. It appears that the IPS caused a general reduction in the likelihood of home health use, but that few subgroups were disproportionately affected.

Our findings on changes in number of visits indicate more targeted effects of the IPS on subgroups of beneficiaries. Among both subgroups, a greater reduction in the

⁷ Consistent with the lack of significance for the interaction terms, a test of the joint significance of the interaction terms would be rejected at the 0.05 level for all four equations.

Table 5

Two-Part Model Estimates of the Effects of IPS on Medicare Home Health Use, with Interaction Terms: 1996 and 1999

Variable	Logit: Any Medicare Home Health Visits		OLS: Log Number of Visits Conditional on Having a Visit	
	Persons With a Hospital Stay	Persons Without a Hospital Stay	Persons With a Hospital Stay	Persons Without a Hospital Stay
Year is post-IPS	-0.880	*-1.402	0.227	*-1.709
Age				
65-70 Years	**0.768	0.627	-0.127	*-0.974
71-75 Years	**0.817	**1.482	0.006	-0.732
76-80 Years	**1.199	**1.506	0.062	-0.553
81-85 Years	**1.296	**1.952	0.121	-0.699
85 Years or Over	**1.428	**2.425	0.098	*-0.825
Female	*0.252	0.087	0.086	0.118
Race is Non-White	0.006	0.206	0.114	0.291
Currently Married	-0.221	-0.251	-0.061	-0.056
Has 1 or More Living Children	-0.169	*-0.341	-0.143	**0.382
Lives Alone	-0.035	**0.553	-0.086	*0.322
Medicaid Enrollee	0.121	0.244	0.144	-0.112
Health Status is Fair or Poor	0.170	**0.475	**0.419	0.129
IADL Limitation Only	**0.753	**1.046	*0.315	0.375
1 or 2 ADL Limitations	**1.265	**2.272	**0.884	**1.067
3 or More ADL Limitations	**1.647	**3.009	**1.223	**1.824
Alzheimer's Disease	0.067	-0.301	0.131	0.158
Arthritis	0.089	0.181	-0.005	0.038
Cancer	-0.069	-0.057	0.086	-0.239
Heart Disease	-0.131	0.237	0.007	0.156
Diabetes	**0.391	**0.822	0.061	0.310
Emphysema, Asthma, COPD	0.185	0.151	-0.121	-0.051
Mental Disorder	-0.078	0.018	-0.054	*-0.640
Stroke	0.229	**0.507	-0.013	**0.570
New England	**0.902	*0.581	*-0.509	-0.543
Mid-Atlantic	-0.308	-0.178	**0.557	**1.297
East North Central	-0.412	-0.039	*-0.342	**0.731
West North Central	-0.160	**0.798	**0.589	-0.582
South Atlantic	-0.242	0.050	*-0.390	-0.452
East South Central	-0.434	*0.577	0.112	-0.273
Mountain	-0.204	0.060	*-0.451	**1.190
Pacific	0.097	-0.125	**0.714	*-0.698
Lives in Urban Area	0.262	-0.224	0.091	-0.233
Number of Days Living in Community Died During Year	**0.004	0.001	**0.004	**0.006
	**0.919	0.991	-0.105	-0.330
Year is Post-IPS				
Age				
65-70 Years	0.294	0.565	-0.222	0.952
71-75 Years	0.382	0.789	-0.278	1.107
76-80 Years	0.456	0.816	-0.329	0.151
81-85 Years	0.570	0.885	-0.340	0.300
85 Years or Over	0.498	0.624	-0.254	0.648
Medicaid Enrollee	0.071	-0.301	-0.191	0.138
Health Status is Fair or Poor	-0.056	0.169	-0.132	0.109
IADL Limitation Only	-0.219	0.310	-0.194	-0.178
1 or 2 ADL Limitations	-0.206	-0.393	*-0.381	0.272
3 or More ADL Limitations	0.090	0.297	*-0.479	*-0.722
Alzheimer's Disease	-0.247	0.343	-0.059	0.098
Arthritis	0.085	-0.424	0.017	-0.070
Cancer	-0.009	0.245	-0.057	0.056
Heart Disease	0.044	0.010	-0.061	-0.351
Diabetes	-0.346	-0.573	0.202	0.006
Emphysema, Asthma, COPD	-0.117	-0.012	0.007	0.309
Mental Disorder	0.017	-0.431	0.017	0.259
Stroke	-0.060	-0.264	-0.173	*0.589
New England	-0.589	-0.313	0.283	0.017

See footnotes at the end of table.

Table 5—Continued
Two-Part Model Estimates of the Effects of IPS on Medicare Home Health Use, with Interaction Terms: 1996 and 1999

Variable	Logit: Any Medicare Home Health Visits		OLS: Log Number of Visits Conditional on Having a Visit	
	Persons With a Hospital Stay	Persons Without a Hospital Stay	Persons With a Hospital Stay	Persons Without a Hospital Stay
Mid Atlantic	*0.917	0.288	-0.179	0.856
East North Central	0.487	0.067	-0.169	0.131
West North Central	-0.252	-0.472	-0.167	1.160
South Atlantic	0.525	0.402	0.032	0.213
East South Central	0.300	0.095	-0.001	0.284
Mountain	0.105	-0.049	0.048	1.267
Pacific	-0.045	-0.029	0.270	0.231
Lives in Urban Area	-0.190	0.248	0.054	0.377
Constant	** -3.608	** -6.084	** -1.423	0.574
Sample Size	3,741	14,687	1,347	557
R-Squared	—	—	0.321	0.415
F-Test	**11.91	**39.96	**16.53	**17.70

*Significantly different from zero at the 0.05 level.

**Significantly different from zero at the 0.01 level.

NOTES: IPS is interim payment system. OLS is ordinary least squares. ADLs is activities of daily living. IADL is instrumental ADLs. COPD is chronic obstructive pulmonary disease.

SOURCE: Centers for Medicare & Medicaid Services: Data from the Medicare Current Beneficiary Survey Cost and Use Files, 1996 and 1999.

number of home health visits after the IPS was found for those with greater functional limitations, all else equal. Because those individuals received more home health visits than average in the pre-IPS period, this pattern is consistent with a scaling back of use among high-cost subgroups. We do find some evidence of an increase in home health visits among persons without a hospital stay who had had a stroke.

Finally, we found little evidence of geographic differences in changes in home health use after the IPS was implemented. Hence, despite geographic variations in the closing of HHA providers, there does not appear to be a corresponding geographic variation in the impact of the IPS on access to home health use, after controlling for beneficiary characteristics. These findings suggest that the reduction in both the likelihood of a Medicare home health visit and in the number of such visits, were reduced proportionately across the different census regions.

DISCUSSION

The recent availability of the 1999 MCBS Cost and Use File, along with data from preceding years, has provided an opportunity to examine changes in Medicare home health utilization associated with the implementation of the IPS. More important, because the MCBS contains information on socioeconomic and health characteristics of Medicare enrollees, it is possible to identify differential effects of the policy changes on subgroups of the population.

Our analysis found that any use of Medicare home health, and intensity of services, varied by health and socioeconomic characteristics, according to a priori expectations. For example, older persons and those with poorer health or functional status were both more likely to use home health and have more visits. In comparing pre- and post-IPS years in multivariate analyses, we found that likelihood of receiving any home health use declined after the IPS was implemented, but that the

larger effect of the IPS was to reduce the number of visits received by home health users. Access to any home health use declined for both post-acute and community-user subgroups. Number of visits per user also declined for both groups under the IPS.

While the basic models were consistent with expectations, we were surprised that the interaction models found only a few cases in which the IPS had a disproportionate effect on access to any home health services, or on number of visits per user, among subgroups of beneficiaries. A notable exception was individuals with many ADL dependencies who received disproportionately fewer visits in the post-IPS period. That individuals with many ADL dependencies tend to have higher than average numbers of visits among users may explain why they were particularly affected when HHAs responded to the per beneficiary cost limits imposed by the IPS.

Our interaction models also found no differential changes in the number of visits among users across geographic areas in response to the IPS. One reason for this outcome is likely to be the IPS provision that established the per beneficiary cost limit on the basis of historical costs of individual agencies and other agencies in their region. Thus, the per beneficiary limits tended to be higher in the regions that had had higher levels of use prior to the IPS. Hence, while the IPS policy managed to reduce overall Medicare spending for home health, it was not successful in reducing geographic variations in utilization

Our finding of proportional changes in utilization across regions also suggest that the disproportionate share of HHA closings across the regions after the IPS was implemented did not translate into disproportionate reductions in home health use. We find no evidence that beneficiaries in the regions with the greatest share of clos-

ings had greater reductions in home health use. For example, while the West South Central region (including Texas, Oklahoma, and Louisiana) had one-third of their HHAs close between 1996 and 1999, utilization change in that region was similar to other regions. Hence, our findings seem consistent with the notion that geographic variations in agency closings were due, in large part, to variations in excess supply of HHAs before the IPS was implemented.

This study was designed to identify utilization changes among subgroups of the Medicare population, as a result of the home health IPS. To fully understand the impact of the IPS, other research is needed to determine, for example, whether reductions in home health visits led to longer hospital stays for the post-acute patients, increased use of skilled nursing facility care by both post-acute patients and community users, or increased burden on informal caregivers or other payers of home care services. It was also beyond the scope of this study to determine if health status outcomes of individuals needing Medicare home health services were adversely affected, or if the IPS simply reduced overutilization of the home health benefit.

In conclusion, despite the relatively short duration that Medicare's IPS was in effect, it had a remarkable impact on the utilization of home health services. Medicare home health care is now reimbursed under the HHA PPS, so the same questions raised here about the IPS need to be re-examined when data become available in the future. Our findings indicate that IPS policies affected utilization disproportionately only for a few subgroups of beneficiaries. They also provide a baseline for determining how access and use of Medicare home health services has changed since the implementation of the case-mix adjusted, Medicare HHA PPS.

REFERENCES

- Adler, G.S.: A Profile of the Medicare Current Beneficiary Survey. *Health Care Financing Review* 15(4):153-163, 1994.
- Benjamin, A.E.: Determinants of State Variations in Home Health Utilization and Expenditures Under Medicare. *Medical Care* 24(6):535-547, 1986.
- Duggan versus Bowen: U.S. District Court, Number 87-0383. Washington, DC. August 1, 1988.
- Katz, S., Ford, A.B., Moskowitz, R.W., et al.: Studies of Illness in the Aged. The Index of ADL: A Standardized Measure of Biological and Psychosocial Function. *Journal of the American Medical Association* 185:914-919, 1963.
- Kenney, G.M., and Dubay, L.C.: Explaining Area Variations in Home Health Utilization and Expenditures Under Medicare. *Medical Care* 30(1):43-57, 1992.
- Komisar, H.L., and Feder, J.: The Balanced Budget Act of 1997: Effects on Medicare's Home Health Benefit and Beneficiaries Who Need Long-Term Care. The Commonwealth Fund. New York. 1998.
- Laschober, M., and Olin, G.: Health and Health Care of the Medicare Population: Data from the 1992 Medicare Current Beneficiary Survey. Prepared by Westat, Inc. under contract to the Health Care Financing Administration. 1996.
- Lawton, M.P., and Brody, E.: Assessment of Older People: Self-Maintaining and Instrumental Activities of Daily Living. *Gerontologist* 9:179-186, 1969.
- Lewin Group: Implications of the Medicare Home Health Interim Payment System of the 1997 Balanced Budget Act. National Association for Home Care. Washington, DC. 1998.
- Liu, K., Long, S.K., and Aragon, C.: Does Health Status Explain Higher Medicare Costs of Medicaid Enrollees? *Health Care Financing Review* 20(2):39-54, 1998.
- McCall, N., Komisar, H.L., Persons, A., et al.: Medicare Home Health Before and After the BBA. *Health Affairs* 20(3): 189-198, 2001.
- Smith, B.M., and Rosenbaum, S.: Medicare Home Health Services: An Analysis of the Implications of the Balanced Budget Act of 1997 for Access and Quality. The George Washington University Center for Health Policy Research. Washington, DC. 1998.
- Stata Corporation: Stata® Statistical Software. Release 6.0. College Station, TX. 1999.
- Swan, J.H., Black, L., Benjamin, A.E., and Fox, P.: Use of Covered Services in Medicare Home Health Care. *Home Health Care Services Quarterly* 14(4):1-18, 1995.
- U.S. General Accounting Office: Medicare Home Health Benefit: Impact of Interim Payment System and Agency Closures on Access to Services. Report to Congressional Requesters, GAO/HEHS-98-238, Washington, DC. 1998.

Reprint Requests: Korbin Liu, Sc.D., The Urban Institute, 2100 M Street, NW., Washington, DC 20037. E-mail: kliu@ui.urban.org