A Profile of Home Health Users in 1992

Elizabeth Mauser, Ph.D., and Nancy A. Miller, Ph.D.

Recently, the use of home health services by Medicare beneficiaries has been growing. From 1987 to 1992, the percentage of all enrollees receiving home health rose from 4.8 to 7.2 percent, while the average number of visits among users increased from 23 to 54. This article uses the 1992 Medicare Current Beneficiary Survey (MCBS) to profile home health users. In addition to providing descriptive information about who uses Medicare home health, Tobit models are estimated to determine the factors that predict home health utilization and reimbursement. Various policy options for redesigning the home health benefit are also discussed.

INTRODUCTION

There have been significant increases in the proportion of Medicare beneficiaries receiving home health services and in the number of home health visits received per home health user. These increases can be partially explained by several policy changes since 1965 affecting both the eligibility and coverage requirements for the Medicare home health benefit. In 1972, Medicare coverage was extended to persons under 65 years of age who qualified as disabled or had chronic renal disease, and the 20 percent coinsurance payment for home health services under Part B coverage was eliminated. The Omnibus Reconciliation Act of 1980 eliminated the 3-day prior hospitalization stay coverage requirement for home health services and

the 100-visit limit. Subsequently, when HCFA settled *Duggan vs. Bowen* (1988), a lawsuit filed by a coalition of home health beneficiaries, providers, and members of Congress, and the revised guidelines for Medicare coverage of home health arising from this lawsuit were implemented in 1989, the utilization of home health escalated. From 1989 to 1992, there was a 210-percent increase in Medicare expenditures for home health services, reaching $7.5 billion in 1992.

Currently, Medicare provides coverage of home health services under both Part A (hospital insurance benefits) and Part B (supplementary medical insurance benefits). The Medicare home health benefit is skilled-care oriented. To be eligible for home health care under either Part A or Part B, a beneficiary must be homebound, under the care of a physician, and need part-time or intermittent skilled nursing services and/or physical or speech therapy. Physicians must prescribe the need for such care. If those requirements are met, beneficiaries are eligible to have payments made on their behalf for these and other covered home health services (i.e., occupational therapy, medical social services, home health aide services, medical supplies, and durable medical equipment). As general conditions of coverage for both Part A and Part B, home health services are covered only if furnished on a part-time (fewer than 8 hours a day) or intermittent (4 or fewer days per week) basis by a Medicare-certified home health agency (HHA).

The types of Medicare beneficiaries using home health have changed over time as a response to modifications in the

eligibility requirements for the home health benefit as well as changes in the overall health care delivery system and consumer preferences toward community-based care. With the implementation of the prospective payment system in hospitals, the need for home health services by Medicare beneficiaries has grown as patients have been discharged "quicker and sicker" from hospitals. As the length of hospital stays has fallen and medical technology has advanced, more medically complex cases are being treated in the home. Additionally, even though home health was originally conceptualized as a post-acute-care service, over time Medicare has been providing more home health to the chronically disabled elderly. All of these changes in the types of beneficiaries receiving home health make it difficult to determine how any reforms of coverage, eligibility, or payment for home health will impact the Medicare population. The purpose of this article is to identify the types of beneficiaries using the Medicare home health benefit in 1992 through a recent survey that contains the most up-to-date information on a representative sample of Medicare beneficiaries. In addition to providing a description of Medicare home health users, this article examines, through multivariate analyses, the determinants of home health use and reimbursement.

The data for this analysis come from the 1992 MCBS, which is linked with Medicare claims data from the National Claims History files. The MCBS is a longitudinal panel survey, sponsored by HCFA, of a representative sample of the Medicare population, including both the aged and the disabled. To permit detailed analysis of the disabled and oldest-old (85 years of age or over), these groups are oversampled. In the analysis that follows, weights are used to account for the oversampling of subsets of the population. Even with the weights, these data may not perfectly represent the characteristics of all beneficiaries. The MCBS, which began in 1991, gathers information on health care use and expenditures, demographic characteristics, health status and functioning, access to care, insurance coverage, financial resources, and family supports. The first round of the MCBS began in September 1991 and ended December 1991. Sample persons are reinterviewed every 4 months or three times per year. As more waves of data are collected on Medicare beneficiaries, the design of the MCBS will enable researchers to examine patterns of health care use over time. The analysis in this article is based on interviews completed with 12,383 Medicare beneficiaries in 1992 which are included in the MCBS access-to-care supplement.

DESCRIPTIVE PROFILE OF MEDICARE HOME HEALTH USERS

The Typical Home Health User

Although Medicare home health users cannot be classified into a homogeneous group, the typical home health user in 1992 was female, white, and 75 years of age or over. The majority of home health users (61 percent) did not live alone, and 36 percent were married. Most home health users (77 percent) had fewer than three limitations in their activities of daily living (ADLs).[1] The following analysis examines, in detail, the types of beneficiaries using home health during 1992.

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[1] The MCBS does not include specific information about the chronicity of ADL limitations; most other surveys ask if these limitations have lasted or are expected to last 3 or more months. When more rounds of data are available, it will be possible to determine whether a particular ADL limitation has lasted 4 or more months by comparing information on different rounds.

Distribution of Visits Across Home Health Users

Even though the Medicare home health benefit was originally designed as an acute-care benefit, the benefit is currently being used by more chronic cases. Since 1989, there has been a sharp increase in the proportion of Medicare beneficiaries using home health and in the average number of home health visits received per home health user. The distribution of visits across users is heavily skewed toward heavy users. From 1989 to 1992, the percentage of beneficiaries using home health increased from 5.1 to 7.2 percent. The average number of home health visits received per user in 1992 was 54, while the median was only 25. During the period 1991-92, the percent of users having more than 200 visits in the calendar year increased from 3.8 to 6.3 percent.

The total number of visits that a beneficiary receives consists of a combination of skilled and unskilled visits. Although 65 percent of home health users had no therapy (physical, occupational, or speech) visits in 1992, the average number of therapy visits for each of those receiving some therapy was 15. More than one-half of home health users (51 percent) had at least one aide visit, receiving an average of 56 aide visits. In contrast, almost all home health users (93 percent) received at least 1 skilled nursing visit, with 65 percent of users having fewer than 20 skilled visits during the year.

Functional Limitations

Home health users differ significantly from non-users in terms of the total number of limitations they experience in ADLs, with home health users having significantly more limitations in ADLs, which include bathing, eating, dressing, toileting, and transferring. Based on data from the 1984 Supplement on Aging, Fredman, Droge, and Rabin (1992) also found that home health care users were significantly more limited in ADLs than controls who were matched on age and gender. In 1992, Medicare beneficiaries using home health had, on average, 1.27 ADLs (out of 5) that they needed hands-on help to perform, while non-users had on average 0.30 ADL. The average total number of ADLs that a home health user needed help, supervision, or equipment to perform was 1.81, compared with 0.45 for non-users. Similarly, home health users needed help performing, on average, 2.50 instrumental activities of daily living (IADLs) out of 6, relative to non-users who needed help performing 0.72 IADL. IADLs include using the phone, doing light housework, doing heavy housework, making meals, shopping, and managing money.

Approximately 6.3 percent of the Medicare population had three or more ADLs. Less than one-fourth (23.3 percent) of Medicare beneficiaries with three or more ADLs used home health in 1992. The average number of visits for users with 3 or more ADLs was 98. Forty-two percent of home health users with more than 100 visits had 3 or more ADLs, while only 19 percent of home health users with under 100 visits had 3 or more ADLs.

Income and Medicaid Eligibility

Income reported on the MCBS is not an exact measure of a beneficiary's income. For married home health users, their spouses' income is included in the income reported on the MCBS. Also, income categories, rather than specific figures, are reported. Given these caveats, home health users appear to be more concentrated among low-income groups. Seventy-nine percent of home health users who

Income Category	Percent of Poverty Level	Percent of Users
65 Years or Over and Married[1]		
0-$5,000	Below 66	15.5
$5,001-$10,000	66-131	15.7
$10,001-$15,000	132-198	25.6
Over $15,000	Above 198	40.1
Missing Income	—	3.1
Under 65 Years and Married[2]		
0-$5,000	Below 59	23.6
$5,001-$10,000	59-118	11.6
$10,001-$15,000	119-178	26.7
Over $15,000	Above 178	30.9
Missing Income	—	7.2
65 Years or Over and Single[3]		
0-$5,000	Below 83	24.7
$5,001-$10,000	83-165	40.7
$10,001-$15,000	166-250	13.9
Over $15,000	Above 250	8.4
Missing Income	—	12.3
Under 65 Years and Single[4]		
0-$5,000	Below 77	38.7
$5,001-$10,000	77-152	51.4
$10,001-$15,000	153-230	8.5
Over $15,000	Above 230	0.0
Missing Income	—	1.4

[1] 4.36 percent used home health.
[2] 3.74 percent used home health.
[3] 9.46 percent used home health.
[4] 3.61 percent used home health.

SOURCE: Health Care Financing Administration, Office of the Actuary: Data from the Medicare Current Beneficiary Survey, 1992.

were single and 65 years of age or over (the majority of home health users) had incomes that fell below $15,000 or 250 percent of the poverty level. Roughly 57 percent of home health users who were married and 65 years of age or over had incomes that fell below $15,000 or 198 percent of the poverty level. Table 1 contains the income distribution of home health users by marital status and age, in relation to the poverty level.

More home health users were eligible for Medicaid relative to the rest of the Medicare population. Twenty-four percent of home health users were eligible for Medicaid in 1992, while 12 percent of non-users were eligible. Medicaid eligibility also varied across different groups of home health users. Users who received more home health visits were more likely to be eligible for Medicaid. Forty-five percent of home health users who received more than 200 visits were Medicaid-eligible, compared with 22 percent of home health users with fewer than 200 visits.

Household Composition

An important source of long-term care (LTC) is informal care provided by family and friends. Among persons with disabilities who live in the community, it has been estimated that roughly 90 percent receive some informal help, while 67 percent depend solely on help from family and friends. The percentage of those who are disabled relying entirely on paid home health providers increased from 5.5 percent in 1982 to 9 percent in 1989 (1982 and 1989 National Long-Term Care Survey).

In discussing issues surrounding home care in the 1990s, Gould, Haslanger, and Vladeck (1992) argue that the relationship between informal and formal care systems must be more clearly defined. Previous research that has focused on the relationship between informal and formal care has been concerned with whether formal home care services are a substitute for informal care, rather than focusing on the integration of formal and informal care (Hanley, Weiner, and Harris, 1991; Weissert, Cready, and Pawelak, 1988). The formulation of policies regarding home health care must take into account the crucial informal care component.

Data from the MCBS indicate that users of home health are more likely to live alone or be unmarried. In 1992, approximately 36 percent of home health users were married, compared with 54 percent of non-users of home health. Marital status did not differ significantly across home health

Living Status and Number of ADLs	Percent of Users With					
	<100 Visits	>100 Visits	<150 Visits	>150 Visits	<200 Visits	>200 Visits
Living Alone	35	41	38	36	34	44
Living Alone With 3 or More ADL Limitations	2	9	3	5	2	9
Living Alone With 0-2 ADL Limitations	33	32	35	31	32	35

NOTE: ADL is activity of daily living.

SOURCE: Health Care Financing Administration, Office of the Actuary: Data from the Medicare Current Beneficiary Survey, 1992.

users with different numbers of limitations in their ADLs. Forty percent of home health users with 3 or more ADLs were married, while 35 percent of home health users with 0-2 ADLs were married. Home health users who received more home health visits during the year were more likely to live alone and have 3-5 limitations in their ADLs. Table 2 summarizes the living situation of home health users by their number of ADLs and home health visits.

Home Health Charges and Reimbursement

Average total charges per home health user were $4,275 in 1992, while total reimbursement equaled $3,112. The average charge per visit amounted to $75.25. However, the average charge for a skilled visit ($92.79) was more than 1.5 times greater than the average charge for an aide visit ($60.31).[2]

Average total reimbursement differed significantly across different groups of home health users. The average reimbursement for home health users with fewer than 150 visits in 1992 (89 percent of home health users) amounted to $2,008. Total reimbursement for home health users with fewer than 150 visits accounted for 58 percent of the total reimbursement for Medicare home health. Average reimbursement for home health users with more than 150 home health visits totaled $12,276; approximately 40 percent of this reimbursement was for visits over 150. Although only 6.3 percent of home health users received more than 200 visits in 1992, this group accounted for 29 percent of the total Medicare home health reimbursement. Payment for visits over 200 accounted for 10 percent of the total Medicare home health reimbursement.

Medical Conditions

There was a wide range of primary diagnoses for home health users in 1992. Additionally, the average home health user was diagnosed with up to three conditions. Table 3 summarizes the primary diagnosis of home health users defined from *International Classification of Diseases, 9th Revision, Clinical Modification* (ICD-9-CM) codes after diagnoses have been grouped into 16 broad categories (Public Health Service and Health Care Financing Administration, 1980). Home health users with more than 100 visits during the year were more likely to be diagnosed with diabetes or urinary system symptoms, while home health users with fewer than 100 visits were more likely to be diagnosed with hypertension or bone fracture. A study based on home health user data from 10

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[2] We do not have information from the MCBS about the average reimbursement for different visit types; however, reimbursement is, on average, 72 percent of charges.

Table 3

A Comparison of the Most Common Primary Diagnoses on MCBS Billing Files for Home Health Users With More and Fewer Than 100 Home Health Visits

Primary Diagnosis	Percent of Users With		Percent of All Users
	<100 Visits	>100 Visits	
Neoplasms	5.6	4.2	5.4
Diabetes	7.6	13.1	8.5
Diseases of Circulatory System	30.2	30.7	30.3
Diseases of Respiratory System	8.0	4.7	7.4
Diseases of Digestive System	4.4	1.4	3.9
Diseases of the Skin	3.7	5.3	4.0
Diseases of the Musculoskeletal System	8.8	8.1	8.7
Fractures, Dislocations, Sprains	*8.0	*0.7	6.8
Diseases of the Genitourinary System	2.0	2.1	2.0
Infectious Diseases	0.9	0.0	0.8
Endocrine, Nutritional, and Metabolic Diseases (Other Than Diabetes)	1.8	0.7	1.6
Diseases of the Blood and Blood-Forming Organs	3.0	4.1	3.2
Mental Disorders	0.9	1.4	1.0
Diseases of Nervous System and Sense Organs	2.8	5.4	3.2

* Significant at $p < .05$.

NOTE: MCBS is the Medicare Current Beneficiary Survey.

SOURCE: Health Care Financing Administration, Office of the Actuary: Data from the Medicare Current Beneficiary Survey, 1992.

States in 1987 found that the most common primary diagnoses of home health users were the following: malignant neoplasms (11.5 percent); heart disease–other (8.3 percent); cerebrovascular disease (7.8 percent); digestive system disease (6.2 percent); arthropathies (5.3 percent); ischemic heart disease (5.2 percent); and diabetes mellitus (5.0 percent) (Branch et al., 1993).

Table 4 contains the medical conditions that respondents to the MCBS reported ever having. These conditions are not necessarily the ones that initiated the home health episode. Home health users who received more than 100 visits during the year were more likely to report having diabetes, osteoporosis, partial paralysis, or stroke.

Other Health Care Utilization and Reimbursement

Home health users utilize significantly more health care services than non-users. Seventy percent of Medicare home health users in 1992 were hospitalized at some point during the year, while only 13 percent of non-users were hospitalized. Out of the home health users who were hospitalized in 1992 and began their episodes of home health care in 1992, roughly 50 percent used home health within 30 days of being discharged. Some of the home health users in 1992 began their episodes of home health care in 1991. Roughly 31 percent of home health users began their episodes of home health care within 30 days after an inpatient stay in 1991. On the MCBS, beneficiaries who reported recent hospitalizations were asked where they were discharged to after their latest inpatient stay. Roughly 9 percent of hospitalized beneficiaries were transferred to an HHA. The majority of patients (73.5 percent) went home, with no home health services following their hospital stay.

Eleven percent of home health users in 1992 had no physician office visits during the calendar year, compared with 20

Table 4
Percent of Home Health Users Ever Experiencing Selected Medical Conditions

Medical Condition	Percent of Users With		Percent of All Users
	<100 Visits	>100 Visits	
Diabetes	*29	*39	31
Alzheimer's	9	3	8
Mental Disorder	8	7	8
Osteoporosis	*16	*23	17
Broken Hip	7	2	6
Parkinson's Disease	4	5	4
Emphysema	22	18	21
Partial Paralysis	*8	*15	9
Hardening of the Arteries	24	22	24
Hypertension	60	67	61
Myocardial Infarction	13	12	13
Angina Pectoris	14	10	13
Stroke	*16	*25	18
Cancer Other Than Skin	11	11	11

* Significant at $p < .05$.

NOTE: These conditions are not necessarily the ones that initiated the home health episode.

SOURCE: Health Care Financing Administration, Office of the Actuary: Data from the Medicare Current Beneficiary Survey, 1992.

percent of non-users. However, of the 30 percent of home health users who did not have an inpatient stay, 15 percent had no physician office visits. For those patients who were hospitalized, 99 percent had some Part B expenditures, but we do not know whether any of these charges were related to a physician setting up a plan of care. Because Medicare currently does not allow physicians to bill for their involvement in a patient's plan of care, it is difficult to determine the extent of physician involvement in home health care.

Not surprisingly, total Medicare expenditures for home health users were significantly higher relative to expenditures for non-users. The total Medicare reimbursement, on average, per home health user in 1992 amounted to $17,913—$13,620 for Part A reimbursement and $4,293 for Part B. In contrast, the average total reimbursement for non-users totaled $1,979 per non-user—$1,036 for Part A and $942 for Part B.

Geographic Variation

The percent of beneficiaries using home health differed significantly across the census regions. In the New England and East South Central regions, 9.5 percent and 10.2 percent of beneficiaries used home health, respectively, while in the West North Central region, a very small percentage (2.8 percent) used home health. Even though there are some differences in the characteristics of Medicare beneficiaries across the census regions as summarized in Table 5, most of them are not substantial. The percent of Medicare beneficiaries with three or more limitations in ADLs ranged from a low of 4.8 percent in the Mountain region to a high of 8.6 percent in New England. The highest proportion of the Medicare population of the West North Central region was 75 years of age or over and lived alone, but only 2.8 percent of beneficiaries in this region used home health. From Table 5, there does not seem to be a clear pattern of differences in the characteristics of Medicare beneficiaries across the census regions that might contribute to the variation in home health use. The variation may reflect differences in the availability of services and practice patterns across the United States. In the multivariate analyses that follow, we examine how

Table 5

Demographic Characteristics of All Medicare Beneficiaries, by Census Region

Census Region	Home Health Users	Limitations in 3 or More ADLs[1]	Male	Living Alone	Over 75 Years of Age
			Percent		
New England	9.5	8.6	42	37	41
Middle Atlantic	6.1	6.4	41	32	39
East North Central	5.1	6.6	42	33	39
West North Central	2.8	6.9	40	39	42
South Atlantic	7.5	5.9	42	32	37
East South Central	10.2	6.6	41	29	35
West South Central	7.2	6.0	44	32	38
Mountain	4.5	4.8	47	30	36
Pacific	5.8	5.8	43	33	39
Puerto Rico	7.2	7.1	50	16	39

[1] The activities of daily living (ADLs) included are: bathing, eating, dressing, transferring, and toileting.

SOURCE: Health Care Financing Administration, Office of the Actuary: Data from the Medicare Current Beneficiary Survey, 1992.

home health utilization is affected by State variation in the supply of nursing home beds, HHAs, and comprehensive outpatient rehabilitation facilities.

DESCRIPTIVE PROFILE OF SUBSETS OF HOME HEALTH USERS

Approximately 89 percent of home health users had fewer than 150 visits in 1992. They were more likely to be diagnosed as having circulatory problems, respiratory problems, or fractures, while users with more than 150 visits were more frequently diagnosed with diseases of the nervous system or sense organs. The average number of visits for those with fewer than 150 visits was 31, with average total home health reimbursement of $2,008; the average number of visits for those with more than 150 visits was 250, with average total reimbursement amounting to $12,276. Approximately 17 percent of the total reimbursement for home health can be attributed to the reimbursement for visits of more than 150 per user.

Home health users with more than 150 visits in 1992 had, on average, 79 skilled visits and 157 aide visits; the 33 percent of users of therapy visits had an average of 26 visits. In contrast, home health users with fewer than 150 visits in 1992 had, on average, 16 skilled visits, 12 aide visits, and the 34 percent of users of therapy visits had an average of 14 therapy visits. For home health users who had more than 150 visits in 1992, the visits up to 150 consisted of, on average, 45 skilled visits, 88 aide visits, and 18 therapy visits for those who received therapy. Visits for users with more than 150 visits consisted of, on average, 69 aide visits, 34 skilled visits, and 14 therapy visits for the 30 percent of home health users who continued to receive therapy after 150 home health visits. Home health users who received more than 150 visits appear to have received roughly 1 skilled visit for every 2 aide visits both before and after reaching the 150 total home health visit mark.

There are some differences in terms of the living situation, number of ADL limitations, and Medicaid eligibility among home health users with more or less than 150 visits. More home health users with fewer than 150 visits were married. Roughly 35 percent of home health users with fewer than 150 visits were married compared with 23 percent of home health users with more than 150 visits. However, the living situation does not differ significantly between these two groups of users. Thirty-eight percent of home health users with

fewer than 150 visits lived alone, compared with 36 percent of home health users with more than 150 visits. Home health users with more than 150 visits tended to be almost a year older than users with fewer than 150 visits—78.5 years compared with 77.6 years. Users with more than 150 visits had significantly more (2.64) limitations in their ADLs relative to the average number of limitations (1.19) for users with fewer than 150 visits (see Table 2). Medicaid eligibility also differs significantly between users with fewer than 150 visits in 1992 and more than 150 visits. Forty percent of home health users with more than 150 visits were eligible for Medicaid, while 22 percent of users with fewer than 150 visits were eligible.

DETERMINANTS OF HOME HEALTH USE AND REIMBURSEMENT

For this article, we modeled home health utilization following the Andersen model of health care utilization (Andersen et al., 1987). The Andersen model provides a useful framework for grouping variables that are predictors of health care utilization. Based on Andersen's model, the use of health services is a function of "predisposing, enabling, and need characteristics." An individual is predisposed to use services based on specific demographic and social characteristics. Enabling characteristics include not only personal resources such as income and insurance benefits but also the availability of services in a community. Need variables relate to the health of an individual. For our analysis, the predisposing characteristics encompass a beneficiary's age, gender, race, marital status, living situation, and education; the enabling characteristics include Medicaid eligibility and the supply of services in a beneficiary's State; and the need characteristics are represented by a beneficiary's medical conditions

and functional status. The Technical Note at the end of this article summarizes the variables included in the estimation.

According to Andersen's model, the need variables should most strongly impact use of health care services. To measure a beneficiary's need for home health care, we include a series of variables measuring a beneficiary's functional status and medical conditions. Functional status is measured through the total number of ADL and IADL limitations. We include five ADLs (eating, bathing, toileting, transferring, and dressing) and six IADLs (using the phone, doing light housework, doing heavy housework, making meals, shopping, and managing money). Because home health utilization should be a positive function of the number of comorbidities, we measure this through the number of different diagnoses recorded on the Medicare claims and by the number of medical conditions that a beneficiary has ever had. A variable is also included to measure whether the beneficiary begins an episode of home health use within 30 days of being released from an inpatient stay. A priori, it is hard to determine how this variable will affect utilization.

The predisposing characteristics of a Medicare beneficiary include marital status, living situation, gender, age, race, and education. Because a spouse, especially a wife, is a major source of informal care, home health use should be lower for males and for married couples. Ideally, the health status of a spouse should be included in the estimation to measure the availability and capability of informal supports. However, the MCBS does not collect this information. If beneficiaries who live alone do not have informal care available, they may be more likely to use home health. On the other hand, beneficiaries living alone may be healthier relative to other beneficiaries, thus requiring less home health

care. If disability is a positive function of age, we would expect use to increase as a beneficiary ages; however, it is unclear, a priori, whether the disabled will have lower or higher use relative to the elderly. Race captures both preferences between and access to different systems of care—institutional versus community. Education is included in the estimation to reflect a beneficiary's tastes and preferences. Additionally, in previous research it has been hypothesized that more educated people are more efficient producers of health (Grossman, 1972).

Medicaid eligibility and the availability of services in a beneficiary's State are used to measure enabling factors. Medicaid eligibility is not only a measure of socioeconomic status but also a measure of a beneficiary's involvement in a system of care. Because lower socioeconomic status is generally associated with higher morbidity, we would expect that the need and use of care would be higher for Medicaid-eligible beneficiaries. To capture availability of resources and services in a beneficiary's State, we include the following in our multivariate analyses: the number of nursing home beds per 1,000 Medicare beneficiaries; the Medicaid reimbursement rate for skilled nursing facility (SNF) care; the number of comprehensive outpatient rehabilitation facilities per 1,000 Medicare beneficiaries; the number of HHAs per 1,000 Medicare beneficiaries; and Medicaid home health expenditures per 100,000 population.

There is a great deal of variation across States in terms of the number of HHAs, the number of nursing home beds, the number of comprehensive outpatient rehabilitation facilities, and the reimbursement rates. This variation reflects not only differences in the resources available in each State but also differences in the practice patterns. Even though there is a trend toward using more community care services, States currently differ significantly in their mix of institutional and community services. For example, the number of Medicare-certified HHAs ranges from 11 in Alaska to 599 in Texas, while the number of HHAs per 1,000 Medicare beneficiaries ranges from 0.08 in Washington to 0.77 in Wyoming. At the same time, the number of nursing home beds per 1,000 Medicare beneficiaries fluctuates from 24.4 beds in Nevada to 85.9 in Nebraska. In Oklahoma, the Medicaid nursing home reimbursement rate averages $46.40, whereas in Alaska the average rate totals $217.19. Twelve States do not have any comprehensive outpatient rehabilitation facilities.

The effect of the supply factors—enabling factors—on home health use is not clear, a priori. How the supply of nursing home beds and comprehensive outpatient rehabilitation facilities affects the demand for home health will depend on the substitutability of home health for these services. Medicaid home health can be seen as a substitute for Medicare home health for the dually entitled (about 24 percent of home health users); thus, Medicaid reimbursement for home health per 100,000 population is included in the estimations to proxy the availability of Medicaid home health. As the Medicaid reimbursement rate for SNF care increases, we would expect providers to encourage more skilled nursing care relative to home health care. Because SNF care could be seen as a substitute for home health care, increased reimbursement for SNF care would increase use and access.

Providers can respond fairly quickly to changes in demand for home health services. As the demand for home health services increases, providers can contract out for additional nurses, aides, or therapists to meet the increased demand. Because the

care takes place in a person's home, it is easier for an HHA to expand its services compared with a nursing home which may have to build additional units or buildings to increase its supply. The number of Medicare-certified HHAs in a State is a very crude measure of the availability of home health. The number of Medicare-certified HHAs per 1,000 Medicare beneficiaries is included in the estimations as a proxy to capture differences in the practice patterns across the United States in terms of the emphasis of community-based care over institutional care within a State.

Because the majority of Medicare beneficiaries received no home health visits during a year, ordinary least squares estimation would produce biased and inconsistent estimates of the population parameters. To estimate the quantity of home health visits received in 1992 by Medicare beneficiaries,[3] we use the Tobit model, making the assumption that the unexplained portion of the quantity of home health visits received is distributed normally and the observed number of visits is truncated at zero (Maddala, 1983). The number of home health visits received by individual i is expressed as:

$$Y_i = \beta'x_i + \mu_i \text{ if } \beta'x_i + \mu_i > 0$$
$$Y_i = 0 \text{ otherwise,}$$

where x_i is a vector of control variables, β is a vector of unknown parameters, and μ_i is an error term normally distributed with mean zero and variance σ^2. Because home health visits consist of a mix of services including skilled nursing, aide, physical therapy, speech therapy, occupational therapy, and medical social service visits, the number of visits does not reflect the type of visits received. Thus, two equations are

estimated. In the first equation, the number of home health visits received during the 1992 calendar year is the dependent variable, while home health reimbursement for this time period is used as the dependent variable in the second equation to capture the variation in the mix of services received by home health users.

The coefficients of the Tobit model do not have the derivative interpretation as in the linear model. The expected value of the dependent variable is

$$E(Y_i) = \Phi(\beta'x_i/\sigma)\beta'x_i + \sigma\phi(\beta'x_i/\sigma),$$

where Φ and ϕ are the cumulative and normal density distribution functions, respectively. The derivatives are the coefficients of the Tobit model multiplied by the conditional probability of a non-zero dependent variable. The derivatives depend on the estimated vector of parameters as well as the control vector.

Results

Before estimating home health utilization and reimbursement, we estimated the probability of a Medicare beneficiary using home health through a logit model. We found that, in most cases, the variables that are significant predictors of the number of home health visits received also predict the probability of using home health. The variables that are significant predictors of the probability of using home health include marital status, total number of ADLs and IADLs, number of medical conditions, age, race, gender, and the availability of comprehensive outpatient rehabilitation facilities. The logit estimation suggests the following: the probability of using home health increases as the number of limitations in ADLs and IADLs increases; a beneficiary who is married is less likely to

Table 6

Tobit Estimation With the Number of Home Health Visits as the Dependent Variable (TOTHH)

Variable	Estimate	SE	PR>CHI	Derivative
INTERCEPT	-189.664	25.736	0.0001	-2.699
NHBED	- 0.257	0.177	0.1452	-0.004
HHA	-18.871	27.379	0.4907	-0.269
NHREIM	-0.006	0.236	0.9798	-0.000
REHAB	2182.570	506.975	0.0001	31.054
MEDHH	-0.003	0.015	0.8375	-0.000
ALONE	-5.488	5.188	0.2901	-0.078
TOTADL	7.635	1.621	0.0001	0.109
TOTIADL	8.689	1.404	0.0001	0.124
MEDICAID	12.438	5.326	0.0195	0.177
MALE	-7.139	4.878	0.1433	-0.102
WHITE	-17.792	5.368	0.0009	-0.253
TOTCOND	2.584	1.145	0.0240	0.037
LTHS	3.893	5.185	0.4527	0.055
MOREHS	6.199	6.429	0.3349	0.088
UNDER65	-18.816	7.809	0.0160	-0.268
AGE7585	3.349	5.473	0.5406	0.048
AGE85	1.422	6.563	0.8284	0.020
DIAGCNT	58.291	1.658	0.0001	0.829
ACUTE	20.971	6.115	0.0006	0.298
MARRIED	-10.502	5.608	0.0611	-0.149
SCALE	82.649	2.106		

Log Likelihood for Normal: -5390
n = 12,098

NOTE: SE is standard error. PR>CHI is the probability of obtaining a Chi-square as large or larger than the computed Chi-square statistic by chance alone.

SOURCE: Health Care Financing Administration, Office of the Actuary: Data from the Medicare Current Beneficiary Survey, 1992.

use home health; as the number of different medical conditions that a beneficiary has ever had increases, the probability of using home health also increases; races other than white are more likely to use home health; males are less likely to use home health; the probability of using home health increases with age; and as the number of comprehensive outpatient rehabilitation facilities increases, the probability of using home health also increases. The coefficients for all of these variables are in the same direction as the coefficients in the Tobit estimation with the number of home health visits received as the dependent variable.

The results from the Tobit estimations are presented in Tables 6 and 7, with the marginal derivatives. The statistical significance differs for some variables between the estimations with the number of visits as the dependent variable and home health reimbursement as the dependent variable, but all of the variables have the

same sign. Not surprisingly, as the total number of limitations in ADLs and IADLs increases, home health utilization and reimbursement also increase. We find that beneficiaries who are married use fewer visits. Because a spouse is an important source of informal care, married beneficiaries require less formal care. Even after controlling for marital status, males use fewer visits, but the difference in utilization between males and females is not statistically significant.

Race appears to be an important predictor of home health utilization. White persons use less home health, other things being equal, relative to all other races, perhaps because of the more frequent use of other health services (such as SNF care) by white persons. Beneficiaries who are also eligible for Medicaid use more home health than those not dually entitled. Higher utilization among the dually entitled may reflect the higher incidence of disease among low-income groups and

Table 7

Table 7

Tobit Estimation With the Home Health Reimbursement as the Dependent Variable (TOTREIM)

Variable	Estimate	SE	PR>CHI	Derivative
INTERCEPT	-9083.360	1374.377	0.0001	-132.599
NHBED	-22.237	9.346	0.0173	-0.325
HHA	-1986.091	1492.787	0.1834	-28.993
NHREIM	-0.346	12.551	0.9780	-0.001
REHAB	76626.819	27087.28	0.0047	1118.598
MEDHH	-0.196	0.761	0.7965	-0.000
ALONE	-273.187	273.913	0.3186	-3.988
TOTADL	414.831	85.535	0.0001	6.056
TOTIADL	432.633	74.224	0.0001	6.319
MEDICAID	541.126	282.132	0.0551	7.899
MALE	-404.587	256.917	0.1153	-5.906
WHITE	-1001.946	283.049	0.0004	-14.626
TOTCOND	153.906	60.218	0.0106	2.247
LTHS	123.089	272.287	0.6512	1.797
MOREHS	253.356	336.765	0.4519	3.699
UNDER65	-1035.907	415.814	0.0127	-15.122
AGE7585	191.687	287.789	0.5054	2.798
AGE85	247.853	344.250	0.4715	3.618
DIAGCNT	3083.076	88.064	0.0001	45.007
ACUTE	1244.591	322.818	0.0001	18.169
MARRIED	-458.230	295.394	0.1208	-6.689
SCALE	4367.203			

Log Likelihood for Normal: -8701
n = 12,098

NOTE: SE is standard error. PR>CHI is the probability of obtaining a Chi-square as large or larger than the computed Chi-square statistic by chance alone.

SOURCE: Health Care Financing Administration, Office of the Actuary: Data from the Medicare Current Beneficiary Survey, 1992.

their involvement in systems of care.[4] Although we do control for the number of different diagnoses and medical conditions, our analysis does not capture the types of medical problems; thus, Medicaid eligibility may be capturing the severity of the conditions experienced by low-income groups. The estimations suggest that beneficiaries with more medical conditions and different diagnoses use more home health compared with other beneficiaries and that patients receiving home health as a post-acute-care service receive more visits. Also suggested is that disabled beneficiaries receive fewer visits compared with the elderly, and that education is not a significant predictor of home health utilization, other things being equal.

There is wide variation in home health utilization across the United States. It appears that some of this variation is due to differences in the supply of services. As the number of nursing home beds per 1,000 Medicare beneficiaries increases, the utilization of home health falls, suggesting that home health and SNF care are substitutes. This effect is not statistically significant in the estimation with the number of home health visits as the dependent variable, but it is significant in the estimation of home health reimbursement. As the number of comprehensive outpatient rehabilitation facilities increases, home health utilization and reimbursement also significantly increase, suggesting that they are complements. The other supply factors are not statistically significant in either of the estimations.

There are a few differences between the logit and Tobit estimations. Living alone increases the probability of using home health; however, someone who lives alone

[4]We do not include income as an enabling factor, because we are missing income information for some individuals; for others, we know only whether their income is above or below $25,000; and for those with incomes above $50,000, we have no idea how high their incomes really are.

receives fewer visits, other things being equal. Being Medicaid-eligible increases the probability of using Medicare home health, but it is not statistically significant, while Medicaid eligibility is significant in the estimation of the number of home health visits received. Although disabled beneficiaries have significantly fewer visits relative to beneficiaries between 64 and 75 years of age, beneficiaries 74 years of age or over do not have significantly more visits compared with beneficiaries under 75 years of age. In contrast, the probability of using home health increases significantly with age.

POLICY IMPLICATIONS

As technology has become more advanced, and the preferences for community care by consumers and providers have grown, HHAs are serving a more diverse population in terms of their clinical and personal care needs. In 1992, Medicare expenditures for home health amounted to $7.5 billion and are expected to reach $17.4 billion by 1996. The recent increase in utilization and expenditures has sparked discussions about how to improve the Medicare home health benefit, while controlling expenditure growth.

The LTC provisions under the Health Security Act[5] proposed by President Clinton include a 10-percent copayment for Medicare home health not within 30 days of a hospital stay. If Medicare beneficiaries had a copayment for home health services, the effect of the copayment on home health use for those who have private insurance would depend on the extent to which the copayment would be covered by private medigap policies. Approximately

89 percent of Medicare home health users have at least some private insurance or are eligible to receive Medicaid home health services. We would expect decreased use of home health by low-income, non-Medicaid beneficiaries, because they tend not to have medigap policies and would not be able to afford the increased cost.

Currently, President Clinton's LTC reform package is expected to expand home and community-based services for persons with severe disabilities by covering everyone with three or more limitations in ADLs. If an individual is cognitively impaired, less stringent ADL eligibility would be used. In 1992, only 23 percent of Medicare beneficiaries using home health had three or more ADLs, receiving an average of 98 visits during the calendar year.[6]

Home health users with zero to two ADLs who are Medicaid-eligible would also be covered in President Clinton's package through a residual program; this group accounted for 18 percent of Medicare home health users in 1992. The average number of home health visits for this group of users was 72 in 1992. The majority (59 percent) of Medicare beneficiaries who received home health in 1992 would not be covered in the new LTC program. Approximately 65 percent of home health users with fewer than 100 home health visits in 1992 had zero to two ADLs, and were not eligible for Medicaid, while 30 percent of home health users with more than 100 visits during the year would not be covered. Almost one-third of home health users who would not qualify for coverage under President Clinton's plan live alone.

When the Medicare home health benefit was originally designed, there was a

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[5] In addition to the Health Security Act, all of the health care reform proposals presented by the Senate and House of Representatives included expanded home and community-based LTC programs.

[6] The MCBS does not contain information about the cognitive impairment of Medicare beneficiaries, except for an indicator of Alzheimer's disease.

100-visit limit per year for home health. In 1980, this limit was eliminated. If such a limit existed today, it would affect close to 18 percent of home health users. Because the number of visits per home health user has been rapidly increasing, a 200-visit limit on home health would have affected 6 percent of home health users in 1992. This group of users was more functionally disabled, tended to live alone, and was more likely to fall into low-income groups. Home health users with more than 200 visits had, on average, limitations in 2.67 ADLs and 3.69 IADLs relative to other users, who had limitations in 1.18 ADLs and 2.42 IADLs. Roughly 44 percent of home health users who had more than 200 visits lived alone, while 34 percent of home health users with fewer than 200 visits lived alone. Furthermore, 44 percent of home health users with more than 200 visits were Medicaid-eligible, but only 22 percent of users with fewer visits were Medicaid-eligible.

Other considerations for reshaping the Medicare home health benefit include whether the benefit should be limited to acute-care cases and how the coordination of care between Medicare and Medicaid could be improved. Although the Medicare home health benefit was initially conceived as a post-acute-care service, this has changed over time as more chronic-care cases have been receiving home health. In 1992, approximately 66 percent of home health users began their episodes of care within 30 days of being discharged from an inpatient stay. Because roughly 24 percent of Medicare beneficiaries are dually entitled, and Medicaid eligibility and coverage policies differ from State to State, it is difficult to coordinate the services between Medicare and Medicaid home health and other community-based services. As the number of beneficiaries using community-based care continues to increase, it becomes more important to examine how Medicare and Medicaid home health coverage, eligibility, and payment policies interact.

This article has provided a glimpse of the diverse group of home health users in 1992. Although beneficiaries use home health for a variety of conditions, we have found that the most significant personal characteristics that predict home health utilization are functional limitations, medical conditions, marital status, race, Medicaid eligibility, and age. As more years of data from the MCBS become available, we will be able to observe how users of home health change over time.

TECHNICAL NOTE

A Description of Variables Included in Tobit Estimations

Dependent

TOTHH   Total number of home health visits received in 1992.

TOTREIM   Total reimbursement for home health visits in 1992.

Independent

Supply Factors

NHBED   Number of nursing home beds in a State per 1,000 Medicare beneficiaries.

HHA   Number of HHAs in a State per 1,000 Medicare beneficiaries.

NHREIM   Nursing home reimbursement per SNF day in a State.

REHAB   Number of comprehensive outpatient rehabilitation facilities in a State per 1,000 Medicare beneficiaries.

MEDHH   Medicaid reimbursement for home health in a State per 100,000 population.

Demand Factors

ALONE   Binary equal to one if a beneficiary lives alone and equal to zero otherwise.

TOTADL   Total number of limitations in five ADLs.

TOTIADL   Total number of limitations in six IADLs.

MEDICAID   Binary equal to one if a beneficiary is Medicaid-eligible and equal to zero otherwise.

MALE   Binary equal to one if a beneficiary is male and equal to zero otherwise.

WHITE   Binary equal to one if a beneficiary is white and equal to zero otherwise.

TOTCOND   Total number of medical conditions that a beneficiary ever had. These conditions are listed in Table 4.

LTHS   Binary equal to one if a beneficiary completed less than high school and equal to zero otherwise.

MOREHS   Binary equal to one if a beneficiary completed more than high school and equal to zero otherwise.

UNDER65   Binary equal to one if a beneficiary is under 65 years of age and equal to zero otherwise.

AGE7585   Binary equal to one if a beneficiary is between 74-85 years of age and equal to zero otherwise.

AGE85   Binary equal to one if a beneficiary is 85 years of age or over and equal to zero otherwise.

DIAGCNT   Number of diagnoses listed on Medicare Home Health claim.

ACUTE   Binary equal to one if a beneficiary began an episode of home health within 30 days of being discharged from a hospital and equal to zero otherwise.

MARRIED   Binary equal to one if a beneficiary is married and equal to zero otherwise.

SCALE   The scale parameter.

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