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# Policy Impact Section

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## Effects of Post-hospital Medicare Home Health and Informal Care on Patient Functional Status

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**Objective.** To examine the effect of post-hospital Medicare home health and informal care on the functional status of 755 Medicare beneficiaries six weeks after hospital discharge for treatment of stroke, chronic obstructive pulmonary disease (COPD), congestive heart failure (CHF), hip procedures, and hip fractures.

**Study Setting/Data Sources.** Consecutive patients enrolled in the study between March 1988 and February 1989 prior to discharge from one of 52 hospitals in three cities. Data sources included patient interviews, medical records, and the Medicare Automated Data Retrieval System (MADRS).

**Analysis.** The effect of the two types of care on patients' subsequent functional status was estimated using a selectivity corrected least squares regression of functional status six weeks post-discharge on hours of informal care, Medicare home health expenditures, and patient prior functional and cognitive status.

**Data Collection/Extraction Methods.** Patients were interviewed before hospital discharge and six weeks later. The patient's primary caregiver was interviewed by telephone six weeks post-discharge. Patient data included demographic characteristics, illness severity, cognitive status, functional status at discharge and six weeks later, post-discharge expenditures for Medicare home health, and hours of informal care.

**Principal Findings.** More informal care after discharge was associated with greater patient functional impairment six weeks later. The amount of Medicare home health that patients used had a nonsignificant effect on subsequent functional status.

**Conclusions.** Post-acute home care may maintain the patient at home and compensate for functional limitations, rather than promote restoration of function. Future studies are needed to examine the effects of specific types of care, services, and providers as well as factors that mediate their effects on patient functional outcomes.

**Key Words.** Post-acute care, home healthcare, informal care, Medicare

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Medicare's role in financing home care for older people with acute and chronic health problems has grown dramatically in recent years (Clouser 1994). Medicare spending for home healthcare increased by 40 percent

between 1988 and 1991 (Bishop and Skwara 1993). This growth reflects increases in the percentage of beneficiaries receiving home health, the average number of home health visits per beneficiary, and service intensity (Mauser and Miller 1994; Reschovsky 1996). The longer episodes of care suggest that Medicare is playing an increasingly larger role in both post-acute and long-term care for older people with functional impairments. To a large extent, Medicare's role in the latter is conditional on its role in the former.

Most recipients of Medicare home health services are also receiving informal care provided by their families and, to a lesser extent, by friends and neighbors. Moreover, the caregiving activities of family and Medicare-funded home health providers overlap to some extent. In particular, home health aides, under the supervision of a nurse, provide physical care—they dress, feed, bathe, and toilet functionally impaired older people. Additionally, visiting nurses provide and supervise medically oriented care. Part of their role often includes teaching family members to provide similar care. Families may give oral and injectable medications and care for wounds in between nurse visits. Similarly, physical, occupational, and speech therapists implement rehabilitation programs for the older person and teach families to provide follow-up care.

Few studies have examined the effects of both types of post-hospital care (informal and Medicare home health) on the subsequent functioning of Medicare beneficiaries. Informal care has been examined primarily with respect to social, psychological, and economic effects on older people and their family caregivers (Greene and Coleman 1995; Linsk et al. 1995; Montgomery 1995). Studies of the effect of formal home care on functional status outcomes for older people have primarily addressed long-term care (Weissert, Cready, and Pawelak 1988).

Overall, it has been difficult to show that formal home care services are associated with significant improvements in the functional status of older people who receive care (Weissert and Hedrick 1994). However, two recent studies suggest that home health services may improve functional status outcomes

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for those receiving the care (Kane et al. 1994; Shaughnessy, Schlenker, and Hittle 1994).

Kane, Finch, Chen, et al. (1994) examined functional status outcomes for patients discharged home with and without Medicare home healthcare. The pattern of change in functional status among those who went home without home health services varied by their discharge DRG. In particular, patients treated for stroke, CHF, and COPD showed an overall pattern of deterioration between discharge and six weeks later. In contrast, patients with those conditions who received post-acute home health services showed improvement in functional status over the six weeks.

A recent study of Medicare beneficiaries found, after adjusting for case mix, that Medicare patients in HMOs received less home healthcare and had lower functional status outcomes compared to those in fee-for-service plans (Shaughnessy, Schlenker, and Hittle 1994). The authors suggest that the higher intensity of home healthcare received by those in the fee-for-service plans accounted for their better functional status outcomes.

In light of the skilled care focus of Medicare home healthcare, policy-makers may expect the effect of Medicare home healthcare on functional outcomes to be different from that of other types of home care, including informal care. Indeed, analysis of Channeling data by Greene, Lovely, and Ondrich (1993) found that nursing services, compared to services provided by home health aides and homemakers, were substantially more influential in decreasing the likelihood of an individual being admitted to a nursing home from the community. Greene, Lovely, and Ondrich (1993) suggest that this reflects nursing as a more professionally intensive intervention compared to the other services. Consequently, it may have a greater effect per unit of service. Thus, to the extent that Medicare home health has a large component of nursing care and supervision, it is reasonable to expect to observe a relationship between levels of Medicare home health and functional status.

The present study uses data from Kane (1994) to examine the effect of both Medicare home health and informal home care on patients' functional status at six weeks post-hospital. Kane (1994) addressed the effect on functional status of receiving any versus no Medicare home healthcare and informal care on post-hospital functional status.

## METHODS

### *Sample*

The analytic sample was obtained from a 1994 study of post-acute care (PAC) by Kane. The study examined post-acute care for Medicare beneficiaries

discharged from hospitals for treatment of one of five conditions common among the elderly and known to require varying levels of post-acute care: stroke, COPD, CHF, hip fractures, and hip procedures. Participants were enrolled in the study between March 1988 and February 1989 from hospitals in three metropolitan areas: Pittsburgh, Pennsylvania (18 of 20 eligible hospitals participated); Houston, Texas (15 of 31 eligible hospitals participated); and Minneapolis/St. Paul, Minnesota (19 of 19 eligible hospitals participated).

Patients were interviewed just prior to discharge and again at six weeks post-discharge. The patient's primary caregiver, the person identified by the patient as providing the most assistance after the hospital, was interviewed six weeks post-discharge. Additionally, a modification of the Medisgroup® approach was used to produce an illness severity score based on data from the medical record. Finally, Medicare expenditures for each patient for home health services provided by Medicare-approved home health agencies were obtained from the Medicare Automated Data Retrieval System (MADRS) for the first six weeks following hospital discharge.

Because this analysis focuses on the effect of post-acute home health and informal home care on patients' physical functioning, patients discharged to nursing homes, hospitals, or rehabilitation facilities and those who were rehospitalized or entered a nursing home (about 5 percent) before the six-week interview were excluded from the analyses. Consequently, the analytic sample includes 755 patients who were discharged to the community and remained there throughout the six-week time period.

### *Model Specification*

The effect of the two types of care on patients' subsequent functional status was estimated using a selectivity corrected least squares regression of functional status six weeks post-discharge on hours of informal care, Medicare home health expenditures, patient prior functional and cognitive status, DRG, illness severity, and patient race. Justification for the model specification is as follows.

Prior studies of formal and informal home care show that patient and caregiver characteristics influence the amount of care patients receive (Bass and Noelker 1987; Branch and Jette 1983; Christianson 1988; Edelman and Hughes 1990; Greene 1983). Consistent with those findings, we assumed that patient and caregiver characteristics influence functional status indirectly through their influence on the amount of post-hospital care that patients receive. However, patient race was included in the ADL equation because other analyses of these data found that non-whites showed less improvement

in functional status at six weeks post-discharge than whites (Kane, Finch, Chen, et al. 1994).

Additionally, separate analyses not reported here revealed no statistically significant relationship between the amount of informal care patients received in the first two weeks after discharge and post-hospital Medicare home health expenditures for those patients (Penrod 1995). Consequently, our approach treated the amount of informal care that patients received as exogenous with respect to the amount of Medicare home health received.

Finally, the probability that patients received Medicare home healthcare was modeled separately from the effect of variations in the amount they received on functional status outcomes. There are two justifications for this approach. First, it parallels the sequence of events at hospital discharge. Prior to discharge, hospital discharge planners (i.e., nurse, doctor, social worker) decide whether Medicare patients meet the criteria for Medicare post-acute home healthcare. After discharge, the home health provider, usually a nurse, makes a home visit to determine how much of what type of care is needed.

Second, the sample is divided into patients with zero expenditures for post-acute Medicare home health and those with positive expenditures. Ordinary least squares (OLS) regression does not account for unmeasured factors influencing both the probability of receiving Medicare home health services and the functional status outcomes for patients who receive the services. The omitted relevant variable (or variables) leads to biased and inconsistent OLS estimates in the regression of functional status on post-acute informal care hours and Medicare home health expenditures. Heckman's (1979) two-step method corrects the bias in the OLS estimates.

### *Measures*

Table 1 summarizes the variables included in the analysis. The table indicates how the variable is measured, its data source, and the reference category for categorical variables in the analysis.

*Dependent variables.* Use of post-acute Medicare home health is measured with a dichotomous variable indicating whether the patient had any Medicare expenditures for home health services between discharge and six weeks later. Patient functional status is measured with a weighted sum of seven functions: incontinence, bathing, dressing, toileting, transferring, feeding, and walking. The weighted ADL measure was developed specifically for the PAC study. (For a detailed discussion, see Finch, Kane, and Philp 1995). It was developed through a Delphi approach in which a panel of experts produced

Table 1: Variables Specification

<i>Variable</i>	<i>Measurement</i>	<i>Source</i>	<i>Reference Category</i>
Probability of use of post-acute Medicare home health	1 = Patient receives Medicare home health 6 weeks post-discharge	MADRS file	0 = No Medicare home health received
Amount of informal care	Hours week 1 and 2 post-discharge of care by the primary caregiver	Six-week telephone caregiver interview	—
Amount of Medicare post-acute home healthcare	Dollars of reimbursement over six weeks post-discharge	MADRS file	—
Patient functional disability score at six weeks post-discharge	Points on the weighted ADL measure	In-person six-week patient interview	
Patient race	1 = White (based on patient self-report)	In-person discharge patient interview	0 = Not white
Patient gender	1 = Female	In-person discharge patient interview	0 = Male
Patient age	Years	In-person discharge patient interview	—
Patient household income	Dollars per year of income (based on patient self-report)	In-person discharge patient interview	—
Patient cognitive status at discharge	Number wrong on SPMSQ	In-person discharge patient interview	—
Patient functional disability before hospital	Points on the weighted ADL measure	In-person discharge patient interview	—
Patient functional disability at discharge	Points on the weighted ADL measure	In-person discharge patient interview	—
Illness severity on admission	Physiologic score used in Apache system	Patient medical record	—
Patient illness is stroke	1 = DRGs 14, 1, 5	Patient medical record	DRG is hip fracture

*continued*

Table 1: *Continued*

<i>Variable</i>	<i>Measurement</i>	<i>Source</i>	<i>Reference Category</i>
Patient illness is COPD	1 = DRGs 88, 85, 86, 89, 90, 92, 93, 96, 97	Patient medical record	DRG is hip fracture
Patient illness is CHF	1 = DRG 127	Patient medical record	DRG is hip fracture
Patient illness is hip procedure	1 = DRGs 209,210,211	Patient medical record	DRG is hip fracture
Site is Minneapolis/St. Paul, MN	1 = Yes	In-person discharge patient interview	Site is Pittsburgh
Site is Houston, TX	1 = Yes	In-person discharge patient interview	Site is Pittsburgh
Post-discharge living arrangement	1 = Caregiver and patient live together	Six-week telephone caregiver interview	0 = Live apart
Prior care arrangements	1 = Received formal, informal, or both types of care before the hospitalization	In-person discharge patient interview	0 = No care before the hospital
Caregiver gender	1 = Female	Six-week telephone caregiver interview	0 = Male
Relationship: Spouse caregiver	1 = Yes	Six-week telephone caregiver interview	0 = Other
Relationship: Adult child caregiver	1 = Yes	Six-week telephone caregiver interview	0 = Other
Caregiver age	Years	Six-week telephone caregiver interview	—
Caregiver has dependents under age 18 at home	1 = Yes	Six-week telephone caregiver interview	0 = No dependents
Caregiver employment	1 = Works outside the home	Six-week telephone caregiver interview	0 = Not employed

the weights for each of the functional areas and for each level of impairment within the areas.

The weighted score is highly correlated with the conventional simple count of ADL limitations. However, the weighted measure addresses problems inherent in other ADL/IADL measures. The weighted score does not assume that each area of limitation is equivalent to every other area. For

example, the inability to use the toilet has a relatively high score of 848. At the same time, the measure scores a person needing a little help with feeding (score of 424) and a little help with transferring (401) at 825, or nearly as impaired as the person requiring help with toileting. The weighted score for each function was summed to produce a total dependency score. *Higher scores reflect higher levels of disability.* Values range from 0–5431.

*Independent Variables.* The caregiver's self-report of the number of hours of care that he or she provided in the first two weeks after hospital discharge was used as the measure of informal care. It is an estimate of the combined time spent helping with personal care, for example, bathing, dressing, and toileting; with household chores; with arranging services and managing business affairs; and with general supervision and watching to make sure the patient was safe. Data on the hours of care provided by other informal caregivers were not available in the data set. As such, the variable covers the majority but not the total hours of informal care received. Values range from 0–224.<sup>1</sup>

The amount of Medicare home healthcare received is the total reimbursement to the home health agency for services provided to the patient from the day of discharge to six weeks later under Medicare Part A and B from the MADRS file. Only home health expenditures by Medicare for the patient are included. A direct measure of services received was not available. Thus, cost serves as a proxy for the type and amount of services that patients used.

## RESULTS

### *Overview of Sample*

Table 2 summarizes the characteristics of patients and caregivers in the sample. The average age of the patients was 75 years, and they were predominantly female and white. The mean of self-reported patient income was about \$15,000 yearly.

At discharge, patients' cognitive skills were relatively intact with an average of about two errors out of ten as measured by the Short Portable Mental Status Questionnaire (Pfeiffer 1975). With respect to functional disability, patients were more impaired at discharge compared to before, or six weeks after the hospitalization. The average functional disability score prior to the hospital was 489 (s.d. = 767); at discharge, 1,799 (s.d. = 1,180); and at six weeks post-discharge 743 (s.d. = 883). Paired *t*-tests indicated that the differences in means were significant in all three comparisons.<sup>2</sup>



**Table 2: Characteristics of Study Sample: Means and Proportions**  
(*N* = 755)

<i>Patient Characteristics</i>	<i>Mean (s.d.)</i>
Female	59%
White	89%
Age	75 yr (7.1)
Cognitive status score at discharge	1.8 (2.2)
Illness severity score	3.4 (3.3)
DRG: Stroke	18%
COPD	18%
CHF	25%
Hip procedures	23%
Hip fractures	16%
Site: Twin Cities	47%
Houston	21%
Pittsburgh	32%
Functional status before hospital	487.2 (766.2)
Functional status score at discharge	1758.9 (1177.5)
Functional status score at six weeks	743.2 (883.32)
Received care before hospital	75%
Received post-acute Medicare home health services	41%
Medicare reimbursement six weeks for users	\$411.92 (\$492.51)
Received post-discharge informal care, week 1-2	96%
Informal care hours over week 1-2	69.3* (67.8)
Patient household yearly income	\$15,531 (\$11,782)
Female	75%
Age	59 yr (14.6)
Relationship to patient:	
Spouse	40%
Adult child	42%
Other family/friend	18%
Had at least one minor dependent at home	18%
Employed outside home	58%
Shared household with patient prior to hospital	54%
Shared household with patient at discharge	66%

\* Hours are reported by the caregiver. Hours reported greater than 16 hours a day were coded as 16 hr/day.

Table 2 additionally summarizes characteristics of the primary informal caregivers. The majority were women with an average age of 59 years. About the same proportion of caregivers were either the patient's spouse or progeny. A smaller group were friends or other relatives (e.g., nieces, nephews, siblings) of the older person. A minority of caregivers had a dependent under age 18 at home. The majority were employed outside the home.

Table 3 presents a detailed description of the pattern of care arrangements prior and subsequent to the hospitalization. The majority of patients received some assistance during both time periods, 75 percent and 96 percent, respectively. The increase in the proportion of patients receiving care in the first two weeks after discharge reflects a move toward patients using more informal care alone and combined with Medicare home healthcare. In contrast, the percentage of patients relying solely on formal care is smaller after discharge compared to the percentage three months before entering the hospital.

Table 4 shows the proportion of patients and caregivers living together before and after hospital discharge. The majority of patients (85 percent) did not change their living arrangement at discharge. Of the 15 percent who did move, the majority ( $n = 103$ ) were patients who did not live with the caregiver before the hospital admission but did share a household after discharge. In all 103 situations, the caregiver was an adult child or other relative of the patient. Thus, the increase in post-discharge shared households resulted from an increase in households composed of patients and their non-spousal caregivers.

Finally, with respect to the amount of care patients received, the average Medicare expenditures for post-acute home healthcare among those receiving it was \$412 over the six-week post-discharge period. The average number of hours of informal care patients received over the first two weeks post-discharge was 69. However, the median was 42, indicating a large number of patients at the lower end of the distribution.

Table 3: Distribution of Care Arrangements Before and Post-hospital Discharge ( $N = 755$ )

	<i>Before Hospital</i> (%)	<i>Week 1-2 Post-Discharge</i> (%)
Both types of care	29	40
Informal care only	36	56
Formal care only	10	1
No care	25	3

Chi-square = 54.2,  $df = 9$ ,  $p < .001$

Table 4: Proportion of Dyads in Shared Households Before and Post-hospital Discharge (N = 755)

	<i>Patient and Caregiver Lived Together Before Hospital</i> (N = 408)	<i>Patient and Caregiver Did Not Live Together Before Hospital</i> (N = 347)
Patient and caregiver lived together at discharge (N = 500)	32.3%	13.6%
Patient and caregiver did not live together at discharge (N = 255)	1.5%	52.6%

*Predictors of Post-acute Medicare Home Health Use*

Approximately 40 percent of the patients in the sample received post-acute Medicare home health services. Table 5 summarizes results of the Probit model to estimate the effect of each independent variable on the probability of patients receiving post-acute Medicare home health services during the six-week post-discharge period. Older patients and those who were more functionally impaired at discharge were more likely to receive the services. Additionally, patients living apart from their primary caregiver before the hospitalization and those who received care before the hospitalization (prior care) were more likely to be users of post-acute Medicare home healthcare.

Both DRG and site influenced the probability of receiving formal home health services. Patients with COPD or hip procedure as their discharge diagnosis were significantly less likely than hip fracture patients to use any post-acute Medicare home services. The probability of receiving post-acute home health was also lower for patients in Houston and Minneapolis-St. Paul compared to patients from Pittsburgh.

*The Effect of Post-acute Care on Functional Dependency*

The results of the selectivity-corrected least squares regression of functional dependency six weeks post-discharge on the amount of the two types of post-acute care, controlling for prior patient cognitive and functional status, DRG, race, and illness severity, are summarized in Table 6. The model accounts for 47 percent of the variance in patient functional status at six weeks post-discharge.

More informal care in the first two weeks after discharge was associated with an increase in functional impairment four weeks later. In particular, each

Table 5: Predictors of Use of Post-acute Medicare Home Health Services: Probit Coefficients and Standard Errors ( $N = 755$ )

<i>Characteristics</i>	<i>Coefficients (s.e.)</i>	<i>p = values</i>
Patient is white	-.26 (.17)	ns
Patient is female	-.16 (.12)	ns
Patient age	.018 (.006)	$t = 2.86, p = .003$
Discharge cognitive status	.03 (.03)	ns
Illness severity	.008 (.02)	ns
DRG is stroke	-.31 (.17)	ns
DRG is COPD	-.44 (.20)	$t = -2.24, p = .025$
DRG is CHF	-.25 (.18)	ns
DRG is hip procedure	-.51 (.17)	$t = -3.05, p = .002$
Site is Twin Cities	-.63 (.12)	$t = -5.16, p < .001$
Site is Houston	-.65 (.15)	$t = -4.31, p < .001$
Patient income	-.00001 (.000005)	$t = -1.98, p = .05$
Patient prior functional status	.00002 (.00007)	ns
Patient discharge functional status	.0002 (.00006)	$t = 3.74, p < .001$
Patient received prior care	.36 (.13)	$t = 2.77, p = .006$
Caregiver is female	-.13 (.12)	ns
Co-resided before hospital	-.40 (.15)	$t = -2.61, p = .009$
Caregiver is spouse	-.19 (.22)	ns
Caregiver is adult child	-.18 (.15)	ns
Caregiver age	-.009 (.006)	ns
Caregiver has dependents	-.06 (.15)	ns
Caregiver is employed	-.22 (.12)	ns

additional hour of informal care is associated with an increase of about two points on the disability scale. In contrast, variations in the amounts of post-acute Medicare home health services that patients receive had an insignificant effect on functional dependency six weeks after discharge.

As would be expected, the level of functional impairment six weeks after hospital discharge was strongly influenced by the patient's functional impairment before admission and at discharge from the hospital. The more impaired the patient was prior to the hospital and at discharge, the higher the disability score at six weeks.

Additionally, the more cognitively impaired patients were at discharge, the more functionally disabled they were six weeks later. Functional impairment at six weeks increased by 59 points with each additional number wrong on the Short Portable Mental Status Questionnaire (SPMSQ) at hospital discharge. After controlling for the other patient factors, DRG was not a significant predictor of subsequent functional status.

Table 6: Selectivity Corrected Least Squares Estimates of the Effects of Post-acute Care on Functional Disability: Coefficients and Standard Errors ( $N = 311$ )

<i>Predictors</i>	<i>Effect On Functional Disability At 6 Weeks Post-discharge</i>	
Hours of informal care	1.75 (.61)	$t = 2.88, p = .004$
\$ of Medicare home health	.13 (.09)	ns
Discharge cognitive status	59.38 (2.85)	$t = 2.85, p = .004$
Patient prior functional status	.45 (.06)	$t = 7.76, p < .001$
Patient discharge functional status	.18 (.05)	$t = 3.61, p < .001$
Stroke	-158.71 (147.2)	ns
COPD	-25.72 (168.4)	ns
CHF	-70.92 (141.4)	ns
Hip procedures	-211.78 (154.7)	ns
Patient is white	-330.82 (128.6)	$t = -2.57, p = .011$
Illness severity	-25.28 (15.2)	ns
Inverse Mill's ratio	-88.52 (154.5)	ns
Adjusted $R^2$	.47	

Race did matter with respect to the disability score. Patients who are white were less impaired six weeks after discharge compared to non-whites. Specifically, white patients scored about 329 points lower on the disability scale where a lower score implies less disability.

Finally, the coefficient for the inverse Mills Ratio was not significantly different from zero. This suggests that no selection effect on functional status was measurable at six weeks post-discharge.

## DISCUSSION

This study examined the effects of post-hospital Medicare home health and informal care on patients' subsequent functional dependency. After taking account of patient functional status before the hospitalization, and cognitive and functional status at discharge, the amount of post-acute home care that patients received had limited effects on their functional status six weeks after discharge.

The finding that more hours of informal care are associated with greater patient dependency four weeks later deserves some comment. The finding can be understood best by considering factors that plausibly mediate the effect of informal care on the older person's functional status.

One factor that influences the relationship between informal care and functional disability is the goal of the care. Despite the fact that the goals of informal home care are implicit and varied, it is generally agreed that informal care for functionally impaired community-residing older people is focused primarily on enabling that person to remain at home with as few unmet needs as possible.

The emphasis of care is to compensate for the older person's functional disability. Informal caregivers often have safety concerns that guide what they do on behalf of their family members, especially with respect to transferring or walking. Their goal is not necessarily to provide rehabilitative care designed to improve functional outcomes for the older person. Caregivers may find that they expend less time and effort actually performing the task themselves for the older person than would be the case if the tasks were completed with a rehabilitative objective in mind. In particular, rehabilitation may require retraining, practice, and support of the older person in addition to the steps required to simply perform or complete the task for the older person.

Moreover, informal caregivers may feel that the older person is safer if they assist with or take over the task. Thus, the positive effect of informal care hours on functional disability may be the result of caregivers performing the task for the older person because it is an efficient and effective way to enable the family member to remain at home. Over time, the older person's skill at some ADL and IADL tasks may actually atrophy, leaving the person more impaired.

Thus, one possible explanation for the finding that more hours of informal care are associated with greater patient dependency four weeks later is that caregivers may inadvertently induce functional dependency. This is consistent with results from the National Long-term Care Demonstration that people who received expanded home care reported more ADL limitations at six months and twelve months compared to baseline (Applebaum et al. 1988).

In the absence of specific discharge planning, including teaching and follow-up, some caregivers may take the patient's functional status at discharge as mostly fixed. If the patient is unsafe getting in and out of bed or a chair, the informal caregiver may provide assistance as long as needed, and the patient's ability to transfer without help may return as part of the natural course of the illness. But whether that functional improvement is recognized and encouraged depends on characteristics of the caregiver, the older person, and the extent to which rehabilitative goals and behavior are present in the caregiving—detailed aspects of caregiving that were not measured in this study, but that can and should be considered in future studies.

A majority of the patients in the sample did not receive Medicare home health services at discharge. Those who did were more functionally impaired at discharge. The positive relationship between disability and the use of home and community-based services among older people is well documented (Bass and Noelker 1987; Branch and Jette 1983; Hanley, Wiener, and Harris 1991; Kane and Kane 1987). Moreover, a recent study of Medicare beneficiaries indicates that users of the home health benefit are significantly more disabled than non-users (Mauser and Miller 1994). Thus, this study provides additional confirmation of the positive relationship between functional disability and the use of post-acute formal home care—and Medicare home healthcare in particular.

Establishing a complementary relationship between formal and informal care in the post-acute period may be a worthy public policy objective, although such a policy has to be examined in light of the objectives of the two forms of care. The extent to which the two forms of care should be complementary may depend on the amount of emphasis placed on patient rehabilitation—only a portion of which is indexed by the measures of functional status employed in the present study—and how much emphasis is placed on personal care that is designed to maintain the patient at home and to compensate for functional limitations, neither of which is clearly rehabilitative.

## NOTES

1. Caregivers who reported informal care hours equal to 24 hours a day were re-coded to 16 hours to allow 8 hours sleep.
2. Prior and discharge:  $t = 31.7, p < .001$ . Discharge and 6 weeks:  $t = 27.2, p < .001$ . Prior and 6 weeks:  $t = -8.9, p < .001$ .

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