

Access to Health Care Services for the Disabled Elderly

Donald H. Taylor, Jr. and Helen Hoenig

Objective. To determine whether difficulty walking and the strategies persons use to compensate for this deficit influenced downstream Medicare expenditures.

Data Source. Secondary data analysis of Medicare claims data (1999–2000) for age-eligible Medicare beneficiaries ($N = 4,997$) responding to the community portion of the 1999 National Long Term Care Survey (NLTCs).

Study Design. Longitudinal cohort study. Walking difficulty and compensatory strategy were measured at the 1999 NLTCs, and used to predict health care use as measured in Medicare claims data from the survey date through year-end 2000.

Data Extraction. Respondents to the 1999 community NLTCs with complete information on key explanatory variables (walking difficulty and compensatory strategy) were linked with Medicare claims to define outcome variables (health care use and cost).

Principal Findings. Persons who reported it was very difficult to walk had more downstream home health visits (1.1/month, $p < .001$), but fewer outpatient physician visits (-0.16 /month, $p < .001$) after controlling for overall disease burden. Those using a compensatory strategy for walking also had increased home health visits/month (0.55 for equipment, 1.0 for personal assistance, $p < .001$ for both) but did not have significantly reduced outpatient visits. Persons reporting difficulty walking had increased downstream Medicare costs ranging from \$163 to \$222/month ($p < .001$) depending upon how difficult walking was. Less than half of the persons who used equipment to adapt to walking difficulty had their difficulty fully compensated by the use of equipment. Persons using equipment that fully compensated their difficulty used around \$300/month less in Medicare-financed costs compared with those with residual difficulty.

Conclusions. Difficulty walking and use of compensatory strategies are correlated with the use of Medicare-financed services. The potential impact on the Medicare program is large, given how common such limitations are among the elderly.

Key Words. Mobility impairment, disability, medicare, access, costs

Elderly individuals with limitations in activities of daily living are likely to have more need for health care services compared with persons without such limitations, both because of the direct effects of such limitations as well as the

underlying medical conditions that cause them (Neri and Kroll 2003). However, mobility limitations in particular might increase the need for medical care while hindering a person's ability to access such care. Any barrier to the full range of needed medical care could be expected to have negative consequences on the health and level of functioning of elderly persons, and could also lead to increased downstream health care costs.

The Medicare program finances health care services for the vast majority of persons age 65 and older in the United States, including many persons with severe activity limitations. Medicare covers outpatient physician and hospital services as well as other care that is especially relevant for the treatment of such persons. For example, home health benefits cover nursing and rehabilitative care, physician visits, and physician oversight of the home health services, and may be more readily accessible to those with difficulties than is outpatient care for which patients must travel (Centers for Medicare and Medicaid Services 2004). However, few physicians visit the home, some office-based services cannot be provided in the home (e.g., radiographs), and the ability to provide oversight for home-based care is limited if the patient cannot be seen and examined. In addition, Medicare finances the purchase of assistive technology devices to aid with disability through its durable medical equipment (DME) benefit. Identifying the appropriate mix of ambulatory, home health, and DME services to be used by elderly beneficiaries with activity limitations may both improve quality of life as well as reduce downstream health care costs.

However, some Medicare coverage and payment policies may undermine access to a full range of medical care for disabled beneficiaries. For example, Medicare coverage is limited to DME used in the home, and multiple items for the same condition are not covered (e.g., walker and wheelchair), and long-stay nursing homes are not covered (Palmetto GBA 2003; Centers for Medicare and Medicaid Services 2003a). Thus, Medicare typically would not pay for a wheelchair if the patient could walk in the home with a walker, but needed a wheelchair for accessing their physician's office. Dilemmas such as this have led patient advocacy groups to call for changes in Medicare DME regulations (Bristo et al. 2000; Consortium for Citizens with Disability 2001).

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Persons with activity limitations report barriers to receiving needed physician services (Iezzoni 2002) and have unmet health needs (Iezzoni et al. 2000). Physically disabled Medicare beneficiaries are more likely to be dissatisfied with their health care (Jha et al. 2002). Yet, disabled adults (persons age 18+) account for 46 percent of total health care expenditures, and they have per capita health care expenditures that are nearly six times greater than nondisabled adults (DeJong et al. 2002). Past studies of health care utilization by persons with limitations typically have controlled for severity or underlying and/or comorbid illnesses in different ways (Chan et al. 2002; DeJong et al. 2002). Thus, it is unclear whether the additional expenditures among these persons are appropriate given their concomitant illness/disability burden.

This paper addresses the effect of difficulty walking indoors and the compensatory strategy used for such difficulties on downstream health care use financed by the Medicare program. Specifically we answered the following three questions: (1) Does increased difficulty walking increase downstream health care use after accounting for overall disease burden and health conditions that could contribute to such difficulty? (2) Does the compensatory strategy (use of equipment versus personal assistance) used to address activity limitations affect downstream health care use after accounting for overall disease burden and health conditions that could contribute to such difficulty? (3) Does use of a compensatory strategy that fully compensates for the underlying mobility limitation result in lower downstream health care use after accounting for overall disease burden and health conditions that could contribute to such difficulty? This study takes advantage of the fact that walking difficulty and compensatory strategy used for walking were measured separately at the 1999 National Long Term Care Survey (NLTCs), and downstream use of Medicare-financed services were measured through year end 2000 using Medicare claims. We conclude by discussing implications for Medicare.

METHODS

Study Sample

Data are from the 1999 NLTCs community sample. The NLTCs is a national survey that includes respondents from 172 primary sampling areas in 42 states across the United States. The 1999 NLTCs consisted of community dwellers who had responded to previous NLTCs surveys and survived to 1999, or community dwelling persons newly added to the study sample. All persons

were age 65 or older and were identified using Medicare enrollment files. The NLTCS collected information about activity limitations, including detailed information about the ability to complete certain tasks and the compensatory strategies used to do so. Persons with complete data were included in our analyses ($n = 4,997$).

Structure of Analyses. The 1999 NLTCS was used to identify respondent's level of difficulty walking (if any) at baseline. Difficulty walking, compensatory strategy used to address such difficulty, and other explanatory variables defined at the 1999 NLTCS interview (fielded April–November 1999) were then used to predict health care utilization measured in Medicare claims data after the interview until death or the censor date, December 31, 2000. Potential follow-up ranged from 16 to 21 months.

Dependent Variables. The following dependent variables were measured in Medicare claims records: outpatient and home health visits; cost of total Medicare-financed care; and cost of Medicare-financed care excluding the cost of outpatient and home health care. Outpatient and home health visits were both believed to be the most sensitive to the effects of difficulty walking and/or the compensatory strategy used for walking. Outpatient visits were defined by modifying an algorithm used by Chin, Zhang, and Merrell (1998). We used CPT codes in Part B Medicare claims data to identify outpatient visits that were similar to the type of care that can be provided via the Medicare Home Health benefit. Information in the Medicare Home Health Intermediary Manual (Centers for Medicare and Medicaid Services 2003b) identified all of the CPT codes used at that time for home health services (American Medical Association 1999; Kirschner et al. 1999). For each service/code used in the home health setting, a similar code for the outpatient sector (if such existed and was applicable) was identified. The exact CPT codes used to identify outpatient visits are available from the authors.

We divided the total outpatient and home health visits used during the study period by the number of months an individual survived, to control for the fact that respondents had different periods of follow-up after the 1999 survey. The total cost of Medicare-financed care (all types of care, including inpatient costs), and total cost minus outpatient and home health costs were also divided by months survived during follow-up. Costs are expressed in constant year 2000 dollars.

Key Explanatory Variables. The most important explanatory variables were how much difficulty a person reported with walking across a room, and the

compensatory strategy an individual reported using for walking inside the home. There were three mutually exclusive categories for the difficulty walking variable: (1) no difficulty walking; (2) somewhat difficult walking; and (3) very difficult walking or an individual could not walk. For the compensatory strategy variable, we defined three mutually exclusive categories: (1) no help needed; (2) used equipment only; and (3) used human help (whether equipment was or was not used).

Other Explanatory Variables. We used the Mini-Mental Status Exam (MMSE) to measure cognition (Folstein, Folstein, and McHugh 1975). The score ranged from 0 to 30, with higher scores signifying better cognitive status. We specified four mutually exclusive cognition groups: (1) good cognition, with a score of 24 or higher; (2) poor cognition, with a score lower than 24; (3) a proxy was needed to complete the NLTCs, in which case an MMSE score was not available; and (4) missing data, when an MMSE score was not available and the survey did not indicate use of a proxy respondent. The following reasons were given for proxy responses: mental incapacity, physical inability, hearing or speech problem, unable to speak English, temporarily absent from the residence (e.g., on a trip), and other reasons. We included binary variables corresponding to these reasons in both descriptive and multivariate analyses.

The overall burden of disease was controlled for with the prospective DxCG score (Ellis et al. 1996). This score utilizes information from all types of Medicare claims records including inpatient, outpatient, physician supplier part B, home health, and SNF files, and incorporates both primary and secondary diagnoses, and procedures; it is a good measure of overall burden of disease vis-à-vis future health care expenditures (Warner et al. 2004). We calculated a DxCG score for all study respondents using Medicare claims data from 1998, the year prior to the 1999 NLTCs survey; a higher score signified that an individual would be expected to have a higher Medicare-financed costs in the following year.

We created five binary variables that represented potential reasons that persons would have difficulty walking, and/or need to use a compensatory strategy for doing so by using self-reported conditions from the 1999 NLTCs. These variables were: musculoskeletal conditions (rheumatism, broken hip, broken bone); cardiovascular conditions (heart attack, other heart problem, hypertension, stroke, circulation trouble in arms or legs); neurological condition (paralysis, other permanent numbness or stiffness, multiple sclerosis, cerebral palsy, epilepsy, Parkinson's disease); obesity; and pulmonary conditions (pneumonia, bronchitis, flu, emphysema, asthma). These variables took the value 1 if a

respondent reported at least one specific condition within each category, or if they self-reported obesity, otherwise the variables were 0.

As some home health services (e.g., home health aid services), are directed to assisting with self-care tasks rather than providing medical services per se, we controlled for self-care ability. However, bathing, dressing, and toileting are all adversely affected by lower extremity impairment. Lower extremity impairment also is the main factor causing walking difficulty, which we believed might hinder access to ambulatory health care services. Thus, controlling for bathing, dressing, or toileting and certainly for all of them would be likely to control for the same construct as difficulty walking (the effect of lower extremity dysfunction on access to health care). Therefore, we chose to control for needing help with eating as this was a purely upper extremity task, yet would also control for home health services needed for self-care purposes. Finally, we controlled for whether an individual died before the study censor date, because of the well-known relationship between utilization of health care services near the end-of-life. Other control variables included respondents' age, race (white versus other), sex, education (high school education, or higher versus less), and if residence is in a rural county (versus urban).

Statistical Methods. We used one-way ANOVA to test whether the number of outpatient, home health visits, and the cost of total Medicare-financed care used after the 1999 NLTCs differed by the three values of the two key explanatory variables of interest (difficulty walking and compensatory strategy). A similar analysis was conducted for all explanatory variables. We also used a median test to compare the dependent variables across the difficulty walking categories, as health utilization data tend to be right skewed. The median test was implemented in *Stata* using a χ^2 test and classified observations as falling above or below the median (StataCorp 2001).

We then used ordinary least squares (OLS) regression to analyze the number of outpatient and home health visits per month survived during the study period, as well as the cost of Medicare-financed care per month survived. We estimated median regression as a sensitivity analysis. Finally, we determined whether persons with fully compensated walking difficulty had reduced use of Medicare-financed health care services compared with persons for whom the compensatory strategy they used did not fully compensate for their reported difficulty walking. We used the intersection of the two key explanatory variables (compensatory strategy and difficulty) to define fully compensated difficulty. Persons who used equipment only or who used personal assistance to cope with difficulty walking, but who also

reported that they had no difficulty in walking across a room and back, were identified as persons with fully compensated difficulty. A χ^2 test was used to compare the effect of fully compensated difficulty on health care use. All analyses were performed using *Stata*, version 7.0 (StataCorp 2001).

RESULTS

Persons who reported a greater level of difficulty in walking at the 1999 NLTCs used fewer office visits in the following months, and more home health visits compared with those with no difficulty (Table 1). Those with no difficulty walking had 0.58 visits/month, those with some difficulty had 0.62, while those reporting walking to be very difficult had 0.49 ($p = .003$). Conversely, those reporting walking to be very difficult had two home health visits/month compared with 1.2 for the somewhat difficult group and 0.32/month for those reporting no difficulty ($p < .001$). Such differences were robust, and differences in the median of both types of visits were also highly significant ($p < .001$). Persons reporting greater difficulty walking also had higher total downstream Medicare-financed health care costs; those reporting that walking was very difficult incurred \$1,230/month versus \$484/month for those with no difficulty ($p < .001$). Similarly, persons reporting walking to be very difficult incurred \$1,012/month in costs that were not related to outpatient visits or home health (e.g., hospital), compared with \$363/month ($p < .001$) among those reporting walking was not difficult.

Virtually all variables differed significantly by difficulty walking (Table 1). Persons reporting that walking was very difficult were older, less likely to be white, had lower education, were less likely to have good cognition, were more likely to have a proxy respondent, and were more likely to die during the follow-up period. One-quarter of those who reported that walking was very difficult died prior to the censor date, while 15 percent of those who reported it was somewhat difficult, and only 6 percent that reported it was not difficult died ($p < .001$). Persons who had great difficulty walking were more likely to self-report medical conditions (musculoskeletal, cardiovascular, neurological, and pulmonary conditions, and obesity) that are plausibly linked to ambulation than were those who reported no such difficulty (p -values ranged from $< .001$ to $.004$).

Comparisons of the same variables across the compensatory strategy categories (none, equipment only, personal assistance) showed that outpatient visits did not differ; however, for all other measures including downstream Medicare costs, the results of ANOVA and median comparisons showed the group using personal assistance to be the sickest, and most vulnerable group,

Table 1: Study Variables Stratified by Walking Difficulty

| | Walking Difficulty | | | F, χ^2 * | p |
|--|--------------------|-----------|----------|---------------|-------|
| | None | Somewhat | Very | | |
| N | 3,516 | 921 | 560 | | |
| <i>Dependent variables (per month)†</i> | | | | | |
| Outpatient visits, mean | 0.58 | 0.62 | 0.49 | 5.9 | .003 |
| Interquartile range‡ | 0.0–.86 | 0.07–0.86 | 0.0–.72 | 19.6** | <.001 |
| Home health visits | 0.32 | 1.2 | 2.0 | 101.8 | <.001 |
| Interquartile range | 0.0–0.0 | 0.0–.14 | 0.0–.72 | 280.7** | <.001 |
| Other Medicare care costs (\$) | 363 | 811 | 1,012 | 68.3 | <.001 |
| Interquartile range | 0.0–72 | 1–732 | 9–222 | 167.5** | <.001 |
| Total Medicare care costs (\$) | 484 | 1,016 | 1,230 | 71.9 | <.001 |
| Interquartile range | 3–345 | 20–1,054 | 34–1,620 | 153.5** | <.001 |
| <i>Explanatory variables (at 1999 NLTCs unless noted)</i> | | | | | |
| Age, years | 78.9 | 82.0 | 82.3 | 91.1 | <.001 |
| Overall disease burden (DxCG score), 1998 | 0.88 | 1.25 | 1.6 | 147.1 | <.001 |
| White (%) | 0.90 | 0.86 | 0.81 | 21.4 | <.001 |
| Female (%) | 0.63 | 0.70 | 0.68 | 9.3 | <.001 |
| High school education or greater (%) | 0.59 | 0.47 | 0.43 | 41.2 | <.001 |
| Rural (%) | 0.51 | 0.55 | 0.56 | 3.7 | .02 |
| Lives alone (%) | 0.39 | 0.43 | 0.36 | 3.9 | .02 |
| Died during study (%) | 0.06 | 0.15 | 0.25 | 116.3 | <.001 |
| <i>Adaptive strategy for walking indoors</i> | | | | | |
| Equipment (%) | 0.12 | 0.32 | 0.28 | 137.6 | <.001 |
| Personal assistance (%) | 0.06 | 0.29 | 0.61 | 819.7 | <.001 |
| <i>Cognition (MMSE)</i> | | | | | |
| Good (%) | 0.46 | 0.30 | 0.17 | 116.0 | <.001 |
| Poor (%) | 0.14 | 0.22 | 0.17 | 17.6 | <.001 |
| Proxy respondent (%) | 0.15 | 0.27 | 0.49 | 199.2 | <.001 |
| Missing data (%) | 0.25 | 0.21 | 0.17 | 9.9 | <.001 |
| <i>Reason for proxy respondent</i> | | | | | |
| Mentally incapable (%) | 0.029 | 0.062 | 0.15 | 79.1 | <.001 |
| Physically incapable (%) | 0.022 | 0.078 | 0.18 | 149.9 | <.001 |
| Hearing or speech problem (%) | 0.040 | 0.066 | 0.12 | 29.7 | <.001 |
| Non-English speaker (%) | 0.009 | 0.015 | 0.014 | 1.4 | .24 |
| Temporarily absent (%) | 0.047 | 0.050 | 0.050 | 0.069 | .93 |
| Other reason (%) | 0.028 | 0.043 | 0.066 | 11.9 | <.001 |
| <i>Categories of health conditions that may contribute to difficulty walking</i> | | | | | |
| Musculoskeletal (%) | 0.59 | 0.77 | 0.73 | 65.1 | <.001 |
| Cardiovascular (%) | 0.57 | 0.75 | 0.80 | 91.2 | <.001 |
| Neurological (%) | 0.14 | 0.31 | 0.46 | 197.1 | <.001 |
| Obesity (%) | 0.18 | 0.22 | 0.23 | 5.6 | .004 |
| Pulmonary (%) | 0.22 | 0.36 | 0.34 | 48.2 | <.001 |

*F is for one-way analysis of variance, or for χ^2 statistic for median test as noted by**.

†Dependent variables measured from date of the 1999 NLTCs interview to December 31, 2000, or death.

‡Values shown are the interquartile range (25th and 75th percentile). Test statistic is for median test. NLTCs, National Long Term Care Survey.

Table 2: Effect of Difficulty Walking and Compensatory Strategy on Downstream Health Care Use

| Alternative Specifications* | Dependent Variables (per Month) | | | | | | | |
|--|---------------------------------|-------|------------------|-------|---------------------|-------|-----------------------------|-------|
| | Visits | | | | Medicare Costs (\$) | | | |
| | Outpatient [†] | | Home Health | | Total | | Excluding Outpatient and HH | |
| | Coefficient [SE] | p | Coefficient [SE] | p | Coefficient [SE] | p | Coefficient [SE] | p |
| <i>Difficulty walking indoors</i> | | | | | | | | |
| Somewhat difficult | -0.023 [0.027] | .40 | 0.51 [.11] | <.001 | 222 [58] | <.001 | 181 [52] | <.001 |
| Very difficult | -0.16 [.036] | <.001 | 1.1 [.15] | <.001 | 163 [78] | .04 | 141 [69] | .04 |
| N | 4,997 | | 4,997 | | 4,997 | | 4,997 | |
| R ² | 0.10 | | 0.09 | | 0.25 | | 0.24 | |
| <i>Compensatory strategy for walking indoors</i> | | | | | | | | |
| Equipment | -0.050 [0.028] | .057 | 0.55 [0.12] | <.001 | 88 [60] | .15 | 72 [53] | .18 |
| Personal assistance | -0.060 [0.036] | .099 | 1.0 [0.15] | <.001 | 172 [78] | .03 | 126 [69] | .07 |
| N | 4,997 | | 4,997 | | 4,997 | | 4,997 | |
| R ² | 0.100 | | 0.09 | | 0.25 | | 0.24 | |

*Explanatory variables difficulty walking and compensatory strategy were not used in the same models.

[†]Ordinary least squares regression used to analyze dependent variables. Numbers shown are coefficients and standard errors in parentheses. In addition to the variables above, all variables shown in Table 1 were included as explanatory variables.

with the group using no compensatory strategy to be the healthiest (data not shown but available from authors).

After controlling for all variables shown in Table 1, persons reporting that walking was very difficult had fewer outpatient visits (0.16 fewer visits/month, $p < .001$), and more home health visits (1.1 more visits/month, $p < .001$, Table 2) compared with those reporting no difficulty. Persons who reported that walking was somewhat difficult did not differ significantly from those with no difficulty in terms of outpatient visits, but did have more home health visits (0.51 visits/month, $p < .001$). Persons who used a compensatory strategy had significantly more home health visits (0.55 more for those using equipment, 1.0 more for those using personal assistance, $p < .001$ for both), but did not

differ from those not using a strategy in terms of outpatient visits. Persons who reported difficulty walking had higher downstream total Medicare costs, as did persons compensating with walking problems via personal assistance. Those reporting walking to be somewhat difficult had costs increased by \$222/month ($p < .001$), while those reporting it was very difficult had a slightly smaller increase of \$163/month ($p < .001$), both as compared with those reporting no difficulty. Individuals using personal assistance incurred costs for the Medicare program that were \$172/month higher ($p = .03$) compared with those using no compensatory strategy.

Less than half (409 of 859) of the persons using equipment only to compensate for walking difficulty, and fewer than one-fourth (195 of 800) of those using personal assistance to do so reported no difficulty in walking (Table 3). Thus, most elderly persons experienced residual difficulty in spite of the compensatory strategy used (equipment or personal assistance). Persons with fully compensated difficulty used fewer downstream health care services after the 1999 NLTCs. Total Medicare spending was \$717/month among

Table 3: Intersection of Difficulty Walking and Compensatory Strategy on Downstream Utilization and Cost to the Medicare Program

| <i>Walking Difficulty</i> | <i>Compensatory Strategy</i> | | | χ^2 | <i>p</i> |
|---------------------------|------------------------------|-----------------------|----------------------|----------|----------|
| | <i>No Help Needed</i> | <i>Equipment Only</i> | <i>Personal Help</i> | | |
| <i>N</i> | 2,912 | 409 | 195 | | |
| <i>Not difficult</i> | | | | | |
| Outpatient visits | 0.58 | 0.61 | 0.64 | | |
| Home health visits | 0.21 | 0.84 | 0.95 | | |
| Other Medicare costs (\$) | 306 | 548 | 829 | | |
| Total Medicare costs (\$) | 413 | 717 | 1,052 | | |
| <i>N</i> | 364 | 293 | 264 | | |
| <i>Somewhat difficult</i> | | | | | |
| Outpatient visits | 0.66 | 0.61 | 0.56 | | |
| Home health visits | 0.76 | 1.4 | 1.6 | | |
| Other Medicare costs (\$) | 865 | 732 | 824 | | |
| Total Medicare costs (\$) | 1,108 | 902 | 1,017 | | |
| <i>N</i> | 62 | 157 | 341 | | |
| <i>Very difficult</i> | | | | | |
| Outpatient visits | 0.55 | 0.53 | 0.45 | 2.4 | .01 |
| Home health visits | 0.83 | 1.6 | 2.4 | 33.7 | <.001 |
| Other Medicare costs (\$) | 757 | 886 | 1,117 | 22 | <.001 |
| Total Medicare costs (\$) | 872 | 1,087 | 1,361 | 24 | <.001* |

*Tests are χ^2 , which test whether the row and columns are independent. All outcomes are measured on a per month basis.

equipment users with fully compensated difficulty compared with \$902/month for equipment users reporting some difficulty and \$1,087/month for equipment users reporting it was very difficult in spite of the compensatory strategy they used ($p < .001$). Individuals using personal assistance as a compensatory strategy but who reported no difficulty walking also had lower downstream Medicare costs. Total downstream Medicare-financed costs were \$1,052/month for those reporting no difficulty while using personal help, but \$1,361 for those who reported walking to be very difficult in spite of using personal assistance ($p < .001$).

DISCUSSION

There are several important policy implications of our findings. First, we find that difficulty walking predicts increased use of Medicare-financed health care services, particularly home health care, after controlling for the direct effects of medical conditions. Given that 14.5 million older Americans report difficulty walking and over 30 percent report using help for mobility in the home (Newcomer et al. 2005; Shumway-Cook et al. 2005), the potential impact on the Medicare program is large.

Second, greater attention is needed from both a policy and research and clinical perspective to determine the most effective ways to reduce the adverse effects of mobility limitations. People who used a compensatory strategy but who still had difficulty walking had downstream Medicare costs that were up to \$300/month more than persons with fully compensated difficulty. Future work needs to determine if investment in different compensatory strategies might reduce such downstream Medicare costs. Our results provide some interesting leads for future clinical studies. Musculoskeletal and cardiovascular conditions were more common in our sample overall, and they were particularly common among persons reporting mobility difficulty. Interestingly, the proportion of persons reporting neurological problems increased by approximately 15 percent comparing those with moderate versus severe difficulty; whereas the proportion of persons reporting musculoskeletal problems decreased by 2 percent with increasing levels of mobility. This suggests that there may be more effective interventions for mobility difficulty because of musculoskeletal disorders compared with neurological disorders and/or that neurological disorders may cause more severe mobility difficulty and effective compensatory strategies for severe difficulty (e.g., power wheelchair) are not widely available. This needs further investigation. One clear clinical implication is the importance of ascertaining the extent to which prescribed

equipment or human help resolves mobility difficulty, and rethinking the prescription if it is insufficiently effective. The data also suggest that compensating with equipment may result in more favorable health care utilization patterns. Which makes perfect sense in that equipment is available at all times and can provide full-body weight support whereas human help tends to be intermittently available and at best provides partial weight support for limited periods of time. More work is needed in this area to better understand these relationships and ensure that policy is appropriate.

Third, this study has implications for the organization and provision of outpatient and home health care to Medicare beneficiaries that depend upon human help for mobility. Around three-fourths of elderly persons who coped with difficulty walking via personal assistance had residual difficulty. While it is not surprising such persons use more home health-financed care, it is concerning that they use less outpatient care, as such persons would be expected to have high need. Uncompensated disability may serve as a barrier to accessing outpatient physician services, which are key to oversight of home care and direction of treatment. The increased home health use among such persons may either represent the substitution of such care for outpatient physician visits, or could be viewed as a compliment, meaning increased need leads to more home health without regard to the interrelationship of physician visits and home health care. Our study cannot definitively distinguish between these alternative explanations; in all likelihood, both are occurring.

There are several limitations to our work. First, the epidemiological nature of the analyses mean that our results may not be causal. Second, more detailed information on the role of informal care, both in meeting direct health care needs and in helping people access needed health care, is needed for a complete understanding of health care for disabled elders, which we were unable to do in this analysis. Third, our sample excluded persons who were in Medicare HMOs as their claims data are unavailable. Finally, there is a possibility of misclassification bias in defining fully compensated disability via the interaction of walking difficulty and compensatory strategy. The two concepts were defined from different questions, but respondents may have answered difficulty questions with respect to the use of their compensatory strategy, while others may not have. While the survey question implied it should be answered according to the usual and customary way of walking, relatively minor differences in the wording of questions on physical function have been found to influence responses in past work (Freedman, Aykan, and Kleban 2003; Freedman et al. 2004).

Finally, our findings of lower downstream health care use among those with fully compensated difficulty is consistent with prior research showing that

people who used equipment for walking but reported no difficulty walking used fewer hours of personal assistance and spent fewer days in bed than those with difficulty walking despite equipment (Taylor and Hoenig 2004). Both assistive technology and exercise can reduce difficulty with mobility (Fiatarone Singh 2002; Verbrugge and Sevak 2002). However, exercise interventions that successfully improved walking in the older population typically were performed under supervision for 3–6 months or longer (Keysor and Jette 2001). Medicare coverage limits the duration of physical therapy and excludes “general exercises to promote overall fitness” and “physical fitness equipment” (Centers for Medicare and Medicaid Services Chapters 2003a, b). Coverage of assistive technology by Medicare is relatively restricted as well, such that specialized mobility aids can be obtained only with difficulty (Iezzoni 2003), beneficiaries are limited to a single type of mobility aid (Centers for Medicare and Medicaid Services Chapter 2003c), and a wheelchair cannot be obtained unless the beneficiary is chair/bed bound (Palmetto GBA 2003). Based on our findings, it is possible that current Medicare policies may contribute to excess downstream health costs and reduced outpatient care by limiting access to mobility aids and exercise support.

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