Empirical Research

Aging in Place Versus Nursing Home Care

Comparison of Costs to Medicare and Medicaid

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ABSTRACT

The objective of this study was to compare the community-based, long-term care program called Aging in Place (AIP) and nursing home care, in terms of cost to the Medicare and Medicaid programs. A retrospective cohort design was used in this study of 39 nursing home residents in the Midwest who were matched with 39 AIP participants. The AIP program consisted of a combination of Medicare home health, Medicaid home and community-based services (HCBS), and intensive nurse care coordination. Controlling for high inpatient Medicare cost in the 6 months prior and the 10 most frequently occurring chronic conditions, multiple regression was used to estimate the relationship of the AIP program on Medicare and Medicaid costs. Total Medicare and Medicaid costs were $1,591.61 lower per month in the AIP group ($p < 0.01$) when compared with the nursing home group over a 12-month period. The findings suggest that the provision of nurse-coordinated HCBS and Medicare home health services has potential to provide savings in the total cost of health care to the Medicaid program while not increasing the cost of the Medicare program.

In the United States, approximately 10 million individuals—nearly 5% of the adult population—require long-term care services (Rogers & Kosimar, 2003). The need for long-term care is expected to continue to grow at an unprecedented rate due in part to the influx of Baby Boomers and the expanding number of individuals living with chronic illness. Innovations in care delivery are essential as the health care system prepares to meet the future needs of the growing number of individuals who require long-term care. The purpose of this article is report the cost component of the evaluation of a community-based long-term care program called Aging in Place (AIP). The clinical outcome evaluation was previously reported (Marek et al., 2005). Cost will be examined from the perspective of the Medicare and Medicaid programs, comparing the cost of AIP participants to individuals of similar case mix receiving long-term care in the nursing home setting.

Medicaid is the major financing system for long-term care in the United States and the safety net for individuals who become impoverished due to disabling illness or injury. Since 1999, spending in Medicare postacute care and Medicaid long-term care services has grown more rapidly than enrollment in either program (Ng, Harrington, & Kitchener, 2010). As the Baby Boomer generation transitions into Medicare, there will be an increased demand for public financing of health care, especially long-term care (Sisko et al., 2009). Given a choice, most older adults prefer to receive long-term care services in their home setting (Johnson, Schwiebert, & Rosenmann, 1994). As a result, expenditures in home and community-based services (HCBS) are growing; however, institutional long-term care services continue to receive the majority of Medicaid long-term care dollars. In 1988, only 10% of Medicaid long-term care expenditures were for noninstitutional services, while in 2007 the share rose to 43% (Burwell, 2001; Burwell, Sredl, & Eiken, 2008). A large portion of the growth in HCBS is attributed to the ruling in the Olmstead Supreme Court case. In this case, the Supreme Court ruled that states may be violating Title II of the American Disabilities Act (ADA) of 1990 if care is provided in an institutional set-

ting when the care could be appropriately provided in the home or other community-based settings (Doty, Mahoney, & Sciegaj, 2010; *Olmstead v. L.C.*, 1999). In addition, several federal initiatives such as the Program of All-Inclusive Care for the Elderly (PACE) and Cash and Counseling Demonstration were designed to facilitate new models of long-term care services delivered in the home or community setting (Doty et al., 2010; Lynch, Hernandez, & Estes, 2008). Despite consumer preference for HCBS, federal initiatives, and the demonstrated cost savings of HCBS, the implementation of HCBS has varied widely from state to state (Kaye, LaPlante, & Harrington, 2009; Kitchener, Ng, Miller, & Harrington, 2006).

One concern of policy makers is that individuals who would normally not use institutional long-term care would use HCBS (Kitchener et al., 2006; Ng et al., 2010). This is often referred to as the "woodwork effect," in which people would "come out of the woodwork," increasing the number of individuals in need of long-term care (Winchester & Frydman, 2003). There also is a belief that individuals who receive long-term care in the community will make greater use of other Medicaid-covered services. While in nursing homes, residents' care is delivered via the "medical model," where access to professional medical attention is included in the daily nursing home rate (Doty, 2000). Therefore, to examine the effect of HCBS via the AIP model, we examined both Medicare and Medicaid expenditures to identify the effect of the AIP program on both health care payors.

The limited use of professional services such as skilled nursing and physical therapy has been identified as a weakness of HCBS programs (Shirk, 2006). In the state of Missouri, the site of the current evaluation, the HCBS program is called Missouri Care Options and offers personal care services, housekeeping, companion care, supervised adult day care, and limited in-home nursing care (Missouri Department of Health and Senior Services, 2011). A program that emphasizes home-delivered skilled nursing services rather than personal care for the individuals most at risk of nursing home admission has been identified as a possible cost-effective substitute for nursing home care (Greene, Lovely, Miller, & Ondrich, 1995). Coordination of benefits between Medicare-financed home health and Medicaid HCBS benefits is one area that could enhance delivery of skilled services in HCBS.

The Medicare home health benefit is more restrictive than Medicaid HCBS in coverage of home care services. To be eligible for Medicare home health, an individual must have services that are ordered by a physician; the care must be intermittent; the home health agency must be certified; and the individual must be homebound. Types of care provided are skilled nursing services, physical therapy, speech-language therapy, occupational therapy, medical social services, some medical supplies, and durable medical equipment (Medicare.gov, 2010). Home health aide services are provided only if there is also a need for skilled nursing, speech-language therapy, or physical therapy. Once a skilled need is no longer required, home health aide services are stopped. The median length of time of a home health episode is approximately 24 days (Centers for Disease Control and Prevention, National Center for Health Statistics, 2010). The Medicare home health program is designed for exacerbations of chronic conditions or other acute illnesses. The program does not meet the needs of frail older adults who are chronically ill and require monitoring in between exacerbations of their illness. However, coordination of HCBS and Medicare home health services provides a bridge to meet both the health care needs during an acute illness as well as follow up and monitoring of chronic health conditions.

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The authors disclose that they have no significant financial interests in any product or class of products discussed directly or indirectly in this activity. This research was supported in part by a grant from the Centers for Medicaid & Medicare Services (CMS), Aging in Place: A New Model For Long-Term Care, grant 18-C-91036; University of Iowa Gerontological Nursing Interventions Research Center; Robert Wood Johnson Nurse Executive Fellows Program 2000 cohort; and Self-Management Science Center grant 1 P20NR010674-01. The views expressed in this article are those of the authors and do not necessarily reflect the official position of the CMS or the U.S. Department of Health and Human Services.

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Received: March 22, 2010; Accepted: March 30, 2011; Posted: August 17, 2011

doi:10.3928/19404921-20110802-01

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AGING IN PLACE PROGRAM

Recognizing the need for new approaches to the delivery of long-term care, the School of Nursing at the University of Missouri created the AIP program. The purpose of the program was to create and test a care delivery system that provided high-quality long-term care to individuals in their home. To implement the AIP program, a home care agency called Senior Care was created. This agency secured both certification as a Medicare home health agency and designation as a Medicaid HCBS provider under the Missouri Care Options program. Unique to the AIP program was the use of nurse care coordinators who managed the delivery of both Medicaid HCBS and Medicare home health services to the AIP participants. On admission to the program, participants received a comprehensive assessment and individualized plan of care that included HCBS and Medicare home health as appropriate. Participants were visited by a nurse care coordinator at least once per month, if not more frequently, to review their plan of care and monitor services delivered. Nurse care coordinators also provided skilled nursing services during their visits to AIP participants. The same Senior Care personnel (nurses, home health aides, social workers, physical and occupational therapists) delivered both HCBS and Medicare home health services. In most home care agencies, HCBS and Medicare home health care are delivered by different individuals, in different organizations or departments, with little coordination or continuity across programs.

In a previous study, the clinical outcomes of clients in the AIP program were compared with a similar group of older adults who resided in nursing homes (Marek et al., 2005). The AIP group's clinical outcomes were better at a statistically significant level ($p < 0.05$) for the following outcomes: (a) cognition at 6, 12, and 18 months, (b) depression at 6 and 12 months, (c) activities of daily living (ADLs) at 6, 12, and 24 months, and (d) incontinence at 24 months. In all four outcome measures, the AIP group stabilized or improved outcome scores while outcome scores in the nursing home group deteriorated. In this article we will discuss the differences in the Medicare and Medicaid costs between the two groups.

METHOD

Sample

The population for this study was older adults living in central Missouri who required long-term care services. This region consists of Boone and its surrounding counties. Columbia is the largest city, and its metropolitan area population is approximately 165,000 (U.S. Census Bureau, 2010). For the AIP program, older adults were recruited from the Medicaid HCBS Waiver Program. In the state of Missouri, a person is considered eligible for HCBS if he or she (a) is "medically eligible" for nursing facility care, (b) could reasonably have care needs met outside a nursing facility, and (c) is qualified for Medicaid funding (Missouri Department of Health and Senior Services, 2011). Individuals are screened and assigned a Level-of-Care Score by a HCBS case manager who then authorizes services such as basic personal care, advanced personal care, nurse visits, housekeeping, and respite care. The HCBS case manager assigns eligible individuals to a state-recognized HCBS provider. During the time of the study, assignment of clients was rotated among seven area home care agencies, which included Senior Care.

The average age of the AIP participants was 76, and 74% were women. The U.S. population requiring long-term care is approximately 70% women (Rogers & Kosimar, 2003). A total of 11% of Missouri residents are Black, which closely matches that of U.S. residents (12%) (U.S. Census Bureau, 2010). The AIP sample, which was 29% Black, exceeds the state percentage; however, the nursing home sample was 100% White with no racial or ethnic diversity identified. More details on the two samples are available in Marek et al. (2005).

To obtain nursing home residents of similar case mix to the AIP group, the Missouri Minimum Data Set (MDS) repository (Morris et al., 1990) was used to match 1,038 Medicaid-certified nursing home residents to the AIP group on performance of ADLs (Morris, Fries, & Morris, 1999) within two points, Cognitive Performance Scale (CPS, Morris et al., 1994) score within one point, age (within 4 years), and admission date (to the AIP program and the nursing home within 90 days). A total of 78 nursing home residents were matched using this process. However, only 39 of the 78 matched pairs had both Medicare and Medicaid as payors for at least 12 months for both members of the dyad, therefore reducing the sample to 39 per group. Use of the MDS data elements for measurement of ADL and cognitive status is reported elsewhere (Marek et al., 2005).

Design

The purpose of this evaluation was to compare Medicare and Medicaid program costs of AIP program participants with the costs of care for similar older adults in nursing homes. The evaluation used a quasi-experimental retrospective cohort design using only participants who had used both Medicare and Medicaid as payors for their health care over a 12-month period.

TABLE 1

Most Frequently Occurring Chronic Medical Conditions[a], By Group

Chronic Condition	Aging in Place Group ($n = 39$)	Nursing Home Group ($n = 39$)	Total	p Value[b]
Diabetes	20	17	37	0.496
Depression	13	18	31	0.247
Heart failure	16	15	31	0.817
Rheumatoid arthritis/osteoarthritis	15	13	28	0.637
Chronic obstructive pulmonary disease	13	14	27	0.812
Ischemic heart disease	9	14	23	0.214
Alzheimer's disease and related dementias	6	16	22	0.012
Osteoporosis	8	6	14	0.555
Cataract	5	8	13	0.362
Chronic kidney disease	7	3	10	0.176

[a] Centers for Medicare & Medicaid Services (2010); [b] Chi-square test used to calculate difference between Aging in Place and nursing home groups.

Data Analysis

The perspective of the cost analysis was that of the payor, in this case the public payors of Medicare and Medicaid. Medicare-allowable charges (Medicare payments plus coinsurance and deductibles as they apply to different benefits) were used to measure benefits under Medicare Part A or Part B. For benefits available under Medicaid (prescription drugs, certain institutional and noninstitutional long-term care costs), the Medicaid-allowable charges were used. In addition, Medicare and Medicaid payments were analyzed separately. Medicare costs were calculated using the Medicare Standard Analytical Files. Medicaid costs were calculated from the Medicaid Management Information System files.

Medicare and Medicaid average per-month costs were analyzed over an 18-month period, starting the 6 months prior to admission to either the nursing home or AIP program and continuing for 12 months postadmission. Only individuals with 12 months of Medicare or Medicaid information were used. Using multiple regressions at the individual patient level, average per-month cost over the 12 months postadmission was the dependent variable. We used average monthly inpatient costs in the 6 months prior to admission as a covariate to capture an individual's underlying use of health care services prior to admission to either the AIP program or the nursing home. In addition, we identified the most frequently occurring chronic medical conditions (Centers for Medicare & Medicaid Services [CMS], 2010) using the International Statistical Classification of Diseases and Related Health Problems (ICD-9) codes available in the Medicare claims data. The 10 most frequently occurring chronic conditions among the participants were used as covariates and coded as dummy variables. In addition, membership in the AIP group also was coded as a dummy variable.

Since the additional costs in the AIP program were related to the additional nurse care coordination interventions, the additional costs of the AIP program were determined from nurse care coordinator time and travel that were not billable under the current payment programs. Nurse care coordinator time was recorded in the categories of direct and indirect time related to individual clients. Also, time was recorded according to payor source so that non-billable time spent in the care coordination intervention was identified. Since time was recorded in this method, we were able to separate the nurse care coordinator time and travel expenses that were additive to the HCBS and Medicare home health programs.

RESULTS

The mean age of the study participants in both groups was 75 and the majority (74%) were women. As expected, the participants had ADL scores in the low range (i.e., higher functioning) on a scale of 1 to 20 (Morris et al., 1999), with a mean score 1.87 (SD = 3.83) for the AIP group and 2.25 (SD = 3.87) for the nursing home group. The CPS scores were also low, averaging 1.0 (SD = 0.94) for the AIP group and 1.23 (SD = 1.13) for the nursing home group, using a 7-point scale where lower scores indicate higher functioning (Hartmaier et al., 1994). No significant differences existed between groups in all of the above variables as expected, since partici-

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TABLE 2

Comparison of Medicaid and Medicare Costs Per Month, Between Groups

Variable	Medicaid Costs	Medicare Costs	Total Costs
6 months prior to admission			
AIP group mean costs (*SD*)	$338 ($347)	$1,556 ($2,953)	$1,894 ($3,100)
NH group mean costs (*SD*)	$1,350 ($848)	$1,437 ($1,511)	$2,787 ($1,826)
Difference in AIP costs and NH costs	–$1,012	$119	–$893
t value	–6.90*	0.22	–1.55
12 months post-admission			
AIP group mean costs (*SD*)	$635 ($471)	$1,006 ($1,409)	$1,641 ($1,619)
NH group mean costs (*SD*)	$2,307 ($419)	$1,118 ($1,347)	$3,425 ($1,435)
Difference in AIP costs and NH costs	–$1,672	–$112	–$1,784
t value	–16.55*	–0.36	–5.15*

Note. AIP = Aging in Place (n = 39); NH = nursing home (n = 39).
* $p < 0.001$.

pants were matched on age, gender, performance in ADLs, and cognitive performance. Diabetes and heart failure were the most frequently occurring chronic conditions in both groups (**Table 1**). In the chronic conditions identified, more patients were identified with Alzheimer's disease or related dementias in the nursing home group when compared with the AIP group ($p = 0.012$).

Medicare and Medicaid Costs

Total Medicare and Medicaid average per-month costs were $1,784 lower ($p < 0.01$) in the AIP group when compared to the nursing home group (**Table 2**). However, examination of Medicare and Medicaid costs separately revealed the major cost reduction was in Medicaid costs, reducing average per-month cost by $1,672 ($p < 0.01$). The reduction in average per-month Medicare cost was $112, which was not statistically significant ($p = 0.72$).

To control for factors associated with health care costs, high inpatient Medicare costs 6 months prior to admission and the 10 most common CMS chronic conditions were used as covariates in multiple regression analysis (**Table 3**). As a result, the savings in Medicaid costs was $765.71 ($p < 0.001$) per month in the AIP group when compared with the nursing home group. In addition, savings to the Medicare program were $825.90 per month ($p = 0.096$), but these savings were not statistically significant. Examination of the Medicare subcategories identified significant reduction in the AIP group's average monthly inpatient ($743.07, $p = 0.050$) and outpatient ($136.06, $p = 0.037$) Medicare costs. Medicare skilled nursing facility ($63.43, $p = 0.586$) costs were not significantly different in the AIP group. However, home health services were significantly higher at $199.35 ($p = 0.050$), and durable medical equipment was $46.39 higher but not statistically significant ($p = 0.178$). Previous high inpatient Medicare costs was a significant predictor ($p < 0.05$) of both Medicaid and all Medicare cost categories. Of the 10 CMS chronic conditions used as covariates, none were statistically significant predictors of total Medicare or Medicaid costs. However, ischemic heart disease was associated with higher Medicare outpatient costs ($195.49, $p = 0.014$) and chronic kidney disease with higher Medicare physician costs ($177.38, $p = 0.003$).

Cost of Aging in Place

Cost of the AIP program includes the dollar value of nurse time, including time visiting, traveling, and other time linked to the AIP participant. The nurse time was spent delivering care in both Medicaid HCBS and Medicare home health and coordinating care between the two programs. The mean number of nurse care coordinator visits per month for AIP clients was 2.19, and the mean cost per month for nurse care coordinator time plus mileage cost was $133.60. This was additive to the care delivered in either Medicaid HCBS or Medicare home health services. Tracking these costs enabled analysis of net cost savings of the AIP program to the Medicare and Medicaid programs.

DISCUSSION

The results of this analysis provide support for further examination of the AIP model of care. Key to this analysis

TABLE 3

Multiple Regression Analysis with High Inpatient Medicare Costs 6 Months Prior to Admission and the 10 Most Common CMS Chronic Conditions Used as Covariates

Variable	Relative Difference in Per-Month Costs[a]	*t*	*p* Value	R^2
Total Medicare and Medicaid costs	–$1,591.61	–3.16	0.002	0.71
Total Medicaid costs	–$765.71	–5.30	<0.001	0.88
Total Medicare costs	–$825.90	–1.67	0.096	0.64
Inpatient	–$743.07	–1.98	0.050	0.58
Outpatient	–$136.06	–2.11	0.037	0.87
Skilled nursing facility	–$63.43	–0.55	0.586	0.50
Durable medical equipment	$46.39	1.35	0.178	0.54
Physician visits	–$49.07	–1.23	0.221	0.75
Home health services	$199.35	1.98	0.050	0.51

Note. CMS = Centers for Medicare & Medicaid Services (2010). Each row is from a separate regression, with the dependent variable representing per–month costs from each category.

[a] Aging in Place group (n = 39) costs versus nursing home group (n = 39) costs.

was to look at both Medicare and Medicaid costs, rather than examine each program without considering the implications for the other. The majority of HCBS and Medicare home health programs have no incentives to provide coordinated care. For example, in the state of Missouri, each program has a separate set of standards, each of the programs is evaluated by different state surveyors, and each program has unique billing requirements. To meet the requirements of both programs, Senior Care—the provider of the AIP services—kept separate records for the HCBS and Medicare home health programs. In addition, staff were required to record time spent in each program so that the Medicare cost reporting did not include time spent in HCBS. Also, there was no payment mechanism for nurse care coordination. The $1,784 savings to the Medicare and Medicaid programs more than covered the $134-per-month cost of nurse care coordination in the AIP program, for a net savings of $1,650 per month or $19,800 per year.

Rogers and Kosimar (2003) noted that approximately 10 million people need long-term care in the United States. Of those, nearly 4.5 million are older than 65 and live in the community. Although not all would be able to take advantage of a program such as AIP, these 4.5 million represent a potential $89.1 billion ceiling of cost savings per year. This is more than 40% of all dollars spent in 2005 on people with long-term health needs in the United States. The AIP program was designed to reach higher functioning older adults needing long-term care. If programs such as AIP were to reach only 10% of the 4.5 million in need of long-term care, nearly $9 billion could be saved. With nurse care coordination, AIP participants were able to quickly receive the skilled services covered by the Medicare program when their condition met the home health requirements. This enabled savings in other portions of Medicare costs. Although the Medicare home health care costs were higher, the additional home health services may have prevented the unnecessary use of other Medicare services. It is interesting that the AIP participants did not have higher hospitalization costs than the nursing home residents. One would think that the nursing home environment would provide the skilled services to prevent a hospital visit more quickly than in the home environment where individuals are not monitored on a 24-hour basis.

The difference in the number of participants who were diagnosed with Alzheimer's disease and related dementias was surprising, as participants were matched on CPS. One explanation for the lower number in the AIP group could be related to the underdiagnosis of individuals with dementia in primary care settings (Ganguli et al., 2004). However, the chronic condition of Alzheimer's disease and related dementias was found not to be a statistically significant covariate in predicting Medicare (p = 0.618) or Medicaid costs (p = 0.676).

There are several limitations in this evaluation. First, the sample is small and participants were not randomly assigned. Instead, to control for group differences, we

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matched AIP participants to nursing home residents on the basis of cognition, performance of ADLs, age, gender, and admission period. The focus of the study was on higher functioning individuals who needed long-term care, not the entire population in need of long-term care. In addition, in the analysis we controlled for the factors of previous health care use and 10 chronic health conditions. The cost of informal long-term care provision by family caregivers was not examined, and a larger demonstration project could provide more solid evidence of the effectiveness of the AIP program. We believe the findings of this study provide enough evidence to merit investment in a larger, more controlled study; however, random assignment to nursing home versus the AIP program may not be feasible.

CONCLUSION

The choice of the site to receive long-term care is based on multiple factors such as functional status, availability of family caregivers, and financial means. Institutional care can be the best viable option for many individuals in need of long-term care. But it is our premise that with community-based services such as the AIP program, more older adults could have the option to stay in their home while receiving long-term care.

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