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Comparing Aging in Place to Home Health Care: Impact of Nurse Care Coordination On Utilization and Costs

EXECUTIVE SUMMARY

- ▶ The goal of this study was to compare utilization and cost outcomes of patients who received long-term care coordination in an Aging in Place program to patients who received care coordination as a routine service in home health care.
- ▶ This research offered the unique opportunity to compare two groups of patients who received services from a single home health care agency, using the same electronic health record, to identify the impact of long-term and routine care coordination on utilization and costs to Medicare and Medicaid programs.
- ▶ This study supports that long-term care coordination supplied by nurses outside of a primary medical home can positively influence functional, cognitive, and health care utilization for frail older people.
- ▶ The care coordinators in this study practiced nursing by routinely assessing and educating patients and families, assuring adequate service delivery, and communicating with the multidisciplinary health care team.
- ▶ Care coordination managed by registered nurses can influence utilization and cost outcomes, and impact health and functional abilities.

NOTE: Authors' biographical statements and acknowledgments can be found on the following page.

FOR THE CHRONICALLY ILL, care delivered in the home is a lifeline to the self-management of chronic conditions. Currently, 90% of Americans age 75 and older have at least one chronic medical condition, and 20% have five or more chronic illnesses (AARP, 2009). The cost of caring for people with five or more chronic illnesses is roughly 17 times higher than for those without chronic illness (Bodenheimer & Berry-Millett, 2009). The complexity of the health care system makes it nearly impossible for patients and families to understand how various services work together, identify what legitimate and feasible demands can be made of providers, and learn how to obtain medical information in a timely and efficient manner (Anderson & Horvath, 2004; Smith, Saunders, Stuckhardt, & McGinnis, 2012). Care coordination is increasingly seen as a way to help patients, families, or other support networks manage medical conditions, and social and psychological problems more effectively (Yang & Meiners, 2014). The impact of care coordination on utilization and cost outcomes in older adults living in the community and receiving

long-term nurse care coordination through Aging in Place (AIP) or routine care through home health care (HHC) is reported.

Care Coordination

In 2003, the Institute of Medicine identified care coordination as a priority to improve the health care system (Greiner & Knebel, 2003). Care coordination is identified by the American Nurses Association (2012) as a core professional standard and competency for all registered nurses (RNs), and is critical to improving outcomes across all patient populations. Additionally, care coordination is essential to achieving the "Triple Aim" of health care reform as identified by the Institute for Healthcare Improvement (2013) as (a) improved patient experience of care quality and satisfaction, (b) improved population health, and (c) reduced per capita health care cost. Care coordination is not only central to the role of the RN, but it also is a growing area of specialty practice for nurses, fueled by new opportunities brought about by the Affordable Care Act and Patient-Centered Medical Homes (Lamb, Schmitt, & Sharp, 2014). The emphasis of the Centers for

Medicare & Medicaid Services (CMS, 2014) on reducing preventable hospitalizations, rehospitalizations, and inappropriate emergency department (ED) utilization further illustrates the need for improved care coordination.

Care coordination is delivered in a variety of configurations, which makes the examination of the effectiveness of the intervention difficult. However, there have been a number of interventions that show promise. Naylor completed three studies about hospital-to-home transitional care of older adults using advance practice nurses to deliver interventions. The interventions included (a) planning transitions while the participant was still hospitalized, (b) working with other care team members to develop the plan, (c) following participants after discharge with phone calls and visits, and (d) giving participants and their caregivers access to telephone support (Naylor et al., 1994; Naylor et al., 1999; Naylor et al., 2004). Care coordination after hospitalization significantly ($p < 0.05$) reduced hospitalizations, rehospitalizations, and costs in older adults. In a recent study of a

home-based care coordination program that was specifically focused on medication self-management, Marek and co-authors (2014) reported total Medicare costs were lower ($p < 0.06$) for patients who received nurse care coordination and a pill box for at least 3 months compared to a control group. The authors concluded it was the nurse care coordination and not the use of the pill box that positively influenced chronic illness outcomes. Finally, Coleman and associates (2004) and Coleman, Parry, Chalmers, and Min (2006) used transitional care coaches to deliver a care coordination intervention that supported patients' abilities to manage their care after hospital discharge by reducing care fragmentation through the use of a transition coach to improve post-hospital discharge self-management support. Patients reported greater confidence in self-management, improved ability to manage medications, and significantly lower rehospitalization rates ($p < 0.05$). What these studies have in common are the successful reduction of utilization of health care resources, including hospitalizations and ED visits.

In 1997, the CMS developed a demonstration project known as the Medicare Coordinated Care Demonstration. The 12 projects each defined its target population, exclusion criteria, and interventions. Ten of the 12 models showed no overall reduction in hospitalizations or Medicare costs (Peikes, Chen, Schore, & Brown, 2009). However, two models (Mercy and Charlestown) had significantly ($p < 0.05$) fewer hospitalizations per person per year and three models (Health Quality Partners, Georgetown, and Mercy) costs were lower than those in the control group, but did not reach statistical significance. The successful models had higher numbers of in-person contacts, targeted people who were neither too well nor too ill, focused on medication adherence, worked closely with local hospitals, and interacted frequently with clients' physicians (Peikes et al., 2009).

Aging in Place Program

It was within this robust and rapidly evolving landscape of care coordination research that investigators from the University of Missouri, Sinclair School of Nursing, tested the AIP program, which is a form of care coordination that delivers long-term care services to older community-dwelling adults to keep them living in the environment of their choice for as long as possible. Aging in Place delivered services, including comprehensive nurse care coordination, through the HHC agency Senior Care. The agency was certified by Medicare and Medicaid, and was designated as a Home and Community-Based Service (HCBS) Provider by the State of Missouri. HCBS are used to fulfill the personal, or homemaker care, needs of older adults. The care coordination intervention in AIP consisted of nurse care coordinators working with an advanced practice registered nurse (APRN) expert to manage a comprehensive care plan that coordi-

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nated physicians, nurses, and other professionals' interventions to improve or support older adults' medical conditions, physical functioning, medication management, and supervision of health and social services necessary to maintain older adults in their homes. Participants were seen by a nurse care coordinator at least monthly, and more frequently as needed, for management of health care problems (Marek et al., 2005; Marek, Popejoy, Petroski, & Rantz, 2006). Care coordination received in home health is different in several ways from AIP. In general, there are not APRN experts working with the staff, the services are focused on resolution of post-hospitalization health problems, are of shorter duration, and are not focused on extending the time patients can live independently in their home environment.

Participants in the AIP care coordination program demonstrated significantly better clinical and cost outcomes when compared to similar individuals in nursing homes and HCBS. Specifically, when compared to nursing homes, the AIP care coordination group significantly ($p < 0.05$) improved in measures of cognition, depression, incontinence, and activities of daily living (ADL) (Marek et al., 2005). Similarly, when the AIP group was compared to the HCBS group, the AIP group had statistically significant ($p < 0.05$) improvement in pain, dyspnea, and ADLs (Marek et al., 2006). Regarding costs, when participants in the AIP program were compared to individuals receiving only HCBS during a 12-month period, the greatest savings was in the monthly Medicare costs per person in the AIP group ($-\$686$, $p = 0.04$), while Medicaid costs per person were significantly higher in the AIP group ($+\$203$, $p = 0.03$) (Marek, Stetzer, Adams, Popejoy, & Rantz, 2012). In a separate analysis of the AIP group compared to nursing homes rather

than home-based services, total monthly Medicare and Medicaid costs per person were $\$1,784$ lower ($p < 0.01$) in the AIP group, with the majority of savings occurring in Medicaid costs (Marek, Adams, Stetzer, Popejoy, & Rantz, 2010).

After the AIP program ended in 2002, Senior Care continued to deliver both HHC and HCBS. We had previously compared AIP to nursing homes and HCBS but not to traditional home health care. This study closes that gap, and allows us to compare usual care delivered in HHC to long-term care coordination. To our knowledge, there is no practice that provided long-term care coordination and later stopped that service but continued to provide HHC. We had the opportunity to use this unique situation to evaluate whether the additional long-term care coordination provided in the AIP program made a difference in utilization and cost outcomes when compared to patients who received HHC without long-term care coordination.

Method

Design. A quasi-experimental time series nonequivalent control group design was used.

Sample. The population for this study was older adults living in central Missouri in their community homes. A total of 213 AIP participants received nurse care coordination from the years 2000-2002 from the HHC agency Senior Care. Participants in AIP were recruited primarily from Senior Care HCBS, but also were recruited based on recommendations for services from local hospitals, and by private referrals. These recommendations and referrals were for individuals perceived to have greater need for and ability to benefit from more intensive care coordination services. After the AIP study ended, the HHC agency continued to provide HHC services, but the long-term care coordination services ended. The compari-

son group was 585 clients who received routine HHC services from 2003-2005 from Senior Care after AIP ended.

Measurement

Demographic data. Demographic variables that describe age, gender, and living arrangements were obtained from the electronic health record (EHR) used by Senior Care. Socioeconomic status was determined by the insurance and payment method documented in the EHR. Patients who were eligible for Medicaid, or for both Medicare and Medicaid, were categorized as having fewer resources and being of low socioeconomic status.

Chronic conditions. Diagnoses for each patient, found in the Beneficiary Annual Summary file, were used to identify each of the 27 chronic conditions, defined by the CMS Chronic Conditions Warehouse.

Functional status and health measures. Functional status, behavioral health, and pain were measured using the Outcomes and Assessment Information Set (OASIS). OASIS is a uniform data set used to assess HHC patients, prospectively pay HHC agencies, and monitor patient outcomes. The data set was designed for research, practice, and policy development (Shaughnessy et al., 1994; Shaughnessy, Crisler, Schlenker, & Arnold, 1997a, 1997b). Data are collected at admission, discharge, transfer, at least every 62 days, and at final discharge. OASIS items are valid and reliable (Hittle, Crisler, Beaudry, Conway, & Shaughnessy, 2002; Tullai-McQuinn, Madigan, & Fortinsky, 2009) for ADLs (Kappa=0.48-0.89), instrumental ADLs (IADLs) (Kappa=0.48-0.82), pain (Kappa=0.58-0.74), depression (0.54-0.89), and cognition (0.63). Functional measures were summed; higher ADL (score 0-8) and IADL (0-6) scores indicate worse function. These items are not being used to measure clinical outcomes, because consistent entries into and out-of-service points for both

groups did not exist. They were compared using the General Estimating Equation procedure.

Covariates. The demographic variables, CMS-defined chronic conditions, and OASIS measures were used to characterize the sample at baseline, and to serve as covariates in the outcome analysis. For inclusion in the regression models, age was recoded into categories <70, 70-79, and 80+, and the effect of age on costs was not linear. Both the younger patients (<70; complex chronic conditions) and the older (>79) had higher costs than patients in their 70s.

Outcome measures. Utilization outcomes were the number of hospitalizations, re-hospitalizations, and ED visits identified in the CMS claims data for each patient. These variables, along with total Medicare and Medicaid costs, defined as payments made by CMS, compose the primary outcome measures. In addition, counts of acute care hospital days, rehab inpatient days, skilled nursing facility (SNF) days, primary care physician visits, and specialty physician visits, were employed as secondary outcomes measures.

Analysis

The groups were first described and compared at baseline in terms of age, gender, living arrangements, socioeconomic status, chronic health conditions, functional status, depression, cognition, and pain. These baseline measures were then employed as covariates to test for differences in the outcome measures of health service utilization and total Medicare and Medicaid costs.

Outcome measures for each patient in each group were accumulated for a period of 1 year from admission in 2002 for AIP, or 2005 for HHC, or death. Those without a full year of outcome data were appropriately weighted in the analysis; however, those who left the study early for other reasons, such as left town or declined serv-

ices, were followed for the full year through their claims data.

Appropriate summary statistics (means, standard deviations, or percent) were calculated by treatment group for each baseline measure. *t*-tests or chi-square tests were used to compare groups.

Health service utilization events were expressed as counts of events per month for presentation of descriptive statistics and *t*-tests, and events per year for the regression analysis. The means and *t*-tests are weighted for number of months in the study. Using treatment group and the baseline measures as covariates, either Poisson regression, Zero Inflated Poisson regression, or Negative Binomial regression was performed using SAS Proc GENMOD (V9.13).

The cost analysis was completed from the payer perspective. Medicare allowable charges were used to measure the Medicare Part A and B benefit, including payments to providers, inpatient, outpatient, SNF, HHC, and durable medical equipment (DME). Three files were used for Medicaid costs. The Medicaid long-term care cost data were added to Medicare SNF data; Medicaid inpatient data were added to Medicare inpatient cost data; Medicaid other cost data were split by internal identifiers into outpatient, home health, and DME and added to those Medicare cost categories. Everything else in the Medicaid other category was added to Medicare carrier costs. The mean monthly payments were calculated by first finding the mean monthly payment for each payment, then calculating the means of the mean monthly payment, weighted for the number of months in the study.

The study occurred over a number of years, making it necessary to correct for inflation. Costs were adjusted to the baseline year, 1999, rather than adjusted forward to 2014 to avoid the impacts of all the policies and events that occurred in recent years, allowing robust conclusions to be reached.

The cost adjustments were made using the Personal Health Care Expenditures and Component Price Index (CPI) (Agency for Healthcare Research and Quality, 2014). The CPI is specific to health care services and mimics an annual expenditure estimate rather than comparing inflation-adjusted resources because health care prices are typically higher than overall inflation. Also, the CPI includes all expenditures from all sources and not just the out-of-pocket expenditures of consumers contained in the CPI. The Medicare and Medicaid categories were collapsed into the CPI categories of hospital, physician/clinical services, SNF, HHC, and DME. A linear longitudinal mixed model was fit to monthly costs, using treatment group, the baseline covariates, total patient costs in the year prior to study admission, and months as predictors. SAS Proc GENMOD with an exchangeable working correlation structure for the repeated measures was employed.

The additional costs to AIP were related to the addition of long-term care coordination; the main costs to the AIP program were nurse care coordination time and travel not billable under Medicare or Medicaid programs, since home health services are paid on an episode of care under the prospective payment system. Nurse care coordinator time and mileage were recorded by direct and indirect time related to clients, and to payer source, in order to identify time spent by nurses in care coordination that was not billable to either Medicaid or Medicare, so it could be accounted for in the analysis. The nonbillable mean cost of \$133.60 per month included nurse care coordinator time plus mileage and was used in previously reported AIP analysis (Marek et al., 2010).

Results

There were several areas in which the groups were significantly different at baseline (see

Table 1.
Sample Characteristics by Group

Variable	Aging in Place (N=213)		Home Health Care (N=585)	
	n	Percent	n	Percent
Number of Females	144	67.6	369	63.1
Race/Ethnicity				
Black	38	17.8	79	13.5
White	172	80.8	489	83.6
Medicaid Eligible	85	39.9**	165	28.2
Living Arrangement				
Alone	93	41.7**	173	28.6
With spouse	64	28.7*	234	38.7
With other family	58	26.0	185	30.6
Paid help	8	3.6	13	2.1
Chronic Conditions				
Alzheimer's dementia	48	22.5**	78	13.3
Congestive heart failure	83	39.0**	169	28.9
Depression	63	29.6*	124	21.2
Rheumatoid arthritis	75	35.2	274	46.8**
Stroke or transient ischemic attack	37	17.4**	56	9.6
Hyperlipidemia	43	20.2	182	31.1**
Cognitive Status Intact OASIS M0560	123	57.8	441	75.4**
Intractable Pain OASIS M0430	37	17.4*	69	11.8
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Age, year	78.8	9.7**	75.4	10.0
Number of depressive feelings OASIS M0590	0.48	0.83**	0.18	0.46
Activities of daily living	2.1	1.8**	1.7	1.3
Instrumental activities of daily living	4.6	2.7*	4.4	4.4

* $p < 0.05$

** $p < 0.01$

Table 1). The AIP group had a mean age of 79 (SD 9.7), which was significantly older ($p < 0.001$) than the HHC group age of 75 (SD 10). Additionally, AIP participants were significantly ($p < 0.05$) more likely to be on Medicaid (40%), and to live alone (44%), or with a spouse (30%). AIP patients had significantly ($p < 0.05$) more Alzheimer's dementia (22%), congestive heart failure (39%), and depression (29%). In contrast, HHC patients had significantly ($p < 0.05$) more arthritis (46%) and hyperlipidemia (31%). For the other 21 chronic conditions, there

were no significant differences in rates between the groups. However, AIP patients were significantly more cognitively impaired ($p < 0.001$) and depressed ($p < 0.05$) (see Table 1).

There were group differences between AIP and HHC in terms of physical functioning. AIP was significantly more impaired in both ADL (M 2.1, SD 1.8, $p < 0.001$) and IADL (M 3.4, SD 1.4, $p < 0.05$). Aging in Place significantly lowered the rate of decline in ADL scores by 0.19 points ($p < 0.001$) and IADL by 0.38 ($p < 0.001$) points, compared to HHC.

For AIP and HHC groups combined, there were a total of 760 hospitalizations. There was no statistically significant difference in the number of hospitalizations between groups ($p = 0.9$). Just under half of AIP (46%) and HHC individuals (49%) had no hospitalizations, and 28% of AIP and 30% of HHC clients had one hospitalization. There were 36 AIP patients rehospitalized, resulting in a rehospitalization rate of 17%, similar to the HHC rehospitalization rate of 18%. The majority of patients in both groups were not rehospitalized (AIP, 83%; HHC,

82%). A total of 1,008 ED visits occurred for 798 patients; 39% of AIP and 47% of HHC patients did not have an ED visit. In all measures of utilization, AIP was equal to or higher than HHC, but was not statistically significant.

Controlling for baseline covariates of age, gender, living arrangements, socioeconomic status, chronic health conditions, functional status, depression, cognition, and pain, regression estimates of the impact of the Aging in Place program on utilization revealed a small, but statistically significant, reduction in rehospitalizations (0.44 events per year, $p=0.047$) and ED visits (0.2 visits per year, $p=0.015$) (see Table 2). Hospitalizations, however, were not significantly impacted (-0.13 events per year, $p=0.20$). In all out-

comes, except for inpatient rehabilitation, AIP reduced use of services. Furthermore, skilled nursing facility (-0.9 events per year, $p=0.07$) and specialty office visits (-0.17 events per year, $p=0.07$) approached significance.

The effect of AIP on total Medicare and Medicaid costs was an average reduction of \$263 per person per month, which was not statistically significantly different than HHC ($p=0.11$). When nurse coordinator time and mileage costs (\$133.60 per month) were included in the comparison, the average reduction per month decreased from \$263 to \$129 per person. Nonetheless, in the AIP group, the costs of care per person were reduced an average of \$77 per month over the 12 months ($p<0.001$). While there was no statistically

significant difference in total costs between the programs, AIP achieved statistically significant savings in provider ($p=0.01$) and outpatient ($p<0.01$) costs, but was statistically significantly more expensive in the DME ($p=0.03$) and HHC ($p= <0.001$) costs (see Table 3).

Discussion

The goal of this study was to compare utilization and cost outcomes of patients who received long-term care coordination in AIP to patients who received care coordination as a routine service in HHC. Lamb and colleagues (2014) identified care coordination as a major role of professional nursing. HHC has historically been a way to deliver community-based care coordination to patients, generally after an acute event, but is not designed to provide long-term care coordination (Marek et al., 2005). We had the unique opportunity to compare two groups of patients who received services from a single home health care agency, using the same EHR, to identify the impact of long-term and routine care coordination on utilization and costs to Medicare and Medicaid programs. As mentioned previously, the goal of AIP was to keep older adults living in the environment of their choice for as long as possible. In this study, AIP patients were significantly older, more likely to live alone, were

Table 2.
Regression Estimates of the Impact of the AIP Program on Utilization for 12 Months

Outcome	Parameter Estimate	Standard Error	<i>p</i> Value
Hospitalizations	-0.1266	9.0980	0.1967
Rehospitalizations	-0.4363	0.2203	0.0477
Emergency department visits	-0.1999	0.0824	0.0153
Acute care days	-0.1154	0.1860	0.5349
Rehab days	1.0208	0.9332	0.2740
Skilled nursing facility days	-0.9299	0.5127	0.0697
Primary care visits	-0.0551	0.0894	0.5378
Specialty care visits	-0.1710	0.0957	0.0741

Table 3.
Mean Monthly Costs of Aging in Place and Home Health Care for 12 Months

Cost Category	Pre-Period						Post-Period					
	AIP		HHC		Diff	<i>p</i> Value	AIP		HHC		Diff	<i>p</i> Value
	Mean	SD	Mean	SD			Mean	SD	Mean	SD		
Total	1,625	1,867	1,915	2,086	290	0.0746	1,506	1,876	1,500	1,988	-5	0.9734
Bcarrier	203	206	289	265	86	<0.0001	172	184	219	246	47	0.0144
IP	1,063	1,485	1,204	1,644	141	0.2713	721	1,423	649	1,403	-73	0.5375
OP	116	199	233	472	117	0.0005	147	280	258	529	111	0.0056
SNF	98	306	69	256	-29	0.1842	113	360	129	410	16	0.6358
DME	37	74	39	130	2	0.8472	99	176	68	170	-30	0.0330
HHC	107	127	80	91	-27	0.0001	253	252	177	175	-76	<0.0001

NOTES: IP = inpatient; OP = outpatient; SNF = skilled nursing facility; DME = durable medical equipment; HHC = home health care

more cognitively and functionally impaired, depressed, had more chronic pain, and used the Medicaid program. Given these constraints and the additional costs of the nurse coordinator program (time and mileage), nurse care coordination was still able to reduce costs to the Medicare program through the reduction of service utilization.

Previous analyses comparing AIP to nursing home patients and HCBS patients found AIP significantly lowered costs (Marek et al., 2005, 2006). In the current analysis, total Medicare costs were lower, but the significant cost savings previously demonstrated were not found. It should be noted the AIP sample was not matched to nursing home or HCBS cohorts as had been done in both previous analyses. This analysis is of the complete population of AIP and HHC in the years following the end of the AIP program, for which there were Medicare and Medicaid claims data available. It is unusual to find programs that have retained the same data infrastructure, allowing for comparison across program changes and time.

Aging in Place patients were cared for differently than HHC patients. The AIP group spent just over \$100 more per month per person in HHC and DME benefits than did the HHC group. AIP patients used more home health care because they lived in situations where it was difficult to manage their health care conditions; they were older, more functionally and cognitively impaired, and lived alone more frequently. It was remarkable that given their precarious situation, AIP patients had significantly lower rates of functional decline in ADLs and IADLs than HHC patients. The ability of older adults to maintain functional abilities is critically important to remaining in the home and avoiding permanent relocation to assisted living or nursing homes, which was a major focus of care coordination efforts.

A major finding in this study was the influence of the AIP program on significantly reducing rehospitalizations. Hospitalization was reduced by 0.44 events per year, and ED visits were reduced by 0.2 events per year. The small but significant decreases in use resulted because over 80% of AIP and HHC patients were not rehospitalized in a year, and over 40% of AIP and HHC did not use the ED. Additionally, much of the current emphasis on reduction of rehospitalization and the recent addition of penalties (CMS, 2014) had not yet started in 2005, leading to the conclusion this outcome was related to the care coordination received by the AIP group. The care coordinators routinely followed their patients after hospital discharge, immediately putting in place an aggressive monitoring and service plan to support patients and their families. The influence of AIP on higher provider and outpatient services is most likely because of the use of HHC services, which allowed for rehabilitation and close followup after health care changes. This approach allowed patients to remain home, and receive close monitoring while not having to travel to appointments. Nationally, it is a challenge to meet patients' nonmedical needs, which are currently managed through family caregiving, paid for privately, or through Medicaid (Komisar & Feder, 2011).

The results of this study are very similar to other studies that found care coordination lowered total Medicare costs when compared to usual care (Marek et al., 2014; Naylor et al. 1999; Peikes et al., 2009). Unlike the Medicare Coordinated Care Demonstration project, this analysis showed small but statistically significant differences in rehospitalizations and ED use in a population that was significantly older, more cognitively and functionally impaired, more depressed, and of a lower socioeconomic status. Both

groups were admitted to the same home health care agency after hospital discharge, the only difference was long-term care coordination received by the AIP group.

Limitations. This study was a secondary analysis of the AIP intervention, conducted nearly a decade after the original study ended. The groups were not matched on subject characteristics or size. One strength is a consistent electronic health record that was used to collect data. We were able to use groups that occurred naturally to realistically compare traditional and long-term care coordination within a single community and agency. This offers a unique view of what care coordination can accomplish for community-dwelling adults.

Conclusion

This study adds to the growing body of evidence about the effectiveness of nurse care coordination. The patients who received AIP services had significantly more problems with functional ability, cognition, and depression. They were at a disadvantage due to low income, which impacted their home environment, social support network, and ability to obtain resources. Considering other costs of the program, AIP costs were still lower than HHC. It should be noted AIP was not a primary medical home. Nurses worked with providers, and through existing payment mechanisms like HHC and HCBS, to manage these complex patients. This study supports that long-term care coordination supplied by nurses outside of a primary medical home can positively influence functional, cognitive, and health care utilization for frail older people. Results of this investigation support the need for additional study about the benefit of using care coordination within the HCBS environment. The care coordinators in this study practiced nursing by routinely assessing and educating patients and families, assuring adequate service delivery,

and communicating with the multidisciplinary health care team. Care coordination managed by RNs can influence utilization and cost outcomes, and impact health and functional abilities. There is a need to explore reimbursement models that will allow independent care coordination practice for nurses, who have long been managing clinically complex patients in community settings. \$

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