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Integrated Home- and Community-Based Services Improve Community Survival Among Independence at Home Medicare Beneficiaries Without Increasing Medicaid Costs

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Abstract

OBJECTIVES: To determine the effect of home-based primary care (HBPC) for frail older adults, operating under Independence at Home (IAH) incentive alignment on long-term institutionalization (LTI).

DESIGN: Case-cohort study using HBPC site, Medicare administrative data, and National Health and Aging Trends Study (NHATS) benchmarks.

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SUPPORTING INFORMATION

Additional Supporting Information may be found in the online version of this article.

SETTING: Three IAH-participating HBPC sites in Philadelphia, PA, Richmond, VA, and Washington, DC.

PARTICIPANTS: HBPC integrated with long-term services and supports (LTSS) cases (n = 721) and concurrent comparison groups (HBPC not integrated with LTSS: n = 82; no HBPC: n = 573). Cases were eligible if enrolled at one of the three HBPC sites from 2012 to 2015. Independence at Home-qualified (IAH-Q) concurrent comparison groups were selected from Philadelphia, PA; Richmond, VA; and Washington, DC.

INTERVENTION: HBPC integrated with LTSS under IAH demonstration incentives.

MEASUREMENTS: Measurements include LTI rate and mortality rates, community survival, and LTSS costs.

RESULTS: The LTI rate in the three HBPC programs (8%) was less than that of both concurrent comparison groups (IAH-Q beneficiaries not receiving HBPC, 16%; patients receiving HBPC but not in the IAH demonstration practices, 18%). LTI for patients at each HBPC site declined over the three study years (9.9%, 9.4%, and 4.9%, respectively). Costs of home- and community-based services (HCBS) were nonsignificantly lower among integrated care patients (\$2151/mo; observed-to-expected ratio = .88 [.68–1.09]). LTI-free survival in the IAH HBPC group was 85% at 36 months, extending average community residence by 12.8 months compared with IAH-q participants in NHATS.

CONCLUSION: HBPC *integrated with long-term support services delays* LTI in frail, medically complex Medicare beneficiaries without increasing HCBS costs.

Keywords

home- and community-based care; independence at home; community survival; provider managed care

Through its first 3 years, the Independence at Home (IAH) demonstration showed that home-based primary care (HBPC) practices, operating under aligned incentives produced by a robust shared savings model, can produce savings through reduced hospitalizations and readmissions.¹ The medically complex, functionally limited IAH-qualified (IAH-Q) population comprises 6% of Medicare's fee-for-service (FFS) beneficiaries but is responsible for nearly one-third of Medicare annual spending, supporting the approach of focusing primary care resources on frail older adults.^{2–4}

Frail, medically complex older adults can be maintained in the community, avoiding the need for long-term institutionalization (LTI), by providing long-term services and supports (LTSS), particularly when integrated with provider managed care.^{5–9} The Programs of All-Inclusive Care for the Elderly (PACE), the exemplar of integrating social supports with medical management of complex older adults, is now operating in 34 states.^{10–13} More than 19 states, facing challenging Medicaid budgets in part from a growing population of nursing home-eligible frail older adults, have turned to managed care organizations to operate their LTSS systems, with several more due to convert in the coming years.¹⁴ Managed LTSS (MLTSS) alone does not provide the integrated care that PACE offers, and federal efforts to combine Medicare and Medicaid services through the same managed care organization

(MCO) in the Financial Alignment (FA) Demonstrations have had mixed results.¹⁵ One underlying limitation of the integrated MCO program in the FA Demonstrations was the cautiousness of FFS beneficiaries enrolling in a MCO with a network excluding some of their current providers. In contrast to these mixed results, the FFS option for financial integration operated in Washington achieved Medicare savings of 6% in its first 2 years.¹⁵

IAH, using a shared savings mechanism based on FFS architecture, is a way of offering provider managed care for those frail older adults who want to retain the flexibility of provider choice in FFS Medicare. The core of the IAH program is HBPC that provides needed medical and social services through a mobile team composed of physicians, nurse practitioners, and social workers to deliver primary care in the patient's home and coordinate social supports. HBPC was shown in a number of studies to have high patient satisfaction while producing substantial reductions in cost, hospital stay, and readmissions.^{16–20} Analysis of data from year 1 of IAH showed promise with savings of 7.7% across all programs and 17% savings in 9 of 17 programs receiving shared savings.¹⁹ As a provider managed care program within FFS Medicare, IAH teams could mitigate the effects of social determinants (accessibility, housing stability, and food security) with either MLTSS MCOs or with Area Agencies on Aging (AAAs) operating in FFS Medicaid.

Although the Centers for Medicare & Medicaid (CMS) has not reported the impact of IAH on Medicaid costs, the practices at one of the IAH sites, the Mid-Atlantic Consortium (MAC), have long been clinically integrating HBPC with support services to help home-limited older adults remain in the community. Using data collected by the MAC outside of the demonstration for program quality purposes, we evaluated whether HBPC, operating under IAH incentive alignment, would lower long-term institutionalization and the costs of home- and community-based LTSS, compared with local LTI and home- and community-based services (HCBS) benchmarks.

METHODS

This analysis compared LTI for patients enrolled in the MAC (three HBPC sites with integrated LTSS) with IAH-Q concurrent comparison groups with and without HBPC (Table 1). The three MAC sites were the University of Pennsylvania (UPenn), the House Call Program of MedStar Health (MedStar), and Virginia Commonwealth University Health System (VCUHS). Concurrent comparison groups were selected from cities of the MAC sites (Philadelphia, PA, Washington, DC, and Richmond, VA). The primary analysis uses local LTI benchmarks from the Medicare 5% file for IAH-Q beneficiaries to identify expected LTI, defined as 90 days or longer of nursing home residence. We used the Minnesota Case Mix classification²¹ to create expected LTSS costs for these patients as a benchmark for LTSS care plan spending in Philadelphia, for which we have waiver expenditures reported by the AAA. We then used the National Health and Aging Trends Survey²² to identify the expected 3-year community survival of IAH-Q Medicare beneficiaries to construct a “community days” measure that was proposed as a surrogate quality measure for frail populations.²³

Intervention Patients

Patients enrolled in the MAC from September 2012 to August 2015 (UPenn, n = 126; MedStar, n = 426; VCUHS, n = 169). Medicare claims-based measures for patient-level characteristics were available through December 2014 for 570 of the 721 patients.

Concurrent Comparison Group Patients

The 2011–2013 National Provider Identifier (NPI)-linked Medicare 5% beneficiary file was used to identify concurrent comparison group patients (n = 655). First, NPI linkage was used to exclude patients seen by the three practices. Then, remaining patients in these communities who met IAH qualification criteria were identified. This IAH-q concurrent comparison group was subdivided into those who did not receive any house calls (n = 573) and those who did receive house calls (n = 82), to account for potential selection biases among house call patients.

The IAH eligibility criteria include enrollment in traditional FFS Medicare, two or more chronic conditions, nonelective hospitalization and post-acute care use, either skilled home care or skilled nursing facility, in the prior 12 months, and deficits in two or more activities of daily living (ADLs). For this study, we used the JEN Frailty Index (JFI) score of 6 or higher in place of the ADLs data that were not available for the claims-defined groups.²⁴

Intervention

The three practices use mobile interdisciplinary teams to serve similarly frail patients. Each site has HBPC proactively integrated care coordination with community supports based on availability of resources and local relationships. Support to patients ranged from adult day healthcare and home health aide-provided personal care services, to transportation, meals, and equipment (eg, stair glides). In UPenn's ElderPAC, the care managers from the Philadelphia Corporation on Aging, the local AAA, are members of the interagency HBPC interdisciplinary team that meets monthly.²⁵ Patients have a choice of their case manager, and 27 of 60 (45%) patients chose the ElderPAC case managers. At MedStar, HBPC social workers on the interdisciplinary team are funded through case management fees from the DC Department of Health's Elderly and Persons with Physical Disabilities (EPD) Waiver. At VCUHS, the HBPC team employs two IAH-funded full-time experienced HBPC social workers who collaborate with the Richmond AAA and various other community LTSS resources to actively intervene when social support systems falter.

Cost Comparisons

Expected HCBS costs were calculated at the three HBPC sites and compared with observed costs that were only available for one site, to test whether heavily resourced care plans would be responsible for LTI rate differences. The expected costs were developed using the Minnesota Case Mix classification that sorts patients into categories based on their number of dependent ADLs for which they require assistance, behavioral needs, and special nursing needs, and assigns costs to those categories.²¹ The classification and cost assignment are described in Supplementary Appendix S1. The expected cost of LTSS for a patient in the MAC was calculated based on the Minnesota Case Mix costs, the case mix of each patient, and the patient's duration of HBPC. Observed care plan costs were available for the 60

ElderPAC patients receiving formal services and were compared with the expected cost for those patients.

Kaplan-Meier Analysis

To determine how long patients lived in the community rather than long term in a nursing home, Kaplan-Meier analysis was used with LTI and death as competing risks. Survival in the community was compared between 721 integrated care patients in the MAC and a concurrent comparison group selected from the National Health and Aging Trends Survey (NHATS). The NHATS is a nationally representative panel of Medicare beneficiaries 65 years and older that started in 2011 with ongoing annual assessments. Among NHATS participants waves 1 to 5 with 6 months or longer continuous FFS Medicare claims ($n = 7371$), we identified the subset of NHATS respondents who met IAH-q criteria. Community survival in each ADL group (2, 3–4, and 5–6) was determined, with the groups weighted by the proportion of patients in the corresponding ADL group from the MAC. This created a blended benchmark for survival in the community among the national Medicare IAH-Q population. Community survival was summarized as either a delay in LTI (the difference in days of community residence conditional on survival)¹⁰ or as community days (days in the community as a share of potential days), a suggested summary quality measure.²³

RESULTS

Both concurrent comparison groups and MAC patients were frail and medically complex. Those receiving HBPC (both MAC and concurrent comparison group patients) were older and with a higher prevalence of dementia (Table 2). The MAC populations had a larger proportion of African Americans (82%) than either concurrent comparison group (43%). All three MAC sites enrolled a more medically complex group of frail older adults, with higher Hierarchical Condition Category scores, JFI scores of 8+, and prevalence of dementia (Supplementary Tables S1 and S2).

The proportion of patients in each case-mix category is shown in Supplementary Table S3. All three MAC sites care for patients with significant levels of functional impairment with more than 80% of patients with four to six or more ADL dependencies (cells D–J).

Despite the high level of frailty, the LTI rate for the MAC (8%) was half that of both concurrent comparison groups (IAH-Q no HBPC, 16%; IAH-Q with house calls, 18%). No differences were found in overall mortality among the groups. The expected monthly HCBS cost for patients in the MAC was \$2432/month; the observed costs from Philadelphia (the most expensive region) were \$2151/month, with a nonsignificant observed-to-expected (O:E) ratio of .88 (.67–1.09) (Supplementary Table S3; Supplementary Appendix S2 lists local cell-specific costs). HCBS monthly spending was primarily composed of home health aides (90%), as well as adult day healthcare, meals, and transportation (Supplementary Table S10).

LTI for patients at each MAC site declined over the three demonstration years from 9.9% to 4.9%, with a mean time to nursing home entry, conditional on survival, of 33 months. By 36 months, long-term institutionalization-free survival in the MAC HBPC recipients (86%)

represented 88% of potential community days, compared with 84% among IAH-Q Medicare beneficiaries in the NHATS (Figure 1B). There was a delay of 12.8 months in LTI among the MAC HBPC patients (Figure 1A). Although 3-year community survival (including death and LTI) were similar at 36 months (41% vs 42%), there were 4.4% more community days among IAH participants, representing 34 925 additional days, or 95 person-years (Supplementary Appendix S3).

DISCUSSION

Providing cost-effective integrated HCBS for medically complex older adult patients with limited resources is challenging. Although a number of trials have evaluated the effect of HCBS on LTI, the focus of those evaluations was on receipt of home and community services rather than an integrated program.^{5–10,15,26,27} In this article, we used the setting of the IAH demonstration to show an impact on LTI for medically complex Medicare beneficiaries, similar to that reported by capitated provider managed care programs such as PACE.

Our findings are consistent with the results of the Washington State FA Demonstration,¹⁵ also based on a FFS architecture but operating under a budget constraint created by a shared savings design. The MAC programs served highly functionally impaired populations at monthly costs not higher than those expected from similarly impaired individuals. Although we found less than 30% of frail Medicare beneficiaries who lose community residence enter a nursing facility long term, the 55% lower LTI rate in MAC IAH patients compared with local IAH-Q Medicare concurrent comparison groups suggests that integrated HCBS with IAH incentives can lead to patients residing in the community longer than with usual care. The 12.8-month LTI delay seen in the longitudinal analysis is consistent with a recent analysis by JEN Associates, showing that PACE in Massachusetts delayed LTI by an average of 11.7 months¹⁰ (Supplementary Appendix S2).

Of the IAH beneficiaries who converted to LTI, 68% had a hospitalization in the preceding 90 days, suggesting that one of the mechanisms by which IAH avoids LTI is by medical stabilization, preventing the upstream hospitalizations that ultimately led to LTI.²⁸ If confirmed, avoidance and delay of LTI among IAH-Q nondual Medicare beneficiaries would provide additional savings to states and CMS by reducing nursing home admissions and subsequent conversion to Medicaid support.²⁹

This pilot analysis of LTI use among MAC IAH beneficiaries is consistent with other studied examples of provider managed LTSS.³⁰ Here, a small team of clinicians who know the patients well are there to help patients and families find solutions that make sense. Longitudinal engagement and trust, along with tightly joining the medical and social aspects of care, are likely success factors.^{31,32} IAH provides an alternative model for states to include in their organization of LTSS that is consistent with patient choice. They suggest that MCOs in MLTSS states that include responsibility for all LTI can reduce their expected LTI rate by expanding HBPC as a provider managed care option.

As just one of the IAH demonstration sites, this study of the MAC experience has a number of limitations. The MAC experience may not be generally representative of all IAH practices, although the recently published evaluation of the IAH demonstration is consistent with these results, reporting a demonstration-wide LTI rate of 12%,³³ noted to be lower than the matched control group LTI rate of 16%.²⁹ Race, as well as Medicaid status, differed between the comparison groups and the MAC (Table 2), although the impacts mitigate the bias with Medicaid status raising LTI risk while African Americans are less likely to experience LTI.³⁴ LTI for MAC patients was identified from practice records, rather than from claims. We did not have Medicaid claims and had verified HCBS spending for only one of the three practices. We did not have the full set of eight ADLs for case-mix classification for all patients and relied on a crosswalk from one site to impute the case-mix distributions of the other two practices. LTSS is local, and the three sites have LTI rates 5% to 13% higher than the national average, making the NHATS survival analysis a conservative measure. Our survival measure, community days, only captured death or LTI, and it did not include temporary institutional days such as hospitalizations or skilled nursing facility stays, which are also reduced among IAH beneficiaries.²⁸ We are addressing these concerns in a study of all IAH sites using concurrent matched controls.³⁵ However, the observed LTI rate for the 570 MAC patients for whom we have Medicare claims showed a year 1 LTI rate, among the 90% of MAC patients with JFI of 6 or higher, of 7.1%, suggesting our reported rates are an overestimate of actual LTI.

In conclusion, providing cost-effective HBPC for medically complex, frail older adult patients are a major challenge in the United States. We found in our study that providing HBPC *integrated with long-term support services* in the community, as part of a program with aligned Medicare incentives, improves community survival free of LTI for frail, medically complex Medicare beneficiaries without increasing the costs of community supports.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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Figure 1.

(A) Comparison of long-term institutionalization (LTI) rates among Mid-Atlantic Consortium (MAC) Independence at Home (IAH) patients (54 with LTI exit) and 455 IAH-qualified (IAH-Q) National Health and Aging Trends Study (NHATS) respondents (74 with LTI exit), conditional on survival. MAC IAH patients had their community exit due to LTI delayed on average by 12.8 months. (B) Patient survival in the community, conditional on survival. MAC IAH patients (blue) compared with IAH-Q NHATS respondents (orange) with LTI or death as competing risks. The 721 MAC IAH patients had 61.3% of their potential days alive in the community, compared with the national IAH-Q NHATS cohort (56.8%), or 34 925 extra days (equivalent to 95 person-years).

Study Groups and Comparison Benchmarks

Table 1.

Analysis and comparisons					
	N	Years	Cost ^a	LTI ^b	Kaplan-Meier community survival ^c
Intervention group					
IAH practices	721	2012–2015	Expected	X	X
UPenn subgroup	60	2012–2015	Observed		
Comparison groups					
Local IAH-qualified benchmarks	655	2011–2013		X	
Longitudinal IAH-qualified NHATS cohort	455	2011–2016			X

Abbreviations: IAH, Independence at Home; LTI, long-term institutionalization; NHATS, National Health and Aging Trends Study.

Note: Data on site-specific cohorts are available in Supplementary Tables S1 and S2.

^aCost analysis compared expected costs for 721 Mid-Atlantic Consortium (MAC) patients based on activities of daily living using the Minnesota Case Mix classification and the observed costs that were only available for a subset of the MAC consisting of 60 patients at the University of Pennsylvania site (Table 2 under Cost and Minnesota Case Mix classification; see Methods section, “Cost Comparisons”).

^bLong-term institutionalization and mortality analysis compared IAH-qualified benchmarks in Washington, DC, Philadelphia, and Richmond and the MAC (Table 3, LTI and Mortality columns).

^cLongitudinal analysis compared patient survival in the community between NHATS and MAC (Figure 1; see Methods section, “Kaplan-Meier Analysis”). The NHATS were used for the Kaplan-Meier analysis because 3 years of survival data with monthly resolution were available, rather than IAH-qualified benchmarks for which only 2 years of cross-sectional survival data were available.

Table 2.**Intervention and Concurrent Comparison Group Patient Characteristics**

Characteristic	IAH-Q concurrent comparison group without HBPC (n = 573)	IAH-Q concurrent comparison group with HBPC (n = 82)	MAC year 1 and year 2 (n = 570)
Sex			
Male	36.0%	30.5%	25.1%
Female	64.1%	69.5%	74.9%
Age, y			
<75	44.9%	30.5%	20.9%
75–84	30.5%	25.6%	30.2%
85	24.6%	43.9%	49.0%
Race			
African American	43.3%	42.7%	82.6%
White/Other/Unknown	56.7%	57.3%	17.4%
Original Entitlement = Age/Older adult	68.4%	79.3%	80.4%
Original Entitlement = Disabled and/or ESRD	31.6%	20.7%	19.7%
Medicare buy-in status	38.9%	36.6%	55.3%
HCC ^a	3.48	3.83	3.65
JEN Frailty Index	7.40	7.60	7.68
1–6			9.0%
6–7	58.3%	51.2%	36.0%
8+	41.7%	48.8%	55.1%
Alzheimer's/Dementia	22.2%	37.8%	62.5%
Asthma/COPD	45.4%	47.6%	30.4%
CHF	44.9%	61.0%	56.1%
Diabetes	54.6%	59.8%	51.1%

Abbreviations: CHF, congestive heart failure; COPD, chronic obstructive pulmonary disease; ESRD, end-stage renal disease; HBPC, home-based primary care; HCC, Hierarchical Condition Category; IAH-Q, Independence at Home-qualified; MAC, Mid-Atlantic Consortium.

^aThe CMS-HCC 2012 V21 PACE model (V2112.87.H1) was used to calculate Hierarchical Condition Category (HCC) scores.

Note: The MAC year 1 data were from September 2012 to August 2013, and year 2 were from September 2013 to August 2014. Year 3 claims data are not yet available. Site-specific demographics for the concurrent comparison groups and cases are included in the Supporting Information.

Table 3.Long-term Care Benefits of Integrated HBPC Programs Among MAC Sites^a

		LTI, %	Mortality, %
MAC (N = 721)		8.1 ^b	25.8
Benchmark	IAH-Q without HBPC (n = 573)	16.4	24.9
	IAH-Q with HBPC (n = 82)	17.7	26.9

Abbreviations: HBPC, home-based primary care; IAH-Q, Independence at Home-qualified; LTI, long-term institutionalization; MAC, Mid-Atlantic Consortium.

^aMAC rate computed as the number of LTI events from 2012 to 2015 divided by the number of beneficiary months of exposure, annualized. Benchmark rates are annualized from Medicare 5% file 2012–2013.

^bP < .05 compared with benchmark.