

Cost Savings and Enhanced Hospice Enrollment with a Home-Based Palliative Care Program Implemented as a Hospice–Private Payer Partnership

Christopher W. Kerr, MD, PhD,¹ Kathleen A. Donohue, MA,² John C. Tangeman, MD, FACP,¹
Amin M. Serehali, MA,² Sarah M. Knodel, MS, MPH,² Pei C. Grant, PhD,¹
Debra L. Luczkiewicz, MD,¹ Kathleen Mylotte, MD,² Melanie J. Marien, MS, PA-C¹

Abstract

Background: In the United States, 5% of the population is responsible for nearly half of all health care expenditures, with a large concentration of spending driven by individuals with expensive chronic conditions in their last year of life. Outpatient palliative care under the Medicare Hospice Benefit excludes a large proportion of the chronically ill and there is widespread recognition that innovative strategies must be developed to meet the needs of the seriously ill while reducing costs.

Objective: This study aimed to evaluate the impact of a home-based palliative care program, implemented through a hospice–private payer partnership, on health care costs and utilization.

Methods: This was a prospective, observational database study where insurance enrollment and claims data were analyzed. The study population consisted of Home Connections (HC) program patients enrolled between January 1, 2010 and December 31, 2012 who subsequently expired ($n=149$) and who were also Independent Health members. A control group ($n=537$) was derived using propensity-score matching. The primary outcome variable was overall costs within the last year of life. Costs were also examined at six months, three months, one month, and two weeks. Inpatient, outpatient, ancillary, professional, and pharmacy costs were compared between the two groups. Medical service utilization and hospice enrollment and length of stay were also evaluated.

Results: Cost savings were apparent in the last three months of life—\$6,804 per member per month (PMPM) cost for palliative care participants versus \$10,712 for usual care. During the last two weeks of life, total allowed PMPM was \$6,674 versus \$13,846 for usual care. Enhanced hospice entry (70% versus 25%) and longer length of stay in hospice (median 34 versus 9 days) were observed.

Conclusions: Palliative care programs partnered with community hospice providers may achieve cost savings while helping provide care across the continuum.

Introduction

OUTPATIENT PALLIATIVE CARE in most communities has been administered primarily via the Hospice Medicare Benefit which provides care for terminally ill individuals with an estimated life expectancy of six months or less. In addition, patients under the Hospice Medicare Benefit have chosen to “forgo curative treatment,”¹ which may exclude many patients facing chronic, incurable illness who might otherwise benefit from palliative care. Health care systems and payers are seeking innovative programs to address the needs of the most seriously ill patients who incur the highest

costs; in 2009, the sickest 5% of patients in the United States accounted for greater than 50% of health care spending, with a large proportion spent in the last year of life, often on hospital and/or ICU care.² Hospital-based palliative care consultation services have, over the past decade, been offered at an increasing number of large U.S. hospitals,³ with a solid evidence base supporting financial and clinical efficacy.^{4–9} As noted in a recent review, less is known about the impact of outpatient palliative care programs.¹⁰

Palliative care offers the rare alignment between positive clinical and economic outcomes. A previous study of home-based palliative care showed reduced costs of up to 33%;¹¹

¹Center for Hospice and Palliative Care, Cheektowaga, New York.

²Independent Health, Buffalo, New York.

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however, this program was implemented through a staff model insurance company and may be difficult to replicate outside of this framework. Similarly, the Aetna Compassionate Care Program showed a 22% reduction in costs at end of life while doubling hospice utilization.¹² The current study describes economic outcomes of a collaborative model between a not-for-profit hospice and a private not-for-profit commercial insurance payer to provide home-based palliative care upstream and outside of hospice. This innovative program, implemented in Erie County in western New York, was supported via a per member per month (PMPM) fee. In a previous study,¹³ the clinical impact of this program was evaluated and was shown to improve symptom management in multiple symptom domains. More than two thirds of enrollees completed actionable advance directives, and the site of death was home for nearly half of those who expired during or after participation. Additionally, patients, caregivers, and physicians all gave the program high satisfaction scores.¹³ An economic analysis of participants in the program who expired is now reported, including the impact of this model on overall end-of-life costs, service-specific costs, and medical service utilization. Hospice enrollment and length of stay are also discussed.

Methods

Program description

The Center for Hospice & Palliative Care, Cheektowaga, New York, established the Home Connections (HC) home-based palliative care program in 2008 jointly with Independent Health, a commercial insurance provider. HC is intended for adults with advanced chronic illness upstream of hospice, so patients may still be receiving aggressive or cure-focused treatments. The program is not restricted to patients with a prognosis of six months or less. The HC team includes a palliative care-trained registered nurse (RN), social worker, volunteers, and palliative care physician. Services include symptom management, education, supportive discussions about health care decision making and goals, social work visits to facilitate access to community support services, respite care, and 24/7 on-call palliative care nurse support. Nurses and social workers visit participants a minimum of every 30 days, and a biweekly interdisciplinary group meeting is held to discuss each patient case with the palliative care physician. When clinically appropriate, HC also helps patients transition into hospice care, if desired.

Sample

This study was approved by the University at Buffalo Health Sciences IRB. The study population consisted of HC participants enrolled for greater than 30 days between January 1, 2010 and December 31, 2012 who subsequently expired ($n=149$). A control group was derived using propensity-score matching, to compare members with similar clinical and demographic characteristics ($n=537$). Members enrolled less than 30 days ($n=68$) were excluded, as many of those members enrolled directly in hospice (63%), therefore limiting the ability to measure the effect of HC on cost and utilization over a defined time period.

Data was abstracted from insurance enrollment and claims. Logistic regression analysis was used to identify control group patients for propensity matching using age, gender,

insurance product, median household income (categorized), neighborhood percentage minority (categorized), prospective risk score,¹⁴ and diagnoses historically associated with palliative care.^{5,16} These diagnoses included cancer, asthma, coronary artery disease (CAD), chronic obstructive pulmonary disease (COPD), diabetes, congestive heart failure (CHF), cerebral vascular accident (CVA), Alzheimer's disease, dementia, chronic renal disease (CRD), and depression. The predicted probability of HC membership was grouped into quintiles, following the methodology of R. D'Agostino.¹⁷ The SAS GMATCH algorithm¹⁸ matched HC members to controls, at a 1:4 ratio. Variables found to be significantly related to participation in HC included age; neighborhood median household income, neighborhood percent minority race; diagnoses of cancer, diabetes, Alzheimer's disease, dementia, CRD, and depression; insurance product; and prospective risk score.

Analysis was restricted to members who had expired in order to eliminate bias introduced by trying to "match" clinical characteristics based on dates of enrollment. The data were filtered to only include those in the range of probability scores for HC members, yielding 5400 members in the pool used to match cases to controls.

Statistical analyses

Outcome measures were costs and utilization of services, evaluated at two years, one year, six months, three months, one month, and two weeks prior to death. Testing of categorical factors was performed using the chi-square or Fisher's exact test. Cost and risk score data were analyzed using the Mann-Whitney test. Statistical significance was set at 5% (two-sided). The effects of program membership on overall costs were analyzed using a repeated measures analysis of variance.¹⁹ This model allowed for changes in cost to be measured between the members based on program membership as well as over time. Cost data in the repeated measures analysis was transformed using a log function to adjust for skewing and outliers. The cost total within the last three months of life was modeled as a gamma distribution using a log link function²⁰ using the generalized linear model procedure.²¹ Multivariate analysis adjusted for the effects of other demographic and clinical characteristics on overall costs.

Results

HC participants and comparison members

The median time in HC, excluding those enrolled <30 days, was 118 days (range: 31–843). Demographic characteristics of HC participants and propensity-matched comparison members are shown in Table 1, with medical diagnoses in Table 2. Propensity score quintiles were evenly distributed, indicating that the groups were well matched for the likelihood of participation in HC. Demographic characteristics and diagnosis were similarly distributed between HC members and controls with the exception of CHF (40% of controls versus 28% of HC members [$p=0.01$]) and CRD (28% of controls versus 14% of HC participants [$p<0.0001$]).

Aggregate costs

A comparison of overall total allowed costs over time is shown in Figure 1. Costs between the two groups were

TABLE 1. DISTRIBUTION OF DEMOGRAPHIC CHARACTERISTICS BETWEEN HOME CONNECTIONS PARTICIPANTS AND PROPENSITY-MATCHED COMPARISON MEMBERS

Characteristic	Home connections (n = 149) No. (%)	Comparison members (n = 537) No. (%)	p-value
Propensity score quintile			0.99
1	29 (19%)	107 (20%)	
2	29 (19%)	113 (21%)	
3	32 (21%)	108 (20%)	
4	29 (19%)	104 (19%)	
5	30 (20%)	105 (20%)	
Age group (years) ^a			0.37
0–50	4 (3%)	9 (2%)	
51–65	20 (13%)	71 (13%)	
66–75	36 (24%)	116 (22%)	
76–90	80 (53%)	280 (52%)	
≥91	9 (6%)	61 (11%)	
Neighborhood median household income (\$) ^a			0.26
≤10,000	2 (1%)	6 (1%)	
10,001–20,000	1 (<1%)	9 (2%)	
20,001–30,000	12 (8%)	52 (10%)	
30,001–50,000	60 (40%)	183 (34%)	
50,001–75,000	45 (30%)	208 (39%)	
≥75,001	29 (19%)	79 (15%)	
Neighborhood percent minority race ^a			0.60
<50%	136 (91%)	498 (93%)	
≥50%	13 (9%)	39 (7%)	
Insurance product ^a			0.52
Article 43	5 (3%)	15 (3%)	
Encompass	10 (7%)	27 (5%)	
Medicare	131 (88%)	470 (88%)	
Medisource	3 (2%)	19 (4%)	
Self-funded	0 (0%)	6 (1%)	
Gender			0.22
Male	70 (47%)	222 (41%)	
Female	79 (53%)	315 (59%)	
Prospective risk score ^a			0.21
Median	13.40	13.74	
Range	1.82–37.89	0.83–44.84	

Author's calculations based on data from Independent Health insurance claims from 2010–2012.

^aVariables significantly related to Home Connections enrollment in the logistic regression model.

relatively equal at two years to six months prior to death. There were statistically significant differences from the last three months to the last two weeks of life, in which HC patients incurred lower costs, even with program fees included.

At three months prior to death the average total allowed PMPM cost was \$6,804 for those in HC, compared to \$10,712 for those not enrolled. At one month prior to death the PMPM cost was \$7,170 for HC versus \$13,440 for controls. The trend continued with lower PMPM costs for HC members during the last two weeks of life as well, with total allowed PMPM cost \$6,674 compared to \$13,846.

There was a highly significant effect of program membership over time within subjects in the repeated measures analysis of variance (p -value < 0.0001). This effect remained highly significant in the multivariate analysis, which included adjustment for CHF and CRD (p -value < 0.0001). The overall group effects between subjects were not statistically significant, however, when looking across the full two years

(p =0.28). These results are consistent with the graphical comparison of program costs over time shown in Figure 1.

The effects of program membership on the total overall medical and program costs during the last three months of life were quantified using a generalized linear model (see Table 3). There was a highly significant difference in costs between those enrolled in HC compared to controls, in which those enrolled in HC had significantly lower costs (p -value < 0.0001). When adjusted for other clinical covariates, those in the HC program still had significantly lower costs (p -value = 0.0002).

Costs by type of service

Facility. HC participants had significantly lower inpatient facility allowed costs than controls at all time points, with the greatest differences at the last one month and two weeks of life. Inpatient hospital admission rates were also much lower for HC participants, particularly during the last six months of life (see Fig. 2). Outpatient facility allowed

TABLE 2. DISTRIBUTION OF MEDICAL CONDITIONS BETWEEN HOME CONNECTIONS PARTICIPANTS AND PROPENSITY-MATCHED COMPARISON MEMBERS

<i>Condition</i>	<i>Home connections (n = 149) No. (%)</i>	<i>Comparison members (n = 537) No. (%)</i>	<i>p-value</i>
Cancer diagnosis ^a			0.19
Yes	87 (58%)	280 (52%)	
No	62 (42%)	257 (48%)	
CAD diagnosis			0.45
Yes	55 (37%)	218 (41%)	
No	94 (63%)	319 (59%)	
CHF diagnosis			0.01
Yes	42 (28%)	213 (40%)	
No	107 (72%)	324 (60%)	
Diabetes diagnosis ^a			0.54
Yes	39 (26%)	155 (29%)	
No	110 (74%)	382 (71%)	
Depression diagnosis ^a			0.10
Yes	30 (20%)	78 (14%)	
No	119 (80%)	459 (85%)	
COPD diagnosis			0.36
Yes	27 (18%)	117 (22%)	
No	122 (82%)	420 (78%)	
CRD diagnosis ^a			<0.0001
Yes	21 (14%)	150 (28%)	
No	128 (86%)	387 (72%)	
CVA diagnosis			0.12
Yes	20 (13%)	103 (19%)	
No	129 (87%)	434 (81%)	
Dementia diagnosis ^a			0.40
Yes	15 (10%)	68 (13%)	
No	134 (90%)	469 (87%)	
Alzheimer's diagnosis ^a			0.62
Yes	11 (7%)	48 (9%)	
No	138 (93%)	489 (91%)	
Asthma diagnosis			0.49
Yes	8 (5%)	21 (4%)	
No	141 (95%)	516 (96%)	

Author's calculations based on data from Independent Health insurance claims from 2010–2012.

^aVariables significantly related to Home Connections enrollment in the logistic regression model.

costs were significantly higher among HC members at two years and one year. While no difference in outpatient costs was observed at six months, outpatient costs for HC members were significantly lower at three months, one month, and two weeks. There were no significant differences in emergency room allowed costs or utilization between HC members and controls at any time point analyzed.

Pharmacy. Prescription costs were significantly higher for HC members across all time points except for one month and two weeks preceding death.

Professional. Overall professional allowed costs were significantly higher among HC members at two years and one year. Conversely, while no difference in professional costs was observed at six months, costs for HC members were significantly lower at three months, one month, and two weeks. Further analysis of specialty care, a subset of professional costs, showed that specialist allowed costs were

significantly higher at one and two years for HC members, though utilization rates were essentially the same. The average allowed specialist PMPM cost and utilization were significantly lower among HC members in the last one month and two weeks of life.

Ancillary. At two years, one year, and six months, HC members had significantly higher ancillary costs; however, there were no significant differences at three months, one month, or two weeks. There were highly significant differences in chemotherapy costs and utilization between HC members and the control group, in which HC members had both higher costs and utilization at one and two years. Forty-seven percent of HC members had received chemotherapy at one year, compared to only 25% of the control group. Similarly, at two years, half of HC members had received chemotherapy, compared to only 27% of controls. Chemotherapy costs and utilization were significantly higher for HC members at six months and three months preceding

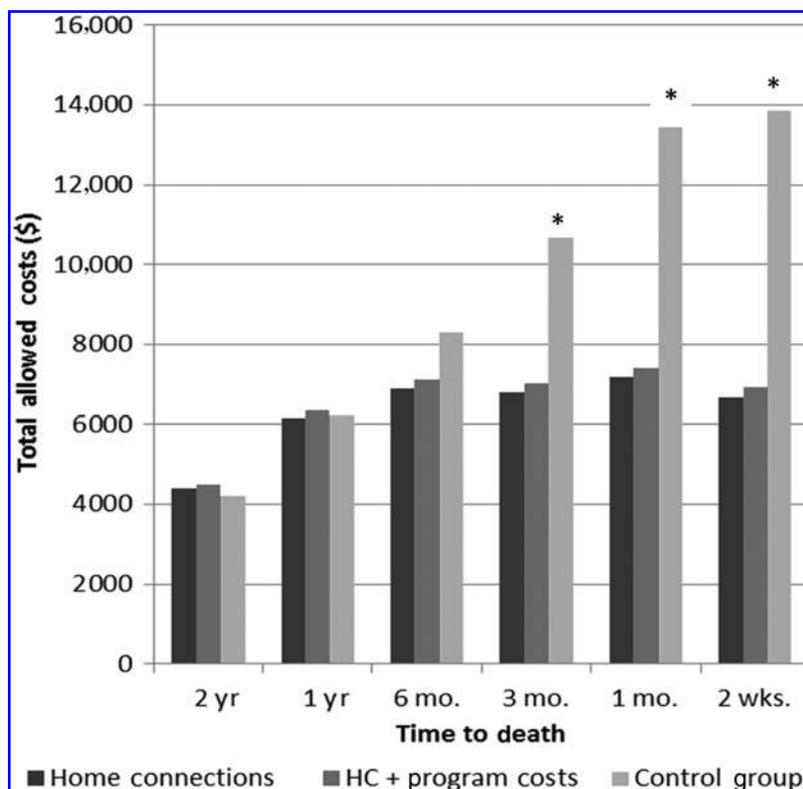


FIG. 1. Comparison of overall total allowed PMPM costs over time and program costs between home connections and control group members. (Author's calculations based on data from Independent Health insurance claims from 2010–2012; *indicates a statistically significant difference ($p < 0.05$.)

death, but not significantly different from the control group at one month or two weeks. Radiation utilization was significantly higher for HC members at six months, three months, and one month prior to death.

Hospice. Significantly more HC participants—105 (70%) versus 133 (25%)—enrolled in hospice ($p < 0.0001$). There was also a statistically significant difference in the

length of time in hospice between HC members (median 34 days, range 0–276) and the control group (median 9 days, range 0–606) ($p = 0.0003$).

Discussion

Outpatient palliative care in the United States has been offered primarily under the Hospice Medicare Benefit, restricted

TABLE 3. GENERALIZED LINEAR MODEL ANALYSIS OF PROGRAM MEMBERSHIP ON OVERALL TOTAL COSTS DURING THE LAST THREE MONTHS OF LIFE

Variable	Parameter estimate	95% Confidence interval	p-value
Univariate model:			
Home Connections participation (yes vs no)	−0.42	−0.62 to −0.21	<0.0001
Multivariate model:			
Home Connections participation (yes vs no)	−0.37	−0.56 to −0.18	0.0002
Age group (years)			
0–50	0.17	−0.42 to 0.76	0.57
51–65	0.41	0.15 to 0.68	0.002
66–75	0.39	0.18 to 0.59	0.0003
76–90	Reference	—	—
≥91	−0.33	−0.60 to −0.06	0.02
Cancer Dx (yes vs no)	0.04	−0.14 to 0.22	0.65
COPD Dx (yes vs no)	−0.05	−0.25 to 0.14	0.59
Diabetes Dx (yes vs no)	−0.06	−0.23 to 0.12	0.50
CHF Dx (yes vs no)	0.17	−0.01 to 0.35	0.07
CRD Dx (yes vs no)	−0.10	−0.32 to 0.12	0.36
Prospective Risk Score	0.05	0.03 to 0.06	<0.0001

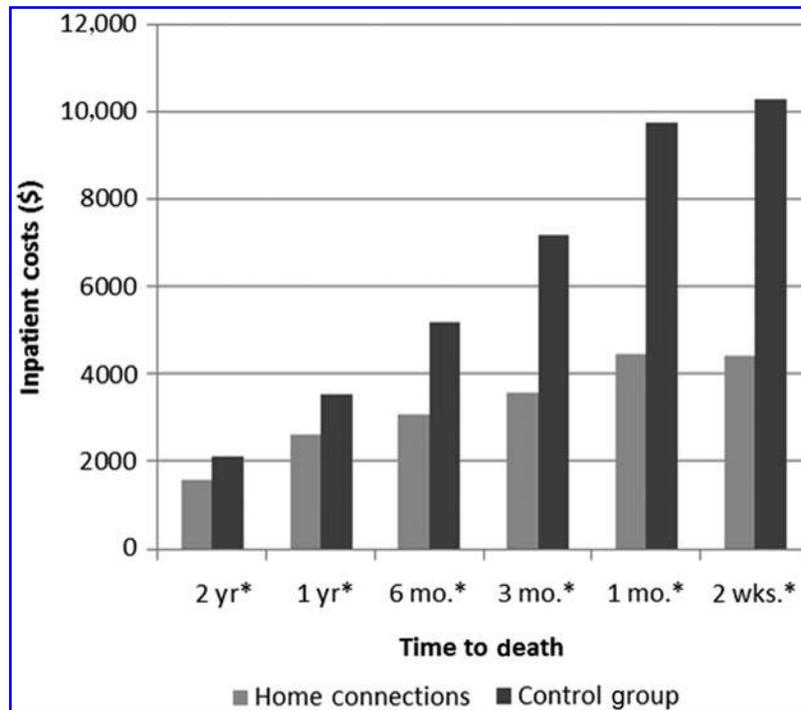


FIG. 2. Comparison of inpatient allowed PMPM costs over time between home connections and control member groups. (Author's calculations based on data from Independent Health insurance claims from 2010–2012; *denotes statistically significant difference in costs for that time point.)

to patients with expected prognoses of six months or less who are not pursuing curative treatments.³ While the number of inpatient palliative care programs has grown rapidly since 2000,^{4–9,22} there remains a strong need for innovative outpatient palliative care programs in order to provide services earlier in illness and throughout the care continuum.¹⁰

The current study presents the financial analysis of Home Connections (HC), a community-based outpatient palliative care program supported by Independent Health, a commercial insurance company, on end-of-life care. The program was cost effective over the study period, with costs the same or lower for HC members, even when program fees were included with patient medical expenditures. HC participants were nearly three times as likely to enroll in hospice near end of life, with a significantly longer length of stay. As reported separately,¹³ the program demonstrated significant clinical benefits for participants, including a high rate of actionable advance directive completion, improvement in multiple symptom domains, and an increased likelihood of dying at home. Patient, caregiver, and clinician satisfaction scores were very positive. Collectively, these findings demonstrate the significant potential of a home-based palliative care program to achieve the Institute of Healthcare Improvement's Triple Aims²³ goals of lower costs, higher quality, and improved satisfaction.

Savings to commercial insurer

The most significant savings were apparent in the last three months of life, with lower overall, inpatient, outpatient, and professional costs. Although outpatient allowed costs and professional costs were higher among HC members at two years and one year, these costs fell significantly compared to

the control group during the last three months of life. Ancillary costs were also higher for HC participants at two years and one year, but were no longer significantly different during the last year of life.

Hospital admissions, specialty visits, and their related costs for HC members were significantly lower than in the control group, and emergency costs showed no difference; while HC patients had significantly higher chemotherapy utilization until the three months preceding death. Although higher chemotherapy costs may be due to patient selection, further analysis of cancer types may help to understand the impact of the program at the service level. It is also conceivable that individuals who are not undergoing chemotherapy are more likely to be open to hospice referrals and thus already be in hospice care instead of a palliative care program. Examination of emergency room visit type may also help provide additional insights into these results.

The types of patients referred to HC may have influenced higher costs earlier in the course of illness. With patient referrals to HC initiated by insurance company case managers and community physicians, it is likely that there was a selection bias towards referral of more complex “high cost, high utilizing” patients. Despite the likelihood that HC patients had greater medical complexity and utilization of higher-cost services, overall costs were equal at one and two years prior to death and lower at all later time points. Avoidance of hospitalizations likely contributed to cost neutrality at earlier time points and cost savings as patients approached end of life. The study was restricted to members who had expired, in order to eliminate bias introduced by deriving an equivalent enrollment date for the control group; further analysis is needed to understand the impact of the program on members who didn't expire to see if cost benefits

are similar. It is also unclear how well the results generalize to patients and health care systems in other settings.

Enhanced hospice referral

Patients with serious illness often face highly fragmented care which may act as a barrier to hospice enrollment.^{24,25} In this study, 70% of patients entered hospice care, compared to 25% in the control group. Additionally, HC patients had a median length of stay in hospice that was nearly a month longer (34 versus 9 days). With the national median length of stay for hospice patients only 19 days,²⁴ timelier referral to hospice, where the Hospice Medicare Benefit pays for all costs referable to the terminal illness, is an obvious cost savings to the commercial insurance company. A recent study showed significant savings continuing after hospice enrollment, with an estimated additional \$6,430 saved per patient during a 15 to 30 day enrollment.²⁵ In addition, hospice care has demonstrated clinical benefits including reduced hospitalizations, ED and ICU use, and reduced likelihood of death in-hospital for patients with cancer.²⁷ In addition to potential financial benefits, patients dying at home experience greater quality of life, physical comfort, and psychological well-being, while family members and caregivers exhibit lower rates of pre-loss grief, posttraumatic stress disorder, anxiety, and depression.²⁸

There are many barriers to hospice referral, including a reluctance to discuss end-of-life issues, lack of provider time, misconceptions surrounding the benefit, and the perceived need to “abandon” curative care.²⁴ Interpretation of the benefit may also vary among hospice providers.²⁹ Hospice referrals in HC were enhanced by the involvement of nurse case managers who were, for the most part, hospice trained RNs comfortable discussing end-of-life issues and helping patients and families define goals of care.

Limitations

The use of propensity-score matching instead of a randomized control trial design may fail to adequately account for unmeasured variables that could explain some group differences, such as differences in program enrollee’s behavior or illness. Further, while many characteristics were evenly distributed between HC and control groups, there was a statistically significant difference in the incidence of CHF and CRD. Dissimilar distributions observed in the CHF and CRD populations may be a result of outreach efforts focusing on primary care and oncology practices. Also, as CRD patients on dialysis are traditionally underrepresented in hospice care, it appears that they were underrepresented in this palliative care program as well. This imbalance was adjusted for in the multivariate total cost analysis during the last three months of life. Additionally, although other diagnoses were distributed relatively evenly between HC and control groups, there was no comparison of severity of illness or comorbidities, beyond what is accounted for in the prospective risk score, an industry-acceptable measure of future cost, as determined by morbidity.

Selection bias towards referral of medically complex patients to the HC program may have contributed to variations such as chemotherapy and radiation costs and utilization observed between HC enrollees and the control group. Patients were not randomly assigned to HC versus usual care,

but were referred by insurance company case managers as well as community physicians based on a subjective perception of need and benefit. Abstraction of date of death from secondary sources may also have led to misclassification of some patients, although members with obvious discrepancies were excluded.

Conclusions

Until recently, the Hospice Medicare Benefit has been the primary means to access home-based palliative care, restricted to the subset of patients no longer receiving curative or aggressive treatment with an expected prognosis of six months or less. Organizations who administer the hospice benefit typically are well positioned and expert in providing home-based palliative care; however, sustainable reimbursement models outside the Hospice Benefit have been absent or inadequate. As pointed out by Kelley, et al.,²⁴ palliative care programs should develop formal relationships with community hospice providers to “offer a bridge to timely hospice enrollment,” thus realizing cost savings across the care continuum and avoiding unintended further care fragmentation. This study provides evidence that a commercial insurance company can realize significant cost savings while financially supporting a home-based palliative care program administered by a community hospice provider.

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Author Disclosure Statement

The authors have no conflicts of interest to report.

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Address correspondence to:
Pei C. Grant, PhD
Center for Hospice and Palliative Care
225 Como Park Boulevard
Cheektowaga, NY 14227

E-mail: pgrant@palliativecare.org