Original Article

Have Hospice Costs Increased After Implementation of the Hospice Quality–Reporting Program?

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Abstract

Context. The Centers for Medicare & Medicaid Services Hospice Quality–Reporting Program introduced the requirement that hospices nationwide begin collecting and submitting standardized patient-level quality data on July 1, 2014.

Objectives. This study examined whether this requirement has increased hospice total costs, general costs, and visiting services costs.

Methods. We conducted a cross-sectional study using data from the 2012 and 2014 Medicare hospice cost reports linked to hospice claims. We measured total costs per patient day (PPD), general costs PPD, and visiting services costs PPD for freestanding hospices. We estimated the incremental costs of operating in 2014 vs. 2012 using hierarchical random effects models and adjusting for year, wage index, care volume, case-mix, and hospice and market characteristics, stratified by hospice ownership type.

Results. Both for-profit and nonprofit hospices reported higher total costs PPD and general services costs PPD in 2014 than 2012. Nonprofit hospices also reported higher general costs PPD in 2014 than 2012. In adjusted models, the total costs PPD in 2014 were $10.55 higher than in 2012 for nonprofit hospices and $6.43 higher for for-profit hospices. The increase in general costs PPD and visiting services costs PPD ranged from $3.15 to $5.87 by ownership and type of costs. Both for-profit and nonprofit hospices showed lower costs PPD for all types associated with more patients and longer length of stay.

Conclusion. Hospice costs increased after the Centers for Medicare & Medicaid Services Hospice Quality–Reporting Program quality data collection/submission requirement. Complementary studies need to understand whether increased costs brought additional benefits.   J Pain Symptom Manage 2019;58:48−55. © 2019 American Academy of Hospice and Palliative Medicine. Published by Elsevier Inc. All rights reserved.

Key Words
Costs, hospice quality, quality-reporting program, cost driver

Introduction

Medicare hospice services aim to provide beneficiaries with high-quality care and better outcomes at the end of life through palliation and interdisciplinary supportive services for the patient and family. The utilization of hospice services has dramatically increased over the last decade. In 2016, approximately 1.4 million Medicare beneficiaries used the Medicare hospice benefit compared with 1.0 million in 2007.[1,2] At the same time, hospice providers have become more diverse with an increasing number of for-profit hospice providers and hospices are caring for individuals with a wide range of diagnoses.[3,4]

Section 3004 of the Patient Protection and Affordable Care Act required the Secretary of the Department of Health and Human Services to establish a

quality-reporting program for all hospice programs mandating that they submit data on quality measures. Failure by a hospice to submit these data is penalized by a two percentage point reduction in its annual payment update. The Centers for Medicare & Medicaid Services (CMS) implemented the hospice quality−reporting program (HQRP) in 2012 and introduced a rigorous patient-level quality data collection/submission requirement in 2014 to track and improve quality of care provided by hospices. On July 1, 2014, hospices nationwide began submitting the Hospice Item Set (HIS), a standardized, patient-level data instrument developed by CMS to collect the data needed for calculation of the seven quality measures implemented in the HQRP. These measures focus on important patient care processes around hospice admission that are clinically recommended or required in the hospice Conditions of Participation,[5] including discussion of patient preferences regarding life-sustaining treatments, care for spiritual and existential concerns, and management of pain (including opioid-induced constipation) and dyspnea.[6]

To meet the CMS HQRP patient-level quality data collection/submission requirement, hospices may need to invest in systems (e.g., new or updated electronic health record systems), staff (e.g., quality measurement or reporting personnel, additional staff training), and data collection and measurement processes. Furthermore, the data collection/submission requirement for key care processes may increase the time and resources required during home visits. We hypothesized that additional investment by hospices to meet HQRP patient-level quality data collection/ submission requirements in 2014 would increase hospice costs.

The objective of this study is to compare hospice costs between 2012 and 2014 (before and after the CMS HQRP patient-level quality data collection/submission requirement) while controlling for factors associated with hospice costs.

Methods
Data and Sample
We used the Medicare hospice cost reports generated from the Healthcare Cost Report Information System to measure hospice costs. All Medicare-participating hospices are required to submit these annual financial reports. Although primarily serving administrative purposes, hospice cost reports have been used in research to address the relationships between hospice costs and patient outcomes.[7,8] Hospices report costs by their fiscal year. Most hospices' fiscal year is aligned with the calendar year (CY). We excluded hospices whose fiscal year was not aligned with the CY (14%) for a clean comparison of hospice

costs between CY 2012 and 2014. A small proportion of hospices' (4.6%) cost report period was shorter than a full year because they opened or closed in the middle of the year. As long as these cost report periods did not span across CYs, we included these cost reports and annualized the costs based on the proportion of the year covered by the cost report period. Overall, our sample included 5224 cost reports from freestanding hospices in 2012 and 2014. Specifically, 2252 hospices had a qualifying cost report for both 2012 and 2014. We compared the costs of these hospices between 2012 and 2014. In addition, 720 hospices had a qualifying cost report in either year. We included these hospices, together with the hospices that had cost reports for both years, in the multivariate regression analysis to examine whether operating in 2014 was associated with higher costs, controlling for everything else.

We linked the Medicare cost reports with the Provider of Services files by hospice provider number to obtain provider characteristics such as profit status, years in operation, and rural or urban location. We used Medicare hospice claims to measure other hospice-level factors that may affect costs, such as patient case-mix and service frequency and intensity. We used the Dartmouth Hospital Referral Region data to define hospice markets and calculate the Herfindahl-Hirschman Index (HHI) to measure the competitiveness of hospice markets.

The study focused on freestanding hospices nationally participating in the Medicare program in CY 2012 and 2014, which reflected more than 70% of hospices.

Variables
Dependent Variables. The key dependent variables were total costs per patient day (PPD), general service costs PPD, and visiting services costs PPD. Total costs PPD were defined as annual total hospice costs divided by the number of patient days served during that year, consistent with prior work.[8] Total costs consist of general service costs, visiting services costs, inpatient care costs, other services costs, and non-reimbursable services costs. General costs PPD captured capital-related cost, plant operation and maintenance, staff transportation, volunteer service coordination, and administrative and general costs. Visiting services costs captured salaries, benefit, and transportation (directly related with care provision) for clinicians and staff who provided visiting services. We selected these two cost categories to examine whether the HQRP patient-level quality data collection/submission requirement in 2014 was associated with cost increases related to system and process investment (general costs) or longer or more intensive home visits (visiting services costs).

We adjusted hospice costs in 2012 to 2014 dollars using the medical care services components of the Consumer Price Index, consistent with the literature.[9]

Independent Variables. The primary independent variable was a dichotomous variable with the value 1 for year 2014 and 0 for year 2012.

We included several other independent variables. Wages were measured by hospice wage indices defined and reported by the CMS in the hospice final rules for fiscal years 2012 and 2014.[10,11] We created two variables—number of patients annually and average annual length of stay—to measure hospice care volume. Hospice-level case-mix variables included the following: patient age was measured by the proportion of patients younger than 65, 65 to 74, 75 to 84, and 85 and older, respectively. Gender was defined as proportion of male patients. Race/ethnicity was defined as the proportion of patients in each of the race/ethnic group (white, black, Hispanic, and other). We measured the proportion of patients with each of the following primary diagnoses (cancer, circulatory/heart, dementia, respiratory, and other). We grouped International Classification of Diseases (ICD) codes reported on the hospice claims into primary diagnosis categories using the Agency for Healthcare Research and Quality Clinical Classifications Software. Patient benefit period (a patient's entire hospice care can consist of multiple benefit periods and the benefit period that the patient is in may indicate resource needs[12]) was measured as proportion of patients in the first 90-day benefit period, the second 90-day benefit period, and third or greater benefit periods. Finally, we measured proportion of patient days in each setting (home, assisted living facilities, long-term care facilities, skilled nursing facilities, and other). We tested these case-mix variables in the multivariate regression models predicting each type of costs PPD. The final analyses included only case-mix variables that were statistically significant at the $P = 0.05$ level for each type of costs PPD, respectively.

To measure intensity of care, we created skilled nursing visit hours PPD, home health visit hours PPD, and medical social visit hours PPD. In addition, we measured proportion of patient days at continuous home care and general inpatient care, respectively.

We used additional hospice and market characteristics that may influence the hospice's operation, including ownership type (for-profit or nonprofit), years in operation, and rural or urban location. Competitiveness of the hospice markets was measured by HHI. Hospice markets were defined based on data from the Dartmouth Hospital Referral Region data, following the hospice literature.[12] Competition in the markets was measured using the HHI based on the number of patients each hospice in a market served.

Analytic Approach

We first compared the costs PPD between 2012 and 2014 among hospices that had a qualified cost report in both years by calculating the cost differences for these hospices and presenting the distribution of the differences.

We then estimated separate hybrid cost functions for each cost category (total costs PPD, general costs PPD, and visiting services costs PPD) following the literature on nursing home costs and home health costs.[9,13,14] We modeled hospice costs as a function of wages, outputs, and hospice characteristics, such as years in operation and rural/urban location. The costs PPD variables had highly skewed distributions. We therefore tested two model options. We first estimated generalized linear models with Gamma family and log link, using the linear terms of the costs PPD as the dependent variables. We also estimated hierarchical ordinary least square models using log-transformed costs PPD as the dependent variables. For this model option, we also log transformed two independent variables (the number of patients and average length of stay) because of their skewed distributions. We followed Buntin and Zaslavsky's recommended procedures to select models for predicting health care costs[15] and determined the hierarchical ordinary least square models with log-transformed dependent variables to be a good fit with the objectives of this study. First, the log-transformed costs PPD variables showed normal distributions, which were desirable for dependent variables. Second, the residuals showed normal distributions. Last and most importantly, the distributions of the predicted costs PPD based on this model option were much closer to the observed costs PPD variables than the distributions of the predicted costs PPD based on the generalized linear models with untransformed costs PPD dependent variables. The latter model option overpredicted costs PPD for high-cost hospices and underpredicted costs PPD for low-cost hospices.

Our final models were estimated with random hospice effects to account for correlation among hospices over time. Given the consistent evidence in the literature that for-profit hospices have lower costs than their nonprofit counterparts[8] and similar evidence from other settings,[2,14] we estimated separate models for nonprofit and for-profit hospices.

To evaluate the impact of the HQRP implementation on costs PPD, we calculated the incremental costs of operating in 2014 relative to 2012 for a one-unit increase in selected measured covariates. Because of the log transformation of the costs PPD outcomes, we used the smearing transformation.[16] We followed the

Table 1
Hospice Characteristics by Ownership Type and Year

	2012				2014			
	Nonprofit, $N = 725$		For-Profit, $N = 1747$		Nonprofit, $N = 761$		For-Profit, $N = 1990$	
Characteristic	Median	SD	Median	SD	Median	SD	Median	SD
Total costs per patient day	$170.14	$1447.18	$140.44	$428.13	$179.54	$1687.68	$145.68	$1237.42
General costs per patient day	$52.86	$448.81	$54.54	$272.40	$58.29	$462.39	$56.42	$968.87
Visiting services costs per patient day	$65.77	$43.21	$55.86	$62.18	$69.44	$710.09	$57.68	$149.70
	Mean or Frequency	SD or %	Mean or Frequency	SD or %	Mean or Frequency	SD or %	Mean or Frequency	SD or %
Wage index	0.97	0.17	0.98	0.16	0.96	0.18	0.98	0.18
Total patients	779.62	1191.19	369.07	777.73	760.38	1136.85	403.73	1860.47
Average length of stay	4.08	0.44	4.34	0.38	4.02	0.48	4.30	0.45
Proportion of patients with cancer primary diagnosis	30.08	11.12	22.35	10.59	29.86	10.38	22.60	10.77
Proportion of patients with circulatory/heart primary diagnosis	13.22	5.46	14.88	8.40	18.25	6.61	20.50	9.16
Proportion of patients with dementia primary diagnosis	15.51	9.16	20.97	10.77	19.01	9.47	25.60	11.64
Proportion of patients with respiratory primary diagnosis	9.18	4.05	8.94	4.63	10.80	4.38	10.44	5.35
Proportion of patients with other primary diagnosis	32.02	9.91	32.87	12.02	22.08	6.81	20.86	8.13
Home health visit hours per patient day	0.29	0.20	0.30	0.17	0.27	0.17	0.29	0.16
Skilled nursing visit hours per patient day	0.27	0.12	0.24	0.17	0.27	0.12	0.25	0.16
Medical social visit hours per patient day	0.04	0.02	0.03	0.02	0.04	0.02	0.03	0.02
Proportion of continuous home care days	0.09	0.38	0.17	0.75	0.07	0.25	0.14	0.43
Proportion of general inpatient care days	1.63	2.41	0.72	3.08	1.48	2.30	0.56	2.34
Years in operation	17.27	8.71	8.90	6.30	18.30	9.37	9.33	6.91
Herfindahl-Hirschman Index	0.21	0.19	0.13	0.11	0.20	0.18	0.11	0.11
Location								
Rural	210	28.97	311	17.80	213	27.95	310	15.58
Urban	515	71.03	1436	82.20	549	72.05	1680	84.42

technique proposed by Baser, which accounted for the random effects.[17] We presented median incremental costs.

Results

For-profit hospices had lower costs PPD than nonprofit hospices for each cost category (total costs, general costs, and visiting services costs) and both years (Table 1). Specifically, the median total costs PPD for nonprofit hospices was $170.14 in 2012 and $179.54 in 2014, whereas the median total costs PPD for for-profit hospices was $140.44 in 2012 and $145.68 in 2014.

Compared with nonprofit hospices, for-profit hospices had smaller patient volume, higher percentage of patients with dementia, and lower percentage of patients with cancer. Furthermore, for-profit hospices provided continuous home care more often and general inpatient care less often. They also were more frequently located in a more competitive urban market.

Figure 1 shows the unadjusted difference in costs PPD for each hospice between 2012 and 2014. There were 2252 hospices with cost reports in both 2012 and 2014 (678 nonprofit and 1577 for-profit). Most hospices (65% of nonprofit hospices and 54% of for-profit hospices) reported increases in total costs PPD. Most hospices also had increases in general and visiting services costs PPD. The only exception was for general costs PPD among for-profit hospices. Slightly less than half of the for-profit hospices (47%) incurred higher general costs in 2014 than 2012.

In multivariate regression models, year 2014 as a main effect was significantly associated with higher
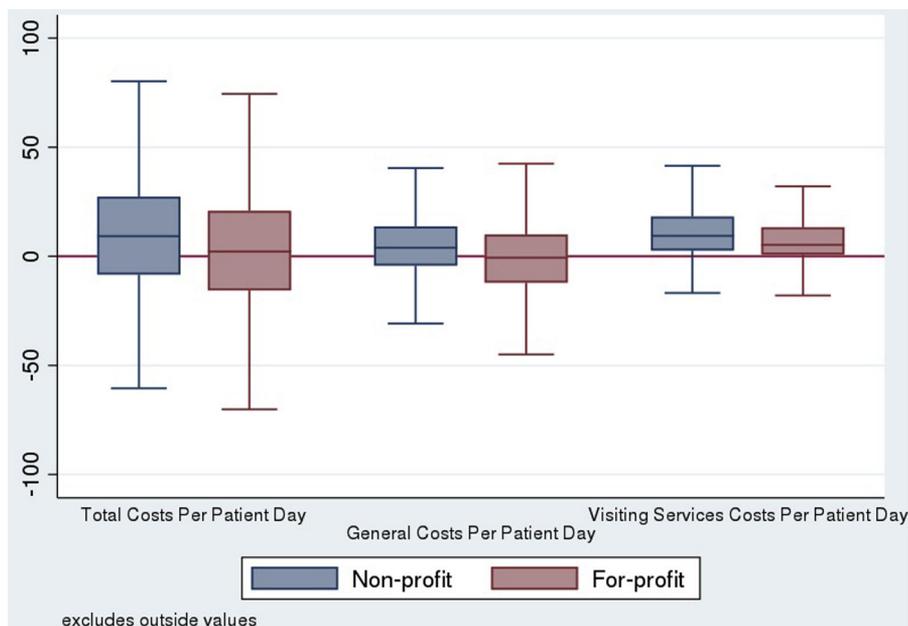
Fig. 1. Difference in costs per patient day between 2012 and 2014, by cost and ownership type. Notes: $N = 2252$ hospices with cost reports in both 2012 and 2014 (678 nonprofit and 1577 for-profit). Graph shows the distribution of difference in costs per patient day between 2012 and 2014.

costs PPD for all types of costs, except for general costs PPD among for-profit hospices (full regression results are presented in Appendix). Additional factors associated with higher costs were wage index, number of patients, and average length of stay. We present incremental costs of key variables of interest and cost drivers for each type of cost by ownership status (Table 2). Compared with 2012, total costs PPD in 2014 were $10.55 higher for nonprofit hospices and $6.43 higher for for-profit hospices ($P < 0.05$). General costs PPD for nonprofit hospices increased $5.70 over the period compared with no significant increase for for-profit hospices. Furthermore, both nonprofit and for-profit hospices had higher visiting services costs

in 2014 relative to 2012 ($3.51 and $3.15, respectively).

Both nonprofit and for-profit hospices incurred higher costs PPD in all types of costs when the wage index was higher, which is expected, but the same one standard deviation increase in wage index (0.17) led to significantly smaller increase in total costs PPD for a for-profit hospice ($13.90) than for a nonprofit hospice ($25.69). Both nonprofit and for-profit hospices had lower costs PPD in all types of costs when they served more patients. For-profit hospices benefited more from economy of scale for general costs PPD compared with nonprofit hospices (−$0.72 per 10 more patients for for-profit vs. −$0.35 for nonprofit) possibly because for-profit hospices typically were

Table 2
Incremental Cost of Key Cost Drivers

Variable	Costs Per Patient Day					
	Total Costs		General Costs		Visiting Services Costs	
	Nonprofit	For-Profit	Nonprofit	For-Profit	Nonprofit	For-Profit
Predicted median costs	$176.82[a]	$145.87[a]	$54.62	$54.97	$68.05	$57.29
Median incremental cost as % of predicted median costs						
2014 (compared with 2012)	$10.55[a]	$6.43[a]	$5.70	ns	$3.51	$3.15
	6.0%	4.4%	10.4%	—	5.2%	5.5%
Wage index (per one standard	$25.69[a]	$ 13.90[a]	$8.37	$8.36	$8.93	$2.47
deviation increase)	14.5%	9.5%	15.3%	15.2%	13.1%	4.3%
Total patients (per 10 more	−$0.80	−$1.18	−$0.35[a]	−$0.72[a]	−$0.18	−$0.15
patients)	−0.5%	−0.8%	−0.6%	−1.3%	−0.3%	−0.3%
Average length of stay (per one	−$0.81	−$0.90	−$0.36	−$0.36	−$0.32	−$0.31
more day)	−0.5%	−0.6%	−0.7%	−0.7%	−0.5%	−0.5%

[a]Difference between nonprofit and for-profit hospices is statistically significant ($P < 0.05$).

smaller than nonprofit hospices. Finally, both nonprofit and for-profit hospices had lower costs PPD in all types of costs when their patients' average length of stay was longer. The incremental cost of average length of stay, however, did not show statistically significant difference between nonprofit and for-profit hospices at the 95% significance level.

Discussion

This is the first study to our knowledge to assess the changes in hospices' costs after the HQRP patient-level quality data collection/submission requirement in 2014. Compared with 2012, we found that operating in 2014 was associated with higher total costs PPD, general costs PPD, and visiting services costs PPD for hospices. It is important for policy makers to understand the cost implications to hospices of additional reporting requirements. It is important to understand hospice costs also because the current literature suggests that the costs to hospices for providing services may be a marker of and may be associated with quality of care and hospice practice patterns. For example, patients cared for by hospices with lower direct patient care costs had higher hospitalization rates.[8] In addition, as hospices' costs of operation and total margins increase, patients' risk of live discharge also increases.[7] Despite the importance, the literature has only limited information on costs to hospices to provide patient care and what drives hospice costs. Nonprofit, large and urban hospices have higher direct patient care costs PPD than for-profit, small, and rural hospices, respectively.[8] Our findings thus add important understanding to the literature.

The increases in total costs PPD, general costs PPD, and visiting services costs PPD between 2012 and 2014 were consistent with our expectations. CMS estimated the average annualized cost for a hospice to fill the HIS forms to be $3818.26 (78 Federal Register 48,233–48,281). Our study found an average of approximately $32,249 and $11,163 higher total costs in 2014, relative to 2012, for nonprofit and for-profit hospices, respectively. The increased total costs were calculated as the product of incremental cost PPD for the year change and total patients and length of stay. The additional increased costs in 2014, compared to CMS's estimates, may be related hospices' system and process changes. Hospices may have invested in new systems and processes to meet the CMS HQRP patient-level quality data collection/submission requirement, which contributed to higher general costs PPD. Furthermore, the requirement may have created an incentive for hospices to improve quality and achieve better quality measure scores with the anticipation that CMS will eventually publicly report the quality measures based on these patient-level quality data. Hospices may have delivered more visiting services or longer visiting hours to assure all the care processes captured by the quality measures were completed to achieve better scores. Additional research to understand the aspects of the HQRP that may be associated with higher costs is warranted.

A limitation of our analyses is that other regulatory changes between 2012 and 2014 may also have affected hospice costs. The fiscal year 2014 hospice final rule (78 Federal Register 48,233–48,281) clarified CMS's guidelines to code primary diagnosis on the hospice claims. Specifically, CMS clarified that the ICD–9–CM codes of "debility" and "adult failure to thrive" listed in the ICD–9–CM Coding Guidelines under the classification, "Symptoms, Signs, and Ill-defined Conditions," could no longer be used as principal diagnoses and reported on hospice claims when a related definitive diagnosis has been established or confirmed by the provider. Since this clarification, hospice claims showed a shift in primary diagnosis. In 2012, 12% of hospice patients had a diagnosis of debility and 7% had a diagnosis of adult failure to thrive. The percentages dropped to less than 1% for each diagnosis (80 Federal Register 47,141–47,207). More accurate and specific diagnosis reporting on the claims for every patient may need more staffing time to process the information on patients' medical record, which may have contributed the increased general costs PPD and total costs PPD in 2014 compared with 2012. However, this regulation change alone should not result in the cost-increase patterns we observed. Specifically, it should not have caused an increase in visiting services costs PPD. Thus, the increased costs we found should still at least be partially related to the HQRP requirement in 2014.

Consistent with the literature,[2] we found lower costs PPD in all cost types among for-profit hospices than nonprofit hospices. Furthermore, although both nonprofit and for-profit hospices saw cost increases in 2014 relative to 2012, for-profit hospices reported a smaller increase in total costs PPD. It is possible that for-profit hospices may be more motivated and efficient in controlling their costs. Alternatively, one might speculate that because nonprofit hospices often are intrinsically more motivated to improve quality, they may have indeed invested more in quality improvement compared with the for-profit hospices. However, for this hypothesis to be true, we would have expected to see most of the differential between nonprofit hospices and the for-profit hospices in the visiting services cost category and not the general cost category, which is not the case.

In addition, we found that when wage index increases, the impact on costs is smaller for for-profit hospices than for nonprofit hospices. Our descriptive

statistics suggest comparable levels of service frequency (i.e., home health visit hours PPD, skilled nursing visit hours PPD, and medical social visit hours PPD) between for-profit and nonprofit hospices. Future studies should confirm if for-profit hospices, considering the rural or urban location in which they operate, manage to control the impact of higher wage index while maintaining a similar level of service frequency and staff skill-mix and, if confirmed, understand how for-profit hospices achieve the result.

A few limitations should be noted. We included only freestanding hospices because they submitted stand-alone cost reports that allowed for an analysis of costs exclusively associated with the hospice operation. As such, our findings may not be generalizable to hospices affiliated with another health care setting such as hospital and nursing home. The latter represented less than 30% of the agencies in 2014 (authors' analysis of the Provider of Services data). This is a substantial proportion of the industry, and future studies should attempt to investigate their costs. Furthermore, we were unable to control for living arrangement or informal caregiving support for hospice patients because such data were not available at the national level. Nonclinical determinants as these may affect hospice patients and their families' care needs and in turn costs to hospices for providing care to them, as evident in other care settings and other countries.[18] However, the availability and capacity of informal caregivers should not have changed systematically from 2012 to 2014. Therefore, our findings about the increased costs in 2014 relative to 2012 should still hold true. In addition, our analysis did not examine whether the increased costs in 2014 relative to 2012 was associated with better quality of care. The HQRP requirement may lead to better documentation of hospice care processes and patient conditions, which may in turn contribute to better care planning and higher quality of care. CMS gradually implemented additional quality-reporting requirements in the HQRP program. Specifically, CMS implemented the Consumer Assessment of Healthcare Providers and Systems (CAHPS®) Hospice Survey in 2015, which addressed additional aspects of care including communication, coordination, and whether care provided was concordant with patient and family wishes and in a culturally appropriate way. CMS also expanded the HIS to add quality measures to address important care processes, such as comprehensive assessment on admission and hospice staff visits to patients and families when death is imminent. Further studies should use additional years of data and new quality data to examine continued cost trend and the association between costs and quality outcomes. Finally, because the implementation of the HQRP patient-level quality data collection/submission

requirement was national, we did not have a control group of hospices. There is a possibility that the increase in costs we observed was partially due to other changes such as the diagnosis reporting requirement change discussed previously. However, we are not aware of other regulatory or practice style−related changes beyond those explicitly accounted for in our models, except the coding change noted previously, that might explain the pattern of cost increases we observed.

Conclusion

Our study found evidence of an increase in costs to hospices for operation and providing care from 2012 to 2014, following the implementation of the CMS HQRP patient-level quality data collection/submission requirement. Complementary studies of whether increased costs brought additional benefits (e.g., more access to services and better quality of care) are needed to gain a better understanding of the cost trend and its impact on care.

Disclosures and Acknowledgments

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Appendix

Multivariate Regression Model Results by Type of Costs

Variable	Costs Per Patient Day (Logged)					
	Total Costs		General Costs		Visiting Services Costs	
	Nonprofit	For-Profit	Nonprofit	For-Profit	Nonprofit	For-Profit
Year (ref = 2012)						
2014	0.059^a	0.044^a	0.104^b	-0.001	0.0510^c	0.0542^a
Wage index (logged)	0.834^b	0.566^b	0.875^b	0.828^b	0.755^b	0.259^b
Total patients (logged)	-0.161^b	-0.169^b	-0.239^b	-0.283^b	-0.096^b	-0.053^b
Average length of stay (logged)	-0.265^b	-0.486^b	-0.391^b	-0.526^b	-0.270^b	-0.427^b
Proportion of patients with circulatory/heart primary diagnosis	-0.006^c	0.000	—	—	-0.001	0.000
Proportion of patients with dementia primary diagnosis	-0.006^c	0.001	—	—	-0.002	0.002
Proportion of patients with respiratory primary diagnosis	-0.007^c	0.002	—	—	-0.002	0.001
Proportion of patients with other primary diagnosis	-0.005^c	0.003	—	—	0.000	0.004^c
Proportion of patients with cancer primary diagnosis	Reference	Reference	—	—	Reference	Reference
Home health visit hours per patient day	0.078	0.300^b	—	—	0.285^a	0.397^b
Skilled nursing visit hours per patient day	0.034	-0.226^c	—	—	0.062	-0.222^a
Medical social visit hours per patient day	1.400	1.853^b	—	—	1.553^c	2.749^b
Proportion of continuous home care days	0.088^a	0.053^c	0.045	0.064^a	0.084^c	-0.008
Proportion of general inpatient care days	0.031^b	0.015^c	0.046^b	0.014^a	-0.016	-0.001
Proportion of routine home care days	Reference	Reference	Reference	Reference	Reference	Reference
Years in operation	0.008^a	0.008^b	0.002	-0.004	0.010^b	0.004^c
Rural location	-0.011	-0.006	-0.074	0.044	-0.030	0.021
Herfindahl-Hirschman Index	0.124	0.025	0.054	-0.122	0.008	0.091
N	1458	3675	1457	3665	1455	3667
R^2 Within	0.184	0.341	0.157	0.262	0.116	0.172
R^2 Between	0.269	0.317	0.178	0.280	0.168	0.158
R^2 Overall	0.271	0.309	0.158	0.261	0.159	0.166

[a] $P < 0.01$.
[b] $P < 0.001$.
[c] $P < 0.05$.