

MILLIMAN CLIENT REPORT

Hospice Medicare Margins

Analysis of Patient and Hospice Characteristics, Utilization, and
Cost

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EXECUTIVE SUMMARY

This report presents results of the authors' analysis of how hospices' Medicare margins relate to the characteristics of the Medicare patients served and the characteristics of the hospice itself, focusing on hospice ownership status (for-profit, nonprofit, and governmental). We gathered patient, service, and hospice level data from the Medicare 100% Part A Limited Data Set (LDS) and hospice cost reports and analyzed the results by hospice categories. Medicare payments account for the vast majority of hospice revenue.

In addition to our claims and cost report analyses, we performed a literature review of publications examining the relationship between features of hospices, hospice patients, and hospice stays (see the background section). The Medicare Payment Advisory Commission's (MedPAC's) annual reports to Congress provided a wide overview of hospice metrics, which together with more focused publications on specific hospice characteristics informed our own analysis plan.

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HOSPICE BENEFIT OVERVIEW

The Medicare Hospice Benefit was established under the Tax Equity and Fiscal Responsibility Act of 1982¹ and became a permanent Medicare Part A benefit in 1986.² The core benefits have remained the same over time; specifically, services furnished by a Medicare-certified hospice provider that are reasonable and necessary for the palliation and management of a beneficiary's terminal illness and related conditions, including nursing care; physician services; physical therapy, occupational therapy, and speech-language pathology services; medical social services; home aide services; medical supplies (including drugs and biologicals) and the use of medical appliances; short-term inpatient care; and counseling services.¹

Hospice use among Medicare beneficiaries has grown rapidly since the early 2000s. Between 2000 and 2018, Medicare hospice expenditures increased from \$2.9 billion³ to \$19.1 billion⁴. According to MedPAC, the total number of hospices increased from 2,255 in 2000 to 4,488 in 2017, and the total number of Medicare hospice users rose from 534,000 in 2000 to 1.5 million in 2017.³ MedPAC also reported that this increase was due to for-profit hospices entering the market. While MedPAC reported fewer for-profit hospices than nonprofit hospices in 2000 (672 versus 1,324), the number of for-profit hospices exceeded nonprofit hospices in 2007 (1,676 versus 1,337), and the gap only widened 10 years later in 2017 (3,097 versus 1,230).³

Hospice Medicare margins, defined as the percentage difference between Medicare payment for hospice services provided to beneficiaries and allowed hospice costs to provide those services, have generally increased since the early 2000s as determined by MedPAC, although year-to-year margins have varied.^{3,5-11} In 2003, the average Medicare margin for all hospices was 6.6%,⁵ whereas in 2016, the average margin was 10.9%.³ For-profit hospices consistently have had higher margins than nonprofit hospices, but the gap between the two widened from 2003 to 2016 as shown by MedPAC.^{3,5-11}

METHODOLOGY

We performed descriptive and linear regression analyses to compare hospice and patient characteristics by hospice ownership status (including for-profit or nonprofit status). The analysis yielded findings on hospice Medicare Margins, patient diagnoses, main location of care, length of stay, and service visits, as well as overall hospice incurred costs across different categories of hospices.

The analysis used two main data sources:

1. Hospice cost reports for fiscal year (FY) 2014 – FY 2017 made available through the Healthcare Cost Report Information System (HCRIS)
2. Medicare 100% Part A Limited Data Set (LDS) for calendar year (CY) 2013 – CY 2017

We linked Medicare claims to hospice cost reports by hospice CMS Certification Number (CCN), and performed the analysis by parent facility CCN (at the cost report level). For non-freestanding hospices, one parent facility CCN could have multiple hospice CCNs. Hospice ownership status was determined by the reported status on the cost reports. See Appendix B for the detailed methodology.

OVERVIEW OF KEY FY 2017 FINDINGS FROM MILLIMAN ANALYSIS

Medicare Margins

- Nonprofit hospices had an aggregate net Medicare margin of 3.0%, compared to 19.9% at for-profit hospices.
- Urban nonprofit hospices had a higher aggregate net Medicare margin (4%) than rural nonprofit hospices (-7%), but urban and rural for-profit hospices had similar aggregate net Medicare margins (20% and 21%, respectively).

Patient Characteristics

- Thirty-two percent of nonprofit hospice patients had an inpatient hospital stay within the week before their initial hospice stay, compared to 22% of for-profit hospice patients.
- The most common diagnosis category of nonprofit hospice patients was cancer (31% of patients at nonprofit hospices versus 22% of patients at for-profit hospices), while the most common diagnosis category of for-profit hospice patients was degenerative diseases of the nervous system/dementia (15% of patients at nonprofit hospices versus 22% of patients at for-profit hospices).
- Twenty-four percent of nonprofit hospice patients had their main location of care as a nursing or assisted living facility, compared to 40% of for-profit hospice patients.

Length of Stay

- The median length of stay for nonprofit hospices was 13 days, compared to 24 days in for-profit hospices.
- For-profit hospices had longer median lengths of stay than nonprofit hospices for all diagnosis categories.

Service Visits

- Nonprofit hospices provided patients with 10% more nursing visits, 35% more social worker visits, and 2 times as many therapy visits as for-profit hospices per patient day.
- For-profit hospices provided patients with about 20% more aide visits than nonprofit hospices per patient day.
- Nonprofit hospice patients received 1.49 physician or nurse practitioner visits per 100 patient days, almost three times the visit rate of 0.51 per 100 patient days for for-profit hospices.

Incurred Costs

- For-profit hospices reported incurring lower daily costs on average for Medicare patients than nonprofit hospices, \$128 versus \$175.

Hospice Discharges

- For-profit hospices had an overall live discharge rate of 21%, whereas nonprofit hospices had an overall live discharge rate of 12%.
- Patients who were discharged alive from for-profit hospices incurred 40% higher daily Medicare Part A costs in the first 2 weeks post-discharge than patients who were discharged alive from nonprofit hospices.

Regression Analysis

- We found statistically significant positive relationships between a hospice's net Medicare margins and
 - the hospice's percent of patients with main location of care in an assisted living,
 - the hospice's percent of patients with main location of care in a nursing facility,
 - the hospice's percent of patients with hospice stays over 365 days,
 - the hospice's percent of live discharges that had an inpatient hospitalization within the 7 days following hospice discharge, and
 - the hospice's average number of therapy days per 100 patient days
- We found statistically significant negative relationships between a hospice's net Medicare margins and
 - the hospice's percent of patients with cancer as the diagnosis category,
 - the hospice being hospital-based,
 - the hospice having a rural service area,
 - the hospice's percent of patients discharged alive,
 - the hospice's percent of patients with a prior inpatient hospitalization within the 7 days before hospice admission,
 - the hospice's average number of nursing days per 100 patient days, and
 - the hospice's average number of social service days per 100 patient days
- Our regression model had low predictive power ($R^2=19.06\%$), indicating that the variables we examined do not explain the full variability in net Medicare margins among hospices.

Our analysis of hospice patient characteristics, utilization, and costs are based on the Medicare 100% Part A LDS claims and hospice cost reports for FY 2014 to FY 2017 available through HCRIS. Only hospices with a cost reporting period spanning at least 360 days and corresponding claims were analyzed for this report; analyses based on a different sample of hospices or different time periods may produce different results. One of the authors, Bruce Pyenson, is a member of the American Academy of Actuaries and meets its qualification standards for this work.

INTRODUCTION

Hospice use among Medicare beneficiaries has been growing at a rapid rate since 2000, with the number of hospice users growing from 534,000 to 1.5 million in 2017 as reported by MedPAC.³ Accompanying this growth has been the rapid expansion of for-profit hospices, with the number of providers increasing from 672 in 2000 to 3,097 in 2017,³ while the number of nonprofit hospices decreased from 1,324 to 1,230 during the same time span.³ The Federal Hospital Insurance and Federal Supplemental Medicare Insurance Trust Funds' Boards of Trustees reported that Medicare expenditures for the hospice benefit have been growing too, and reached \$19.1 billion for 2018.⁴ Medicare margins, a general indication of hospice profitability, have been growing steadily since the early 2000s. However, for-profit hospices have had consistently higher margins than nonprofit hospices, and this gap has only widened in recent years as shown by MedPAC.³

This report presents results of the authors' analysis of how hospices' Medicare margins relate to the characteristics of the Medicare patients served and the characteristics of the hospice itself, focusing on hospice ownership status (nonprofit, for-profit, governmental). We gathered patient, service, and hospice level data from the Medicare 100% Part A Limited Data Set (LDS) and hospice cost reports and analyzed the results by hospice categories. We examined the following aspects of hospice care:

- Patient characteristics
- Length of stay
- Service visits
- Incurred costs
- Live discharges and post-discharge costs
- Medicare margins

Our analyses corroborate and add to the existing published literature on patterns in hospice length of stay, patient diagnoses, live-discharges rates, incurred costs, and Medicare margins.^{3,5–20} We note that Medicare's reimbursement of hospices (and most other providers) is not cost-based—that is, Medicare does not pay a hospice more if its costs are higher or less if its costs are lower. It would not be surprising to see that a hospice's Medicare margins are generally lower when that hospice has higher costs, and Medicare margins are higher when costs are lower. However, our purpose was to examine patient and hospice organizational factors and not the spending decisions of the hospice.

BACKGROUND

In addition to our claims and cost report analyses (see the Results and Discussion section), we performed a literature review of publications examining the relationship between features of hospices, hospice patients, and hospice stays. The information provided in this background section of the paper summarizes information from the literature, and presents knowledge prior to the authors' analysis. MedPAC's annual Reports to Congress provided a wide overview of hospice metrics. We also examined more focused publications by various authors on hospice ownership, hospice care in the facility setting, live discharges, hospice profitability, length of stay, and patient diagnoses. The Medicare Benefit Policy Manual and the Medicare Claims Processing Manual published by the Centers for Medicare and Medicaid Services (CMS) provided details about CMS' implementation of the hospice benefit and claims reporting requirements for hospice services, which guided our claims analysis.

MEDICARE HOSPICE BENEFIT

The Medicare Hospice Benefit was established under the Tax Equity and Fiscal Responsibility Act of 1982¹ and became a permanent Medicare Part A benefit in 1986.² The core benefits have remained the same over time, specifically services furnished by a Medicare-certified hospice provider that are reasonable and necessary for the palliation and management of a beneficiary's terminal illness and related conditions, including nursing care; physician services; physical therapy, occupational therapy, and speech-language pathology services; medical social services; home aide services; medical supplies (including drugs and biologicals) and use of medical appliances; short-term inpatient care; and counseling services. Hospices must make all of these services available to receive payment.^{1,2,21–23} Patient cost-sharing for hospice care is minimal, limited to 5% of drugs and biologicals provided during home care (up to \$5 per prescription) and 5% of the Medicare payment rate for respite care (up to the Part A inpatient hospital deductible level).²⁴

To elect hospice, a beneficiary must be eligible for Medicare Part A coverage and certified as terminally ill, meaning that the patient's life expectancy is 6 months or less based on the normal course of the illness as certified by the hospice medical director (or physician member of the interdisciplinary group (IDG)) and the beneficiary's attending physician.^{1,25} The first benefit period is 90 days; if the patient lives through the initial period, they can qualify for a second 90-day period so long as their terminally ill status is recertified by a hospice medical director or member of the IDG.^{1,25} The individual may continue to elect hospice for unlimited 60-day periods thereafter, until the death of the patient or a change in prognosis that makes the patient ineligible for hospice.²⁵

Although the hospice benefit is available to all Medicare beneficiaries eligible for Part A coverage, it is available only under traditional fee-for-services (FFS) Medicare.²² Medicare Advantage (MA) enrollees who elect hospice receive their hospice benefit and coverage for their unrelated Part A and B costs from Medicare FFS. The MA plan continues to cover the unrelated Part D costs and any supplemental benefits covered by the plan.²²

MEDICARE HOSPICE PAYMENT SYSTEM

Medicare is the primary payer for hospice services, covering more than 90% of hospice patient days in 2017.³ Medicare pays hospices a daily rate for each patient-enrolled day that is intended to cover the costs of services identified in the patient's plan of care, regardless of the services actually provided to a patient on a specific day.^{1,26} There are four defined levels of hospice care with different per diem rates: routine home care (RHC); continuous home care (CHC); inpatient respite care (IRC); and general inpatient care (GIP).

- An RHC day is a day on which an individual who has elected to receive hospice care is at home and is not receiving continuous home care.²⁶
- A CHC day is a day on which an individual who has elected to receive hospice care not in an inpatient facility (hospital, skilled nursing facility (SNF), or hospice inpatient unit) and receives hospice care consisting predominantly of nursing care on a continuous basis at home during a period of patient crisis.²⁶
- An IRC day is a day on which the individual who has elected hospice care receives care in an approved facility on a short-term basis to provide respite for the primary caregiver.²⁶
- A GIP day is a day on which an individual who has elected hospice care receives general inpatient care in an inpatient facility for pain control or acute or chronic symptom management which cannot be managed in other settings.²⁶

Until changes to the RHC payment policy in 2016 (see section Recent Changes to the Hospice Program),²⁷ the per diem rate for each level of hospice care has been a single rate that is deemed appropriate to cover the respective costs of care.^{1,22,23} The rate for each level of care has a labor share and a non-labor share;²⁸ those shares differ by level of care, reflecting the estimated proportion of input costs attributable to wage and non-wage cost.²⁸ Labor portions of the daily rates are adjusted via the hospice wage index for the geographic area the hospice operates in.²⁸ Annual rate updates are tied to the inpatient hospital market basket index,¹ and beginning in 2013, a productivity adjustment (which reduces the update factor by economy-wide multi-factor productivity growth) was applied to all hospice rates as per the Patient Protection and Affordable Care Act of 2010 (ACA).²³

Due to uncertainties over the cost of the hospice benefit when it was first authorized, two caps on Medicare revenue for hospice services were implemented in the Tax Equity and Fiscal Responsibility Act of 1982 to impose cost containment measures.¹ The first cap limits the amount of hospice inpatient care an individual can receive to 20% of their total patient days.¹ The second cap is an absolute dollar limit, termed the aggregate cap, on the average annual payment per beneficiary a hospice can receive.²⁹ This cap requires hospices to reimburse Medicare if the mean per capita Medicare spending per cap-eligible beneficiary during the year exceeds this pre-determined amount.^{1,29} The aggregate hospice cap amount for FY 2019 (as of October 2018) is \$29,205.²⁸

TRENDS IN HOSPICE UTILIZATION AND OWNERSHIP

Hospice use among Medicare beneficiaries has been growing at a rapid rate since the early 2000s. Between 2000 and 2018, Medicare hospice expenditures increased from \$2.9 billion³ to \$19.1 billion.⁴ MedPAC reported that the total number of hospices increased from around 2,250 in 2000 to 4,488 in 2017, and the total number of Medicare hospice users rose from 534,000 in 2000 to 1.5 million in 2017.³ MedPAC also reported the fastest growth occurred in the period of 2000 to 2007, where the average annual percent change in the number of hospices was 5.4%, and the growth subsequently slowed to an average of 3.4% per year from 2007 to 2016.³

Enrollees of MA plans have historically used hospice services more than patients covered under FFS Medicare, although MedPAC found that the gap is closing due to the greater rate of increase in FFS hospice use over time.³ In 2000, 21.5% of FFS decedents were enrolled in hospice while 30.9% of MA decedents were enrolled in hospice; in 2017, the proportion of FFS and MA decedents enrolled in hospice increased to 49.5% and 52.4%, respectively.³ MedPAC has recommended that hospice be included in the MA benefits package to reduce the fragmentation of care accountability and financial responsibility for MA enrollees who elect hospice.³⁰ In addition, in January 2019, CMS

announced that beginning in CY 2021, the Value-Based Insurance Design (VBID) model will test on a voluntary basis including the Medicare Hospice Benefit in MA.³¹

Major shifts in the ownership status of hospices also occurred over the past two decades. In 2000, for-profit hospices only made up 30% of all hospice providers; in 2017, for-profit hospices made up 69% of hospice providers. Nonprofit and governmental hospices, on the other hand, have been slowly dropping in number from 2000 to 2017, as reported by MedPAC.³ Alongside this shift in ownership has been a sharp increase in the number of chain providers and hospices that are commonly owned with a nursing home. The number of hospices associated with a chain provider increased from 333 in 2000 to 1,372 in 2011,³² and in 2015, 20% of nursing homes shared ownership with a hospice, up from 5% in 2005.³³ Stevenson et al. found that the majority of chain providers were for-profit, with the largest 5 for-profit chains accounting for 189,664 enrollees in 2011 (15% of the overall market).³² Of all for-profit providers, approximately half of them were attributed to a chain provider in 2011.³² Reliable information that connects the agencies that compose the chains is difficult to obtain, resulting in sparse research on general descriptions of the behavior of for-profit chains as a whole. Patients of a hospice that is commonly owned with a nursing home were 65% more likely to have come from the commonly owned nursing home.³³

Studies by MedPAC have speculated about the reasons for the expansion in the hospice industry, identifying factors such as increased awareness of the hospice benefit and more nursing home patients being transferred to hospice. Thompson et al. and MedPAC point to the rise of for-profit providers as a driver of the growth in the hospice industry.^{3,16,19} MedPAC found that while the median length of stay for hospice patients has remained relatively stable since 2000, the 90th percentile of the length of stay has increased by approximately 100 patient days from 2000 to 2017, suggesting that the longest 10% of hospice stays are now substantially longer in the current hospice environment.³ Wachterman et al. and MedPAC have suggested that some hospices could be taking advantage of the U-shaped costs associated with hospice patients (higher costs are incurred at the beginning and end of the patient's hospice stay^{3,19}) by selecting patients with longer average length of stay.^{3,13} For-profit providers, responsible for the growth in the number of hospice providers over time,¹⁶ have a higher proportion of patients with longer lengths of stay, which may imply that long hospice stays and profitability are linked as suggested by MedPAC.³

Additionally, there has been an increase in the proportion of hospice patients with neurodegenerative disorders, such as dementia, from 1992 to 2006, and these patients typically have longer hospice lengths of stay compared to other disorders.¹⁹ In conjunction with higher rates of neurodegenerative disorder patients, the proportion of nursing facility residents enrolled in hospice has also increased, and their higher hospice enrollments rates have been linked by Stevenson and Bramson to their higher concentration in neurodegenerative disorder patients.^{19,34} While nursing facility residents are generally older than other Medicare beneficiaries and more likely to be candidates for hospice,³⁴ a 2009 MedPAC report to Congress warned of dual incentives for both the nursing facility and hospice provider to enroll patients through negotiations of room and board rates.¹⁹ Hospice live-discharge rates, defined as the percentage of patients who are discharged alive from a hospice, increased from 13.7% in 2000¹⁴ to 18.4% in 2013, and subsequently experienced a decline to 16.7% in 2017.³ While being discharged alive from a hospice is not common, there are multiple reasons it may occur: patients may decide to reengage in curative treatment, their condition improves, or it could be an indication of lower quality hospice care as suggested by Teno et al.¹⁷ The 90th percentile of live-discharge rates for hospices was 53% in 2017, up from 47.2% in 2013.³ In a 2013 study conducted by Acumen, LLC of hospices from 2008-2010 that was referenced in MedPAC's 2013 report, they found that among patients discharged alive, 18% were discharged after a stay of less than 2 weeks, and 40% were discharged after a stay of less than 60 days.²⁰

TRENDS IN HOSPICE MEDICARE MARGINS

Medicare margins, defined as the difference between Medicare payment for hospice services and allowed hospice costs to provide those services, have generally increased since the early 2000s, though year-to-year changes have varied as reported in MedPAC's annual Reports to Congress.^{3,5-11} In 2003, the average Medicare margin for all hospices was 6.6%,⁵ whereas in 2016, the average margin was 10.9%.³ While margins have increased for all hospice ownership types in recent years, MedPAC found the highest margins among for-profit hospices, which have been expanding in the hospice market. For-profit hospices consistently have had higher margins than nonprofit hospices, and the gap between the two widened from 2003 to 2016 as reported by MedPAC.^{3,5-11}

As of 2016, 12.7% of hospices exceeded the Medicare cap.³ MedPAC determined that the above cap hospices were disproportionately likely to be small, for-profit, and freestanding.³ The percentage of hospices exceeding the Medicare cap on total payments has been increasing since it was observed at 2.6% in 2002.³ MedPAC has also associated exceeding the cap with other hospices characteristics such as long lengths of stay and high live discharge rates.³

Research into the differences between Medicare margins for hospices with different patient and stay characteristics has revealed some possible explanations. There is a generally positive association with the volume of hospice patients and Medicare margins as reported by MedPAC.³ Long lengths of stay and higher Medicare margins are

associated as well; MedPAC found that hospices in the highest quintile for share of patients with stays greater than 180 days had an aggregate Medicare margin of 15% in 2016, compared to -5% for hospices in the lowest quintile.³ O'Neill et al. observed this same pattern of association between length of stay and profitability is with profit margins, which, unlike the Medicare margin, include non-reimbursable costs such as volunteer and bereavement costs.^{3,18} The proportion of patients in a nursing facility or an assisted living facility has also been positively associated with Medicare margins by MedPAC. In 2016, hospices above the 50th percentile for proportion of nursing facility patients had 14% margins compared to 8% for hospices below the 50th percentile, and hospices above the 50th percentile for proportion of assisted living facility patients had 14% margins compared to 6% for hospices below the 50th percentile.³

Finally, Dolin et al. noted that some regulators have expressed concerns that some hospice patients may be inappropriately discharged to increase profits.¹⁵ MedPAC suggested in their June 2013 report to Congress that some hospices could seek out long-stay patients and discharge them when the hospice is close to hitting the Medicare payment cap.²⁰ MedPAC's analysis found that in 2010 hospices which hit the Medicare payment cap had a 36% live discharge rate compared to 16% for hospices below the cap.²⁰ Analysis by Dolin et al. associated a 3 to 4% increase in live-discharge percentage with a 1% increase in profitability.¹⁵

RECENT CHANGES TO THE HOSPICE PROGRAM

In response to concerns about the increasing percentage of long hospice stays and the potential for hospice provider fraud and abuse regarding such stays, the ACA adopted the recommendation of MedPAC for hospice program eligibility recertification by mandating that the hospice physician or nurse practitioner has a face-to-face encounter with the beneficiary to determine continued eligibility of the individual for hospice care prior to the 180-day recertification and each subsequent recertification.²³ CMS implemented this policy beginning in calendar year 2011.²⁵ Furthermore, in the case of hospice care provided to an individual for more than 180 days by a hospice program for which the number of such cases for the program comprises a substantial percentage, the ACA requires that hospice care provided to the individual is medically reviewed.^{19,23}

In addition, effective January 2016, CMS adopted the first major changes to the hospice payment structure since the inception of the hospice program in 1983. First, the structure of payment for RHC (the most common type of hospice care) was changed from a single per diem payment to two per diem rates, depending on the time period that the RHC day is billed during the beneficiary's hospice stay. RHC has a higher payment rate during the first 60 days of hospice care (\$196 per day in 2019) and a lower rate for day 61 and beyond (\$154 per day in 2019).²⁸ Second, a service intensity add-on payment was added for nursing and social worker visits occurring in the last seven days of life, where Medicare pays an additional \$42 per hour for these visits that occur during this time period (up to four hours are payable per day) for patients receiving RHC in 2019.²⁸ Hospices tend to provide more services at the beginning and end of a stay and less in the middle. As a result, under the prior flat RHC per diem, long stays were more profitable than short stays. The new payment provisions were created to account for the observed U-shaped costs incurred by hospices in caring for patients by creating an appropriate U-shaped payment model, with front and back loaded payments for the higher intensity care expected at the beginning and end of a hospice stay.²⁷ This movement away from the flat per diem is consistent with MedPAC's 2009 recommendation, based on their concerns that the misalignment of payment with hospice costs led to a number of issues, such as making the payment system vulnerable to patient selection; spurring some providers to pursue revenue-generation strategies, such as enrolling patients likely to have long stays, including some who may not meet the eligibility criteria; and generating wide variation in profit margins across providers based on the length of stay.¹⁹

MedPAC observed that these Medicare hospice payment reforms were expected to modestly reduce the variation in profitability across hospices and they determined that the variation in profitability across providers by length of stay narrowed between 2015 and 2016.^{3,11} Where there was a 29 percentage point spread in margin between the lowest length of stay quintile and the second highest length of stay quintile in 2015, MedPAC found that in 2016 the difference in margins narrowed slightly to about 25 percentage points.^{3,11}

FUTURE CONSIDERATIONS FOR HOSPICE PAYMENT

Since 2013, MedPAC has recommended that CMS forgo the annual hospice payment rate increases, and most recently recommended a 2% decrease in payment rates for FY 2020 due to positive indicators of payment adequacy for hospices— beneficiary access to care, quality of care, provider access to capital, and Medicare payments relative to providers' cost.^{3,5-7,9-11} These annual rate update recommendations have not been adopted by CMS. However, because Medicare margins have been shown in the literature to vary so substantially by hospice ownership, future changes to reduce the annual updates for hospice payment rates could disproportionately affect certain types of hospices.

The effects of the rapid introduction of for-profit hospices on rising Medicare hospice expenditures are not fully understood, and further investigation into whether for-profit hospices are putting upward pressure on Medicare

expenditures while maintaining high profits is important to evaluating the efficiency and quality of the hospice industry. Moreover, as CMS continues to evaluate the potential for future changes to hospice payment rates and as Medicare Advantage plans begin to test covering hospice services through the VBID model in 2021,³¹ a broader understanding of how types of hospices differ will become increasingly important to considerations of hospice access, cost, and quality.

RESULTS AND DISCUSSION

DATA SAMPLE

For our analysis, we examined over 3,000 Healthcare Cost Report Information System (HCRIS) cost reports over 2014 - 2017, with corresponding claims from the Medicare 100% Part A LDS files which we matched by CMS Certification Number (CCN). We analyzed hospice patient characteristics, length of stay, service visits, incurred costs, live discharges and post-discharge costs, and estimated Medicare margins.

We grouped hospices by three major metrics: ownership status (for-profit, nonprofit, and governmental), type (freestanding, hospital-based, home health agency (HHA)-based, and SNF-based), and rural/urban (see methodology section for details). Table 1 shows the breakdown of the hospices into these categories. Over 2014-2017, about 90% of for-profit hospices were freestanding, whereas only about half of nonprofit hospices were freestanding, with the remainder split between hospital-based and HHA-based, and very few SNF-based. As governmental hospices only make up approximately 4% of 2014-2017 hospice cost reports, we focused our analysis on for-profit and nonprofit hospices.

TABLE 1: DISTRIBUTION OF HOSPICE STUDY POPULATION, 2017.

TYPE OF HOSPICE	NUMBER OF HOSPICE COST REPORTS BY OWNERSHIP STATUS			
	ALL	NONPROFIT	FOR-PROFIT	GOVERNMENTAL
All Hospices	3,444	763	2,591	90
Type				
Freestanding	2,841	432	2,395	14
Hospital-Based	277	206	8	63
Home Health Agency-Based	316	115	188	13
SNF-Based	10	10	0	0
Location†				
Urban	3,016	587	2,400	29
Rural	427	176	190	61

Source: Milliman analysis of the HCRIS cost reports.

†One hospice's cost report in 2017 could not be mapped to an urban/rural service area.

PATIENT CHARACTERISTICS

We identified individual patient-stays using the Medicare 100% Part A LDS files. We counted each time a hospice patient died, was discharged alive, or was transferred as an individual patient-stay, referred to as 'patient' for the remainder of this paper. Between 11% and 12% of identified hospice patients had a subsequent hospice stay, so the same beneficiary will often be included in more than one group.

The age and gender breakdown of patients was quite similar between for-profit and nonprofit hospices, with about three-quarters of patients 75 or older, and 55 - 60% female across 2014 to 2017 (see Table 2). For-profit hospice patients were more likely to be dually-eligible for Medicare and Medicaid, and similarly likely to have been an MA patient before enrolling in hospice care. About a third of nonprofit hospice patients had a prior inpatient stay within 7 days of their initial hospice stay, compared to about a quarter of for-profit hospice patients, which indicates that nonprofit hospices have higher patient acuity upon initiation of the hospice stay.

TABLE 2: PATIENT BREAKDOWN FOR HOSPICES IN STUDY POPULATION BY OWNERSHIP STATUS, 2017.

PATIENT CHARACTERISTICS	NONPROFIT	FOR-PROFIT
Age Range		
<65	6%	6%
65-74	19%	18%
75-84	30%	30%
85+	45%	46%
PATIENT CHARACTERISTICS		
Sex		
Male	43%	40%
Female	57%	60%
Plan Coverage		
% Prior Medicare Advantage	30%	32%
% Dual Eligible	20%	27%
Prior Inpatient Stays		
% of Patients with Inpatient Stays within 7 Days Before Initial Hospice Stay	32%	22%

Source: Milliman analysis of the HCRIS cost reports and the Medicare 100% LDS.

The most significant differences in patient characteristics between nonprofit and for-profit hospices were the patient's diagnosis category and the main location of care. We grouped the primary diagnosis codes observed on patients' final hospice claim into 13 diagnosis categories as shown in Table 3; see Table C-4 in Appendix C for details. The most prevalent diagnosis category for nonprofit hospices was cancer, with 31% of patients; 22% of for-profit hospice patients were cancer patients. For-profit hospice patients showed two diagnosis categories which tied for highest prevalence, cancer (22%) and degenerative diseases of the nervous system (dementia) (22%), compared to 15% of nonprofit hospice patients in the latter category.

TABLE 3: DISTRIBUTION OF PATIENT DIAGNOSIS CATEGORIES BY OWNERSHIP STATUS, 2017.

DIAGNOSIS CATEGORY	NONPROFIT	FOR-PROFIT
Cancer	31.4%	21.9%
Heart/Circulatory System (other than brain)	17.2%	20.2%
Cerebrovascular Disease	8.7%	10.9%
Respiratory System	11.6%	11.2%
Other diseases of nervous system	4.2%	4.7%
Degenerative diseases of nervous system (Dementia)	15.2%	21.9%
Chronic kidney disease	2.4%	2.0%
Infection	1.8%	1.0%
Cirrhosis	1.3%	1.2%
Anorexia/Malnutrition/Dysphagia	2.3%	2.6%
Acute kidney disease	0.4%	0.2%
Gastrointestinal Hemorrhage	0.3%	0.2%
Other	3.4%	2.1%

Source: Milliman analysis of the HCRIS cost reports and the Medicare 100% LDS.

We also analyzed the main location of care for patients, defined as the location where the beneficiary spent the largest share of RHC days enrolled in hospice. We found that for-profit hospice patients were twice as likely to have their main location of care at an assisted living facility and 50% more likely to have their main location of care at a nursing facility than nonprofit hospice patients (see Table 4).

TABLE 4: PERCENT OF PATIENTS WITH MAIN LOCATION OF CARE AS NURSING OR ASSISTED LIVING FACILITY BY OWNERSHIP STATUS, 2017.

MAIN LOCATION OF CARE	NONPROFIT	FOR-PROFIT
% with Main Location of Care at Assisted Living Facility	8%	16%
% with Main Location of Care at Nursing Facility	16%	24%

Source: Milliman analysis of the HCRIS cost reports and the Medicare 100% LDS.

The patient diagnosis category and main location of care appear to be associated, as the diagnosis category disparity between for-profit and nonprofit hospices shrank when we examined only patients who had their main location of care at a facility (see Table 5).

TABLE 5: PERCENT OF HOSPICE PATIENTS WITH MAIN LOCATION OF CARE AS NURSING OR ASSISTED LIVING FACILITY WITH CANCER OR DEMENTIA DIAGNOSIS CATEGORIES BY OWNERSHIP STATUS, 2017.

MAIN LOCATION OF CARE/DIAGNOSIS CATEGORY	NONPROFIT	FOR-PROFIT
Nursing Facility		
% of patients with cancer diagnosis category	15%	12%
% of patients with degenerative diseases of nervous system (dementia) diagnosis category	27%	31%
Assisted Living Facility		
% of patients with cancer diagnosis category	13%	9%
% of patients with degenerative diseases of nervous system (dementia) diagnosis category	36%	38%

Source: Milliman analysis of the HCRIS cost reports and the Medicare 100% LDS.

LENGTH OF STAY

Both for-profit and nonprofit hospices had a substantially higher average patient length of stay than median patient length of stay (see Table 6), due to a small number of patients with extremely long stays. For both ownership types, the average length of stay increased steadily from 2014 to 2017. We note that effective January 1, 2016, CMS altered the payment system for RHC, the main category of hospice care, so that lower daily rates were paid after the first 60 days of hospice care.²⁸ However, we did not observe a decrease in average or median length of stay in the 2 years of analysis following the implementation of the new payment policy.

TABLE 6: AVERAGE AND MEDIAN LENGTH OF STAY FOR HOSPICE PATIENTS BY OWNERSHIP STATUS, 2014-2017

HOSPICE TYPE	AVERAGE LENGTH OF STAY (DAYS)				MEDIAN LENGTH OF STAY (DAYS)			
	2014	2015	2016	2017	2014	2015	2016	2017
All Hospices	60	69	75	79	17	17	18	18
Nonprofit	50	56	59	61	13	13	14	13
For-Profit	72	84	92	94	22	23	24	24

Source: Milliman analysis of the HCRIS cost reports and the Medicare 100% LDS.

Nonprofit hospices had much shorter lengths of stay than for-profit hospices, with a median length of stay that was only about half that of for-profit hospices. This relationship is likely associated with the different distributions of patient diagnosis categories we found between nonprofit and for-profit hospices, among other factors. Patients in the degenerative diseases of the nervous system category, the most prevalent diagnosis category for for-profit hospices,

tended to have the longest lengths of stay. However, even within diagnosis categories, the median length of stay was much longer for for-profit hospices than nonprofit hospices (see Table 7). Further analysis would be needed to determine the reason for this gap.

TABLE 7: MEDIAN LENGTH OF STAY FOR HOSPICE PATIENTS BY DIAGNOSIS CATEGORY AND OWNERSHIP STATUS, 2017.

DIAGNOSIS CATEGORY	NONPROFIT	FOR-PROFIT
Cancer	15	18
Heart/Circulatory System (other than brain)	14	29
Cerebrovascular Disease	9	25
Respiratory System	8	19
Other diseases of nervous system	20	47
Degenerative diseases of nervous system (Dementia)	27	50
Chronic kidney disease	6	8
Infection	4	5
Cirrhosis	10	13
Anorexia/Malnutrition/Dysphagia	22	33
Acute kidney disease	5	6
Gastrointestinal Hemorrhage	7	10
Other	8	15

Source: Milliman analysis of the HCRIS cost reports and the Medicare 100% LDS.

SERVICE VISITS

Nonprofit hospices provided patients with almost 10% more nursing visits, 35% more social worker visits, and 2 times as many therapy visits per patient day than for-profit hospices (see Table 8). This relationship varied across patient main location of care, with the gap shrinking for social worker visits and therapy visits for patients with main location of care at a nursing or assisted living facility, and disappearing for nursing visits at these facilities. The patient's main location of care may affect the unit cost of the hospice providing visits, as a professional could visit multiple patients at one location without added transportation costs and time for travel between patients' homes in the community. However, patients in facilities may be less likely than patients residing at home in the community to need visits from hospice staff, as potentially overlapping care is also being provided by the facility staff. Both for-profit and nonprofit hospices had slightly fewer visits per patient day for patients with main location of care at a nursing or assisted living facility.

The longer median length of stay at for-profit hospices compared to nonprofit hospices may also affect the average number of discipline visits per day. Hospice costs (and services) typically follow a U-shaped curve, with high intensity at the time of the patient's admission and the time surrounding the patient's death.¹⁹ On the other hand, long-stay hospice patients may receive fewer visits per week than short-stay patients and require a lower discipline skill mix.¹⁹ For example, in 2017 we found an overall average of 0.26 nurse visits and 0.05 social worker visits per patient day over the complete hospice stay, compared to an average of 0.83 nurse visits and 0.17 social worker visits per patient day in the first 2 days of a patient's hospice stay. Similarly, in 2017 we observed an average of 0.64 nurse visits and 0.10 social worker visits per patient day in the last 7 days before a patient's death. These findings confirm the U-shaped intensity pattern, and this was similar for nonprofit and for-profit hospices. However, the typically shorter length of stay in nonprofit hospices means a higher percentage of hospice days are in a high service intensity period of care, compared to for-profit hospices where a lower percentage of hospice days are in a high service intensity period. This length of stay difference between hospices of different ownership type likely contributes to our findings of a higher number of nursing, social worker, and therapy visits per patient day provided by nonprofit hospices than for-profit hospices.

Hospice aide visits, however, showed the opposite relationship. For-profit hospices had nearly 20% more aide visits per patient day than nonprofit hospices. In addition, while nonprofit aide visits per patient day levels were similar for patients with main location of care in an assisted living or nursing facility compared to other locations, for-profit aide visits per patient day were over 30% higher for patients with main location of care in an assisted living or nursing

facility compared to other locations. This finding is consistent with the experience of long-stay patients commonly found in these main locations of care who likely require visits of a lower skill mix during the large number of low intensity days after their admission and before the lead-up to death.

TABLE 8: DISCIPLINE VISITS PER 100 PATIENT DAYS BY PATIENT MAIN LOCATION OF CARE AND OWNERSHIP STATUS, 2017.

PATIENT MAIN LOCATION OF CARE	NURSING VISITS		SOCIAL WORKER VISITS		THERAPY VISITS		AIDE VISITS	
	NONPROFIT	FOR-PROFIT	NONPROFIT	FOR-PROFIT	NONPROFIT	FOR-PROFIT	NONPROFIT	FOR-PROFIT
Any	27.10	25.03	6.23	4.53	0.11	0.05	28.60	34.46
Nursing Facility	23.16	23.48	6.47	4.98	0.07	0.03	34.15	39.12
Assisted Living Facility	24.77	25.79	6.07	4.61	0.10	0.05	31.49	40.99
Other	28.96	25.45	6.18	4.29	0.13	0.05	26.07	29.58

Source: Milliman analysis of the HCRIS cost reports and the Medicare 100% LDS.

As of January 1, 2016, hospices are paid for nursing and social worker visits in the last 7 days before a patient's death in addition to the daily payment for each day the patient is enrolled in hospice.³⁵ However, we saw only consistent, small increases in these visits from 2014 to 2017 (see Table 9), indicating that this policy change did not cause a large shift in hospice practice patterns.

TABLE 9: DISCIPLINE VISITS IN THE LAST 7 DAYS BEFORE DEATH PER DAY PER 100 DEATHS, 2014-2017

HOSPICE TYPE	2014	NURSING VISITS			2017	2014	SOCIAL WORKER VISITS		
		2015	2016	2017			2015	2016	2017
Nonprofit	57.68	59.51	60.26	60.89	10.42	10.49	10.79	11.02	
For-Profit	63.68	64.38	65.57	66.42	8.73	8.67	9.39	9.72	

Source: Milliman analysis of the HCRIS cost reports and the Medicare 100% LDS.

Nonprofit hospices had a higher number of physician and nurse practitioner visits per day than for-profit hospices on RHC, IRC, and GIP days; on RHC and IRC days, the rate was nearly double (see Table 10). Experts assert that physician home visits are an essential part of hospice care and, in the case of a patient receiving RHC, allow a physician to see a patient in his or her place of residence, obtain a firsthand view of the caregiving system, and get a clearer picture of how to best care for the patient.³⁶ In contrast to RHC days, on CHC days for-profit hospices showed a higher rate of physician and nurse practitioner visits than nonprofit hospices. Urban hospice patients received physician and nurse practitioner visits at twice the rate of rural hospice patients. For both nonprofit and for-profit hospices, the number of provider visits per day was significantly lower for patients with their main location of care at nursing or assisted living facilities compared to patients in other main locations of care. This may have been because physician services were already being provided by non-hospice staff at nursing and assisted living facilities.

TABLE 10: DAYS WITH PHYSICIAN AND NURSE PRACTITIONER VISITS PER 100 PATIENT DAYS BY LEVEL OF CARE AND MAIN LOCATION OF CARE

PATIENT MAIN LOCATION OF CARE	ALL		RHC DAYS		CHC DAYS		IRC DAYS		GIP DAYS	
	NONPROFIT	FOR-PROFIT	NONPROFIT	FOR-PROFIT	NONPROFIT	FOR-PROFIT	NONPROFIT	FOR-PROFIT	NONPROFIT	FOR-PROFIT
Any	1.49	0.51	0.49	0.28	8.87	14.19	4.37	2.03	46.87	42.44
Nursing Facility	0.56	0.25	0.33	0.17	8.58	14.02	4.84	1.11	46.83	39.18
Assisted Living Facility	0.67	0.39	0.44	0.30	8.21	15.01	4.83	1.75	51.45	52.79
Other	1.99	0.69	0.55	0.32	9.15	13.84	4.33	2.12	46.72	42.37

Source: Milliman analysis of the HCRIS cost reports and the Medicare 100% LDS.

INCURRED COSTS

Hospices also report incurred costs from providing hospice services to Medicare patients. The reported costs per patient day were significantly higher for nonprofit hospices than for-profit hospices, with for-profit hospices at \$128 in Medicare cost per patient day and nonprofit hospices at \$175 in 2017. These reported costs are made up of costs directly related to patient care such as nursing care and therapy (direct patient costs) and associated general costs related to items such as building, equipment, and volunteer service coordination (general service costs). Nonprofit hospital-based hospices reported the highest costs of any hospice type, \$226 in Medicare costs per patient in 2017. General service costs for a hospital, HHA, or SNF-based hospice come from a portion of the general service costs of the full parent facility, so these hospices may have some latitude in where costs are actually reported, and allocated parent facility costs could increase the per-day hospice costs. We also specifically examined costs for nonprofit and for-profit freestanding hospices (see Table 11) to generate a comparison that was not confounded by the allocation of general service costs from a parent facility to the hospice. The gap in per-day costs between freestanding hospices with different ownership types was somewhat smaller, but nonprofit freestanding hospices still reported \$40 higher Medicare costs per patient day than for-profit freestanding hospices. Hospices identified with an urban service area also reported higher costs than rural hospices, and the nonprofit to for-profit cost gap increased to about \$50 within these categories.

TABLE 11: REPORTED MEDICARE HOSPICE COSTS PER DAY BY OWNERSHIP STATUS, 2017.

HOSPICE TYPE	NONPROFIT	FOR-PROFIT
All	\$174.69	\$128.16
Freestanding	\$166.66	\$126.96
Hospital-Based	\$226.42	\$195.22
Home Health Agency-Based	\$169.70	\$142.59
SNF-Based	\$110.78	.
Urban	\$174.90	\$128.84
Rural	\$171.93	\$115.08

Source: Milliman analysis of the HCRIS cost reports. Note there were no SNF-based for-profit hospice cost reports spanning at least 360 days for 2017.

More detailed cost categories are also reported on cost reports, but for all hospice patients, not just Medicare patients. Nonprofit hospices reported higher general service costs and direct patient costs per patient day than for-profit hospices, and slightly higher non-reimbursable costs (see Table 12). Non-reimbursable costs include items such as bereavement services, volunteer programs, and fundraising, and are not included in the Medicare costs per patient day discussed above or in Medicare margin calculations. Within the more detailed cost categories, for-profit hospices generally spent less in all categories with the exceptions of occupational therapy, spiritual counseling, other counseling costs, nursing facility room & board, and advertising. The difference between hospice spending by ownership type varied by cost category, with the largest observed percentage differences (only including service categories with costs over \$1 per day) for contracted inpatient care, fundraising, palliative care program, and advertising.

TABLE 12: REPORTED HOSPICE COSTS PER DAY BY OWNERSHIP STATUS, 2017.

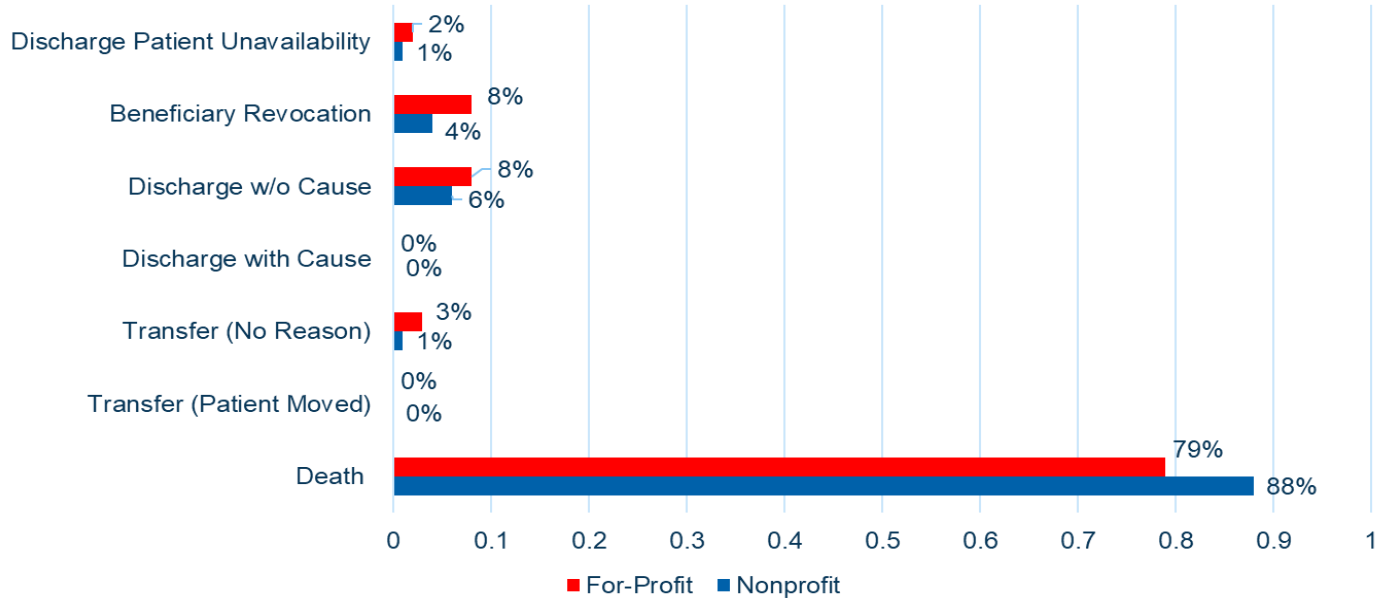
COST CATGEORY	NONPROFIT	FOR-PROFIT
General Service Costs	\$89.98	\$72.95
Volunteer Service Coordination	\$1.18	\$0.70
Other General Service Costs	\$88.80	\$72.26
Direct Patient Costs	\$77.12	\$55.79
Inpatient Care-Contracted	\$1.04	\$0.14
Nursing Care	\$41.32	\$27.88
Physical Therapy	\$0.23	\$0.18
Occupational Therapy	\$0.04	\$0.06
Speech-Language Pathology	\$0.02	\$0.01
Medical Social Services	\$6.42	\$4.33
Spiritual Counseling	\$2.52	\$2.77
Dietary Counseling	\$0.06	\$0.04
Other Counseling	\$0.03	\$0.12
Palliative Radiation Therapy	\$0.08	\$0.01
Palliative Chemotherapy	\$0.09	\$0.01
Other Direct Patient Costs	\$25.27	\$20.24
Non-Reimbursable Costs	\$19.08	\$18.38
Bereavement	\$1.81	\$0.72
Volunteer	\$0.18	\$0.08
Fundraising	\$1.43	\$0.11
Hospice/Palliative Care Fellows	\$0.01	\$0.00
Palliative Care Program	\$1.91	\$0.22
Other Physician Services	\$0.11	\$0.01
Residential Care	\$0.48	\$0.05
Advertising	\$0.79	\$3.26
Telehealth/Telemonitoring	\$0.03	\$0.00
Thrift Store	\$0.50	\$0.00
Nursing Facility Room & Board	\$6.41	\$10.71
Other Non-Reimbursable Costs	\$5.41	\$3.23

Source: Milliman analysis of the HCRIS cost reports.

HOSPICE DISCHARGES

Nonprofit hospices had lower rates of live discharge than for-profit hospices, 12% versus 21% in 2017 (see Figure 1). The gap was likely due in part to the different patient diagnosis category and patient acuity mix between hospices with different types of ownership. Hospices can provide reasons for a live discharge, such as the patient transferring to another hospice, revoking the hospice benefit, proving unavailable for care, or some other cause.³⁷ Of the patients who were discharged alive, there was a similar distribution of reasons between for-profit and nonprofit hospices. Forty percent of live discharges from for-profit hospices had no cause listed, compared to 48% from nonprofit hospices. Beneficiary revocations accounted for 36% of live discharges for both nonprofit and for-profit hospices.

FIGURE 1: HOSPICE DISCHARGE STATUS DISTRIBUTION BY OWNERSHIP STATUS, 2017.



Source: Milliman analysis of the HCRIS cost reports and the Medicare 100% LDS.

Sixty-five percent of nonprofit hospice patients who were discharged alive in 2015 and 69% of for-profit hospice patients who were live discharged in 2015 went on to enter a subsequent hospice stay before the end of 2017. However, the Part A claims experience of patients immediately post-discharge was quite different for patients discharged alive from the different hospice ownership types. Patients discharged from for-profit hospices incurred on average more than 40% higher daily Medicare Part A (inpatient, outpatient, SNF, and HHA) costs than patients discharged alive from nonprofit hospices for the first 7 days and the first 14 days post-discharge, and more than 30% higher for the first 90 days post-discharge (see Table 13). Days in which a patient was not alive or had entered a new hospice stay were excluded from the calculation of post-discharge costs. For freestanding hospices, this gap was slightly lessened but still significant.

TABLE 13: DAILY PART A POST-DISCHARGE COSTS FOR PATIENTS DISCHARGED ALIVE, 2017.

TYPE OF HOSPICE	DAILY COSTS FOR 7 DAYS POST-DISCHARGE	DAILY COSTS FOR 14 DAYS POST-DISCHARGE	DAILY COSTS FOR 90 DAYS POST-DISCHARGE
Nonprofit	\$180.12	\$151.64	\$91.69
Nonprofit-Freestanding	\$184.95	\$158.34	\$97.92
For-Profit	\$258.92	\$212.93	\$120.97
For-Profit-Freestanding	\$262.00	\$215.91	\$122.97

Source: Milliman analysis of the HCRIS cost reports and the Medicare 100% LDS.

This relationship is consistent across 2014 to 2017 (see Table 14).

TABLE 14: DAILY PART A POST-DISCHARGE COSTS FOR 7 DAYS POST-DISCHARGE FOR PATIENTS DISCHARGED ALIVE, 2014-2017.

TYPE OF HOSPICE	2014	2015	2016	2017
Nonprofit	\$171.23	\$171.07	\$170.80	\$180.12
Nonprofit-Freestanding	\$175.78	\$173.56	\$174.06	\$184.95
For-Profit	\$239.47	\$246.00	\$252.35	\$258.92
For-Profit-Freestanding	\$241.47	\$247.76	\$255.51	\$262.00

Source: Milliman analysis of the HCRIS cost reports and the Medicare 100% LDS.

We found a sizeable difference in post-discharge Part A costs depending on the point in the hospice stay at which the patient was discharged (see Table 15). Patients discharged early on in the hospice stay (within 2 months, comprising 36-43% of patients discharged alive) had the highest post-discharge costs, about \$90 higher than the average patient. For patients discharged around the 6 month mark (5.5-8 months, comprising 12-13% of patients discharged alive), the daily post-discharge costs were lower than the average patient by about \$100. In addition, the percentage gap between nonprofit and for-profit patient post-discharge costs changed by discharge time period. For patients discharged within 2 months, the daily post-discharge costs were only 30% higher for for-profit patients than nonprofit patients. However, for patients discharged at around 6 months, daily post discharge costs at for-profit hospices were about double those at nonprofit hospices.

TABLE 15: DAILY PART A POST-DISCHARGE COSTS FOR 7 DAYS POST-DISCHARGE FOR PATIENTS DISCHARGED ALIVE AT DIFFERENT POINTS IN THE HOSPICE STAY, 2017.

TYPE OF HOSPICE	ALL PATIENTS DISCHARGED ALIVE	PATIENTS DISCHARGED ALIVE 0-2 MONTHS AFTER HOSPICE ADMISSION	PATIENTS DISCHARGED ALIVE 5.5-8 MONTHS AFTER HOSPICE ADMISSION
Nonprofit	\$180.12	\$273.61	\$75.10
Nonprofit-Freestanding	\$184.95	\$274.36	\$82.34
For-Profit	\$258.92	\$353.42	\$153.59
For-Profit-Freestanding	\$262.00	\$356.34	\$157.56

Source: Milliman analysis of the HCRIS cost reports and the Medicare 100% LDS.

During the hospice stay, non-hospice Part A costs were insignificant, averaging only \$2-3 per day for nonprofit and for-profit hospice patients.

MEDICARE MARGINS

We calculated aggregate gross Medicare margins for hospice categories as follows:

$$\frac{\text{Medicare payments during cost report time period} - \text{Medicare costs from cost reports}}{\text{Medicare payments during cost report time period}}$$

The Medicare costs from the cost reports only included direct patient costs and associated general service costs for Medicare patients, not non-reimbursable costs. We also calculated aggregate net Medicare margins excluding overpayments by removing estimated overpayments from the Medicare payments in the numerator and denominator. Details on the estimation of overpayments can be found in the Appendix B. Hospices with overpayments (above cap hospices) are much more likely to be for-profit than nonprofit (see Table 16).

TABLE 16: NUMBER OF HOSPICES IN STUDY POPULATION ABOVE/BELOW MEDICARE CAP AND CORRESPONDING AGGREGATE NET MEDICARE MARGINS, 2017.

	ABOVE CAP HOSPICES		BELOW CAP HOSPICES	
	NONPROFIT	FOR-PROFIT	NONPROFIT	FOR-PROFIT
Number of Hospices	3	308	760	2,278
Medicare Margins (Including Overpayments)†	-	18.6%	3.1%	20.6%
Net Medicare Margins (Excluding Overpayments)†	-	7.9%	3.1%	20.6%

Source: Milliman analysis of the HCRIS cost reports and the Medicare 100% LDS.

†Margins are not shown for above cap nonprofit hospices due to the low sample size.

Based on our analysis, net Medicare margins increased between 2015 and 2017 for all major hospice categories, but remain much higher for for-profit hospices than nonprofit hospices. In 2017, we calculated an aggregate net Medicare margin of 3.0% for nonprofit hospices and 19.9% for for-profit hospices (see Table 17). Even when limiting our analysis to freestanding hospices, nonprofit hospices had an aggregate net Medicare margin of 6.3% compared to 20.6% for for-profits. The net Medicare margin for all nonprofit hospices increased 3.0% from 2015 to 2017, but not much of this increase was experienced by freestanding nonprofits, which only saw a 0.4% increase in margin over the same time period.

TABLE 17: AGGREGATE NET MEDICARE MARGINS BY OWNERSHIP STATUS AND TYPE, 2015-2017.

TYPE OF HOSPICE	2015	2016	2017
Nonprofit	0.0%	1.8%	3.0%
Nonprofit-Freestanding	5.9%	6.3%	6.3%
Nonprofit-Rural	-16.1%	-9.3%	-7.4%
Nonprofit-Urban	1.2%	2.6%	3.7%
For-Profit	16.7%	17.5%	19.9%
For-Profit-Freestanding	18.0%	18.1%	20.6%
For-Profit-Rural	17.7%	17.4%	20.9%
For-Profit-Urban	16.6%	17.5%	19.8%

Source: Milliman analysis of the HCRIS cost reports and the Medicare 100% LDS.

The urban or rural identification of the hospice made little difference in the margins of for-profit hospices, despite differences in the Medicare costs per patient day (see Table 18). However, nonprofit rural hospices had much lower aggregate net Medicare margins than their nonprofit urban counterparts despite their similarity in Medicare costs per patient day.

TABLE 18: REPORTED MEDICARE HOSPICE COSTS PER DAY AND AGGREGATE NET MEDICARE MARGINS BY OWNERSHIP STATUS, TYPE, AND LOCATION, 2017.

TYPE OF HOSPICE	MEDICARE COSTS PER DAY	NET MEDICARE MARGINS
Nonprofit-Urban	\$174.90	3.7%
Nonprofit-Urban-Freestanding	\$167.03	6.7%
Nonprofit-Rural	\$171.93	-7.4%
Nonprofit-Rural-Freestanding	\$160.21	-1.4%
For-Profit-Urban	\$128.84	19.8%
For-Profit-Urban-Freestanding	\$127.59	20.6%
For-Profit-Rural	\$115.08	20.9%
For-Profit-Rural-Freestanding	\$114.71	21.0%

Source: Milliman analysis of the HCRIS cost reports and the Medicare 100% LDS.

Net Medicare margins also showed clear patterns based on patient length of stay and main location of care, characteristics that are associated with hospice ownership status (see patient characteristics and length of stay sections). Hospices in higher quintiles for the percent of patients with main location of care at a nursing facility or assisted living facility had higher net margins in all years (see Table 19). Hospices in higher quintiles of average length of stay and percent of stays greater than 180 days had higher margins in all years except for the highest quintile. The margins in the highest quintile for these hospices with long lengths of stay were lower than those in the fourth quintile, likely due to the hospice aggregate cap policy.¹ This policy limits the total Medicare payment annually to a hospice based on the year's mean beneficiary per-capita amount calculated as Medicare hospice payments for cap-eligible beneficiaries compared to a pre-determined amount. Hospices with a high proportion of long stays will have a greater number of hospice days for fewer patients, and are thus more likely to hit the aggregate cap. Payments that exceed the aggregate cap must be repaid to Medicare.

TABLE 19: AGGREGATE NET MEDICARE MARGINS ASSOCIATED WITH QUINTILES OF HOSPICE METRICS, 2015-2017.

QUINTILE OF GIVEN METRIC	AVERAGE LENGTH OF STAY			PERCENT OF STAYS >180 DAYS			PERCENT OF PATIENTS WITH MAIN LOCATION OF CARE AT A NURSING FACILITY			PERCENT OF PATIENTS WITH MAIN LOCATION OF CARE AT AN ASSISTED LIVING FACILITY		
	2015	2016	2017	2015	2016	2017	2015	2016	2017	2015	2016	2017
Lowest Quintile	-10%	-8%	0%	-11%	-9%	-2%	-1%	3%	7%	4%	4%	7%
Second Quintile	3%	5%	10%	2%	5%	9%	4%	6%	9%	2%	4%	8%
Third Quintile	12%	14%	17%	13%	13%	17%	11%	11%	13%	8%	8%	11%
Fourth Quintile	19%	19%	21%	19%	20%	22%	11%	12%	14%	12%	14%	17%
Fifth Quintile	17%	15%	20%	16%	14%	18%	17%	18%	22%	15%	16%	20%

Source: Milliman analysis of the HCRIS cost reports and the Medicare 100% LDS.

For hospices in each of the quintiles discussed above, net margins increased from 2015 to 2017, except for the hospices in the highest quintiles of average length of stay and percent of stays over 180 days. For these quintiles, the net margin dipped down from 2015 to 2016 before increasing in 2017. This temporary dip may be related to the CMS policy of reducing RHC payments after the 60th day of a hospice stay, which went into effect January 1, 2016.

REGRESSION ANALYSIS

We performed a linear regression analysis for hospice net Medicare margins, focusing on identifying relationships between margins and patient and hospice characteristics. See Table D-1 in Appendix D for a full list of the variables considered for our regression model. We first performed an automated stepwise regression to exclude variables with an insignificant contribution to the model, and then manually added nonlinear and interaction terms if they proved statistically significant. Finally, we tested adding back variables removed earlier in the process to see if they subsequently became statistically significant in the final model.

The final model parameters are shown in Figure 2. The model had low predictive power ($R^2=19.06\%$), but showed statistically significant relationships between several variables and net Medicare margins, when controlling for the other variables in the model. However, the variables included in the model did not explain the full variability in net Medicare margins among hospices. It is likely that specific categories of hospice expenditures such as administrative costs and capital-related costs have a substantial impact on Medicare margins. However, we excluded them from the model as differences in these categories may reflect hospices' business decisions or preferences, which were not the focus of this analysis.

TABLE 20: REGRESSION ANALYSIS OUTPUT

VARIABLE	PARAMETER ESTIMATE†	STANDARD ERROR	MODEL PREDICTION OF CHANGE IN MARGIN (IF VARIABLE INCREASES BY 1 SD)‡
Intercept	0.17813***	0.0213	
Hospital-Based	-0.20926***	0.0112	
Rural	-0.0188*	0.0089	
For-Profit Status	0.0318	0.0163	
Governmental Status	0.17273***	0.0351	
% of Patients at Assisted Living Facility	0.08529***	0.0219	1.25%
% of Patients at Nursing Facility	0.1243***	0.0163	2.53%
% of Patients with Cancer Diagnosis	-0.19629***	0.0333	-2.24%
% of Patients with LOS over 365 days	2.56685***	0.2058	12.61%
% of Patients Discharged Alive	-0.176***	0.0220	-2.98%
% of Patients with a Prior IP Admission 7 Days Before Hospice Admission	-0.14608***	0.0308	-1.49%
% of Live Discharges with IP Admissions within 7 Days	0.1422***	0.0303	1.38%
Average Number of Nursing Days per 100 Days	-0.00366***	0.0003	-5.22%
Average Number of Social Service Days per 100 Days	-0.0063***	0.0011	-2.01%
Average Number of Therapy Days per 100 Days	0.02368***	0.0063	1.09%
(% of Patients with LOS over 365 Days) squared	-7.88294***	0.5007	-5.56%
(For-Profit)(% of Patients with LOS over 365 Days)	-0.94608***	0.1949	
(For-Profit)(Average Number of Nursing Days per 100 Days)	0.00173***	0.0004	
(Governmental)(% of Patients with LOS over 365 Days)	0.7151	0.3839	
(Governmental)(Average Number of Nursing Days per 100 Days)	-0.00529***	0.0010	

† *($P < 0.05$), **($P < 0.01$), ***($P < 0.001$)

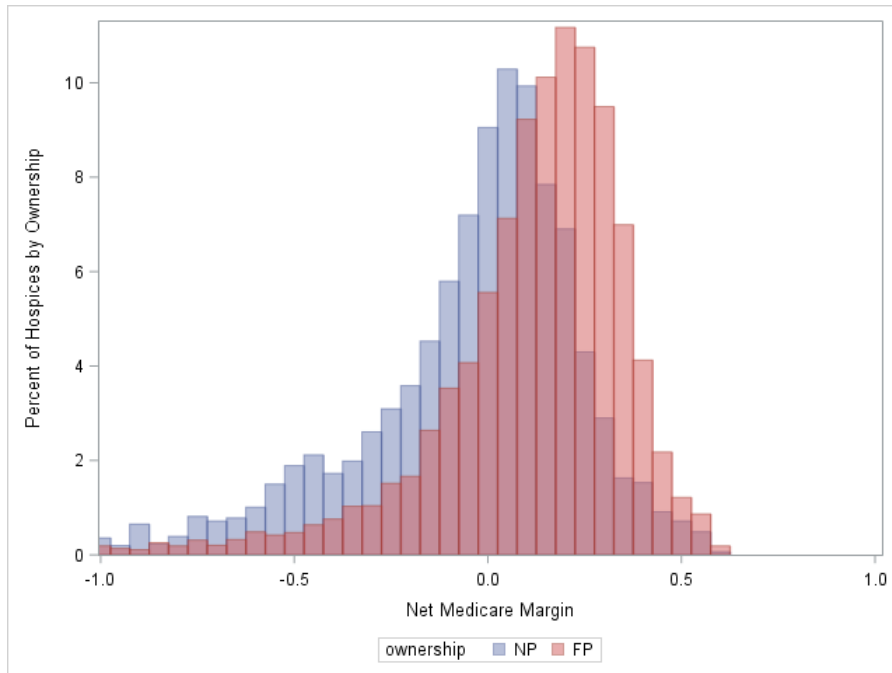
‡ The model prediction of the change in margin if the variable in question increases by 1 standard deviation can be used to compare the relative impact of the parameter estimates for continuous variables.

Source: Milliman analysis of the HCRIS cost reports and the Medicare 100% LDS. The regression was performed for hospices with net Medicare margins between the 1st and 99th percentiles.

We found statistically significant positive relationships between net Medicare margins and the percent of patients with main location of care in an assisted living facility, percent of patients with main location of care in a nursing facility, percent of patients with hospice stays over 365 days, percent of live discharges with an inpatient hospitalization within 7 days, and the average number of therapy days per 100 patient days. We found statistically significant negative relationships between net Medicare margins and the percent of patients with cancer as the diagnosis category, the hospice being hospital-based, hospices with a rural service area, the percent of patients discharged alive, the percent of patients with a prior inpatient hospitalization 7 days before hospice admission, the average

number of nursing days per 100 patient days, and the average number of social service days per 100 patient days. All variables in the final model were significant at the 5% level (all variables except the rural designation were significant at the .1% level) with the exception of ownership status, implying that other variables that showed significant differences between for-profit and nonprofit hospices may account for part of the sizeable difference in margins seen in Figure 2.

FIGURE 2: DISTRIBUTION OF NET MEDICARE MARGINS BY OWNERSHIP STATUS, 2015-2017.



Source: Milliman analysis of the HCRIS cost reports and the Medicare 100% LDS. The histogram shows net Medicare margins between the 1st and 99th percentiles.

We found correlations between many of the variables tested. For example, because of the path of their disease and treatment, cancer patients tend to have shorter lengths of stay than patients with other conditions and also have lower live discharge rates. In the statistical analysis, this appears as follows: the median length of stay for a hospice is negatively correlated with the percent of the hospice’s patients with cancer as the diagnosis category, and the percent of patients with cancer is negatively correlated with the live discharge rate. As shown in Table 21 the live-discharge rate had a strong positive correlation with net Medicare margins before considering other variables. However, when other patient and hospice characteristics were added to the model, the coefficient on the live-discharge rate switched from positive to negative. This implies that the hospice live-discharge rate interacts with these other variables, and that a negative association between live-discharge rate and Medicare margins is seen only when controlling for these other variables. The regression analysis by itself also does not reveal which variables hospice management might influence that could be causing the observed differences between for-profit and non-profit hospices—and the resulting differences in Medicare margin.

TABLE 21: DEVELOPMENT OF THE PARAMETER FOR 'PERCENT OF LIVE DISCHARGES' IN THE REGRESSION MODEL.

VARIABLE	REGRESSION 1: NO CONTROLS		REGRESSION 2: ADDED PATIENT/STAY CHARACTERISTICS		REGRESSION 3: ADDED HOSPICE TYPE AND OWNERSHIP STATUS CHARACTERISTICS	
	PARAMETER ESTIMATE†	STANDARD ERROR	PARAMETER ESTIMATE†	STANDARD ERROR	PARAMETER ESTIMATE†	STANDARD ERROR
Intercept	0.02128***	0.00533	0.05553***	0.01635	0.04192***	0.01660
% of Patients Discharged Alive	0.10117***	0.01830	0.01485	0.02177	-0.12932***	0.02186
% of Patients with Cancer Diagnosis Category			-0.42383***	0.03379	-0.19712***	0.03350
% of Live Discharges with IP Admissions within 7 Days			0.36415***	0.03138	0.20436***	0.03072
% of Patients at Assisted Living Facility			0.21098***	0.02285	0.12971***	0.02217
% of Patients at Nursing Facility			0.16589***	0.01706	0.14001***	0.01651
Hospital-Based					-0.24553***	0.01146
HHA-based					-0.06794***	0.00973
SNF-based					-0.04192	0.04223
For-Profit Status					0.07953***	0.00807
Governmental Status					0.00199	0.01685

† (P<0.05), ** (P<0.01), *** (P<0.001)

Source: Milliman analysis of the HCRIS cost reports and the Medicare 100% LDS.

CONCLUSION

Our analysis supports many of the differences between for-profit and nonprofit hospices observed by other research:

- **Length of stay:** MedPAC's March 2019 report to Congress shows longer average and median lengths of stay for for-profit hospices versus nonprofit hospices that are comparable to our results. Their estimates for median and average length of stay in 2017 were 23 and 109 days, respectively, for for-profits, and 13 and 67 days for nonprofits.³ Additionally, a 2011 study by Wachterman, et al. on a hospice population from 2007 estimated median length of stay for for-profit and nonprofit hospices as 20 and 16 days, respectively. The Wachterman study also found significantly longer median lengths of stay for dementia patients in for-profit hospices (26 days) compared to nonprofit hospices (43 days), similar to our 2017 findings.¹³
- **Diagnosis category:** The 2011 study by Wachterman, et al., found significantly lower proportions of cancer patients (34.1% vs. 48.4%) and higher proportions of dementia patients (17.2% vs. 8.4%) in for-profit versus nonprofit hospices for 2007.¹³
- **Live-discharge rates:** The 2016 Prsic, et al. study found higher rates of live discharges for for-profit hospices (22.7%) than nonprofit hospices (16.3%) in the first half of 2012 after adjusting for age, gender, race, and hospice primary diagnosis.¹⁴ These results are similar to our unadjusted findings.
- **Costs and margins:** MedPAC's 2019 March report to Congress found average total costs per day for for-profit and nonprofit hospices in 2016 of \$133 and \$175 per day, respectively, quite close to our findings.³ Furthermore, MedPAC observed a 16.8% profit margin for for-profit hospices and a 2.7% Medicare margin for nonprofit hospices in 2016,³ comparable to our results.

CMS implemented hospice payment changes in 2016 to move away from a flat per diem payment structure for RHC to one that is higher at the beginning and end of a hospice episode and lower in the intervening period. The goal of this change was to better align payment with the pattern of costs throughout an episode. Despite this, through the second year of implementation (2017) as shown in Table 19 we observed only a small reduction in variation in margins across providers with different characteristics. Additional hospice payment system refinements could be implemented in order to further reduce the large variation in margins across hospice providers.

We also found significant differences in care of hospice patients before and after a hospice stay, differences that have not previously been identified. In 2017, 32% of the nonprofit hospice patients in our analysis had inpatient stays within the week prior to the hospice stay, compared to 22% of for-profit patients. These recent hospital stays are consistent with nonprofit hospices enrolling higher acuity patients at the initiation of hospice care, who are likely to have high costs in the beginning of their hospice stay. In addition to for-profit hospices having nearly twice the live discharge rate of nonprofit hospices, the patients discharged alive from for-profit hospices incurred an average of 40% higher daily Part A costs in the week after discharge from hospice care than the patients discharged alive from nonprofit hospices. Further analysis could be performed to identify the components of these post-discharge costs, as well as to explore whether high post-discharge costs could be incorporated into the Medicare hospice payment system in order to incentivize high quality and efficient care. While hospices are responsible for providing (directly or under arrangement) all care for the palliation and management of the terminal (and related) condition to enrolled patients, after a patient is discharged from hospice, the hospice is not financially or otherwise responsible for providing care, even that which is related to the terminal condition. The hospice has no financial incentive to consider post-discharge spending when enrolling patients or managing their care during the hospice stay.

An example of using post-discharge payment incentives to encourage improved quality of care at a lower cost is the Hospital Readmission Reduction Program (HRRP), established by the ACA in 2012.²³ Under this program, hospitals are financially penalized if they have higher than expected risk-standardized 30-day covered condition readmission rates. Readmissions within 30 days of hospital discharge are associated with unfavorable patient outcomes and high costs that are potentially avoidable. MedPAC found that the HRRP led to fewer admissions with no adverse impact on mortality, and the decline in readmissions across all conditions resulted in net savings to the Medicare program of roughly \$2 billion per year.³ Given the high rate of live discharge of hospice patients (about 1 in 6) and our finding of the variable utilization of Part A spending in the post-discharge period, policies that hold hospices accountable for high intensity post-discharge care could be considered to both improve care for beneficiaries and reduce cost to the Medicare program.

Finally, given the high variation in practice patterns across hospices and findings that suggest some types of hospices are more likely to focus on patients expected to have long stays and high profitability, targeted auditing by CMS could help to improve program integrity and reduce margin variation. Seven years after CMS began requiring a face-to-face encounter to determine continued hospice eligibility prior to the 180-day recertification and each subsequent recertification, hospice length of stay continues to increase, suggesting that additional targeted scrutiny of hospices' application of eligibility criteria may be warranted.²³ For example, the ACA requires medical review of individual hospice cases that received more than 180 days of care from a hospice program for which the number of such cases for the program comprises a substantial percentage.²³ Moreover, MedPAC has suggested CMS apply additional program integrity scrutiny to those hospice providers caring for patients who have very long hospice stays in assisted living facilities, above cap hospices with long stays and high live-discharge rates, and hospices that receive a high share of their payments for hospice patients before their last year of life.³ Such targeted auditing has the potential to complement future hospice payment policy changes to reduce the large variation in margins across hospice providers and discourage the focus of some hospices on those patients expected to be most profitable.

APPENDIX A: DATA SOURCES

MEDICARE 100% PART A LIMITED DATA SET

This Limited Data Set (LDS) contains all Medicare Part A FFS paid claims generated for all Medicare beneficiaries in the U.S. excluding professional claims (carrier file) and DME claims. Information includes diagnosis codes and procedure codes, along with site of service information as well as beneficiary age, gender, and eligibility status. The data is released on an annual basis. We used the Medicare 100% beneficiary data for 2013 to 2017.

CMS COST REPORTS

CMS cost reports for freestanding hospices, hospitals, home health agencies (HHAs), and skilled nursing facilities (SNFs) are available through the HCRIS.³⁸ The hospital, HHA, and SNF cost reports for locations with hospices break out hospice-specific data. We analyzed the cost reports for FY 2014 to FY 2017 with a reporting period of at least 360 days.

APPENDIX B: METHODOLOGY

GENERAL METHODOLOGY

We used the CY 2013 to 2017 Medicare 100% LDS files and the FY 2014 to 2017 CMS hospice cost reports for this analysis. CMS hospice cost reports are made available through the HCRIS,³⁸ and we used the cost reports available as of November 29th, 2018. Fiscal year referenced in this report is defined as the federal fiscal year of October 1 of one calendar year through September 30 of the next.

We gathered patient and service level data observed in the 2013 to 2017 Medicare 100% LDS by provider and linked the data to the 2014 to 2017 CMS cost reports via their hospice CCN. We then summarized cost report information and claims data based on key hospice characteristics including ownership status, hospice type (freestanding, hospital, home-health based, and skilled-nursing facility based), and rural/urban location. We excluded from the analysis cost reports that had a fiscal year period less than 360 days, and we only reported Medicare claims that were positive and associated with Part A coverage.

The unit of analysis was a single cost report representing a hospice. For non-freestanding hospices, one parent facility cost report could have multiple hospice CCNs. Cost reports do not include reliable variables identifying the parent organization or chain to which a hospice agency belongs. Therefore, we were unable to carry out analysis at the hospice chain level. Urban/rural hospices were distinguished by their Medicare Core-Based Statistical Area (CBSA) code reported on the CMS cost report. If the service area of the hospice included multiple CBSA codes, the overall urban/rural classification of the hospice was assigned based on the majority of the CBSA classifications reported. FY 2014 cost reports for freestanding hospices did not report CBSA codes, so we mapped the hospice zip code to a CBSA. A small number of hospice cost reports did not list service area codes and so could not be identified as rural/urban.

We performed the linear regression analysis of hospice and patient characteristics on Medicare margin on the SAS 9.4 platform. We organized a list of variables believed to be relevant to hospice profitability and performed an automated stepwise selection process for determine the optimal mix of variable inclusion for model fit. Only observations with net Medicare margins between the 1st and 99th percentiles of all net Medicare margins were included in the analysis to avoid the effects of outliers. Once the optimal model was obtained, higher order interaction and non-linear terms were added on a conceptual basis to more accurately capture the relationship between certain key metrics and profitability. All p-values were evaluated at the 5%, 1%, and 0.10% level.

FIELD DEFINITIONS

Hospice Identification

FY 2014 to FY 2017 freestanding hospice cost reports and the hospice portions of hospital, SNF, and HHA cost reports with a listed hospice CCN were considered to be a hospice for this analysis. This analysis was limited to cost reports spanning at least 360 days.

Cost Report Fields

See Table C-5 in Appendix C for a full list of the cost report fields used in the analysis.

Patient-Stay Identification

Any Part-A covered hospice stay in the Medicare 100% LDS claim file which mapped to a cost report based on CCN and time period was considered a valid patient-stay for this analysis.

Recent Inpatient Stay

A beneficiary was identified as having an inpatient stay within 7 days of hospice admission if they had an inpatient discharge within 7 days prior to the hospice stay in the Medicare 100% LDS files.

Hospice Services

Hospice services were categorized by the revenue center codes listed in the Medicare 100% LDS hospice revenue file as shown in Table C-1 of Appendix C. The four major levels of care are identified in italics.

Beneficiary Main Location of Care

A beneficiary's main location of care is the location where the beneficiary spent the largest share of RHC days enrolled in hospice during 2013 to 2017. The location of each RHC day was determined by the HCPCS Q-codes found in the Medicare 100% LDS hospice files, as shown in Table C-2 of Appendix C.

Hospice Inpatient Unit

If a majority of GIP days at a given hospice has place of service code Q5006 (inpatient hospice facility), then the hospice was considered to have its own inpatient unit.

Discharge Status

Discharge status on each claim was determined from the patient discharge status found on the Medicare 100% LDS claims file, as well as the corresponding condition codes found on the Medicare 100% LDS condition code file and occurrence codes found on the Medicare 100% LDS occurrence code file as shown in Table C-3 of Appendix C.

Hospice claims are reported on a monthly basis; if a patient is still at the same facility at the end of the month, they are reported with discharge status 30. We considered the start and end date of a hospice stay, within each claim, to be the earliest revenue center date on each claim and the through date listed on the claim. Claims with discharge status 30 were aggregated with any later claims from the same provider until a different discharge status is hit, in order to account for hospice stays which span multiple months.

Beneficiary Diagnosis Category

Beneficiaries were categorized by disease category based on the primary diagnosis found on the Medicare 100% LDS hospice claims file for the beneficiary's last hospice claim in 2013 to 2017. Diagnosis codes were categorized according to the mapping in table C-4 of Appendix C.

Beneficiary Prior Coverage Status

A beneficiary will be considered to be a prior MA patient if they have any MA coverage in the 2 months prior to their initial hospice stay within 2013 to 2017. Patients with no MA coverage or no coverage at all in the 2 months prior to their initial hospice stay will be considered non-prior MA patients.

Beneficiary Dual Eligibility

A beneficiary was considered dual-eligible if the patient had at least 1 month of state buy-in during a hospice stay.

Post-Discharge Costs

Post discharge costs were the costs occurring after hospice discharge, but before any additional hospice stay, for claims in the Medicare 100% LDS inpatient, outpatient, skilled nursing facility, and home health agency files.

MEDICARE MARGIN CALCULATION

We calculated the hospice Medicare margins associated with a cost report using the following approach:

1. **Estimate overpayments within cap years:** CMS sets 2 caps on Medicare revenue for hospice services.¹ The first cap limited the amount of inpatient care a beneficiary can receive to 20% of their total hospice patient-days.^{1,39} We found a very low proportion of inpatient days overall, and so did not use this first cap in our analyses. The second cap is an absolute dollar limit, termed the aggregate cap, on the average annual payment per beneficiary that a hospice can receive.^{1,29} This cap requires hospices to reimburse Medicare if mean per capita Medicare spending per cap-eligible beneficiary during the cap year exceeds this pre-determined amount.^{1,29} The cap year for FY 2014 to FY 2016 was November-October. The cap year in FY 2017 was October-September.
 - i. We gathered all Medicare payments to a hospice within a cap year.
 - ii. We used the proportional methodology to determine patient counts for the cap year. To determine the beneficiary fraction to be assigned to a cap year, we divided the number of days the beneficiary was in a given hospice in the cap year by the total number of hospice days for the beneficiary in any hospice at any point in CY 2013-CY 2017 from the Medicare 100% LDS. In practice, hospices performing the cap calculation would likely have more information on past hospice stays for a beneficiary and less information on future hospice stays and could end up with different beneficiary fractions. For FY 2014 margins, we needed overpayment information for cap years 2013 and 2014. Because the cap year for 2013 begins in 2012 and we did not use CY 2012 Medicare 100% LDS claims, we could not accurately calculate Medicare margins for FY 2014 as the proportional methodology for overpayments relies on beneficiary hospice claims from prior years. Each patient in each cap year is not counted as a full 'patient' if they were in hospice care during other cap years as well. This data limitation would affect the margin calculations after FY 2014 due to some very long hospice stays, but would not be as prevalent.
 - iii. We then determined if the hospice was over the cap and, if so, the corresponding overpayment for the cap year. We considered a hospice to be over the cap in a given cap year if their Medicare payments during that cap year, adjusted to remove the impact of sequestration, exceeded the cap amount times

the fractional patient count. The overpayment amount was the amount by which the cap was exceeded, reduced by 2% to account for sequestration. If the cap was not exceeded, there was no overpayment amount. This is consistent with CGS Administrators' Medicare methodology for calculating hospice overpayments (CGS is a Medicare Administrative Contractor).⁴⁰

2. Estimate overpayments within cost report reporting periods: Hospice cost report reporting periods do not always line up with the cap years, so we had to estimate a separate overpayment for the proper time period.
 - i. If a hospice reporting period overlapped two cap years, we prorated the overpayment amounts from those two cap years.
 - ii. As we did not have data for cap year 2018, for cost report periods that spanned cap years 2017 and 2018, we used the full 2017 overpayment.
3. Estimate Medicare margins, including and excluding overpayments: Medicare margins excluding overpayments are referred to as net Medicare margins. For the regression analysis we used net Medicare margins for individual hospices. For the descriptive analysis we used aggregate net Medicare margins for all hospices with specified characteristics.
 - i. We gathered all Medicare payments to a hospice within the cost report reporting period.
 - ii. Individual Medicare margins including overpayments were calculated as $[\text{Medicare payments} - \text{Medicare costs from cost reports}] / [\text{Medicare payments}]$.
 - iii. Individual Medicare margins excluding overpayments were calculated as $[(\text{Medicare payments} - \text{cost report year estimated overpayments}) - \text{Medicare costs from cost reports}] / [\text{Medicare payments} - \text{cost report year estimated overpayments}]$.
 - iv. For aggregate Medicare margins, we performed the above calculations using the sum of Medicare payments, estimated overpayments, and Medicare costs from cost reports for all hospices with specified characteristics.

APPENDIX C: CODE SETS

TABLE C-1. REVENUE CENTERS⁴¹

REVENUE CENTER CODE	DESCRIPTION	UNITS
0651	<i>Routine home care (RHC)</i>	Days of RHC on claim
0652, 0653, 0654	<i>Continuous home care (CHC)</i>	15 minute increments of CHC provided (1 line for each day)
0655	<i>Inpatient respite care (IRC)</i>	Days of IRC on claim
0656	<i>General inpatient care (GIP)</i>	Days of GIP on claim
0657	Physician services	N/A
0250	Non-injectable drugs	One line=one fill, NDCs reported. NDC qualifier represented the quantity of the drug filled and is reported as the unit measure
0636	Injectable drugs	One line=one fill, HCPCS reported. Units represent the amount filled
029X	Infusion pumps – equipment	One line=one pump order
0294	Infusion pumps – drugs	One line=one medication refill, HCPCS reported. Units represent the amount filled
042X	Physical therapy (when accompanied by HCPCS G0151)	15 minute increments
043X	Occupational therapy (when accompanied by HCPCS G0152)	15 minute increments
044X	Speech-language pathology (when accompanied by HCPCS G0153)	15 minute increments
055X	Skilling nursing (when accompanied by HCPCS G0154 ,G0299, or G0300)	15 minute increments
056X	Medical social services (when accompanied by HCPCS G0155)	15 minute increments
057X	Aide (when accompanied by HCPCS G0156)	15 minute increments

TABLE C-2. PLACE OF SERVICE⁴¹

HCPCS/CPT CODE	DESCRIPTION
Q5001	Home
Q5002	Assisted living facility
Q5003	Nursing facility (unskilled)
Q5004	Nursing facility (skilled)
Q5005	Inpatient hospital
Q5006	Inpatient hospice facility
Q5007	Long term care hospital
Q5008	Inpatient psychiatric facility
Q5009	Place not otherwise specified
Q5010	Hospice residential facility

TABLE C-3. DISCHARGE STATUS⁴¹

DISCHARGE STATUS	PATIENT DISCHARGE STATUS CODE AND CONDITION/OCCURRENCE CODE (IF APPLICABLE)
Discharge to home without cause and not due to patient unavailability	1 (no condition code)
Discharge to home with cause	1 with condition code H2
Discharge to home due to patient unavailability	1 with condition code 52
Discharge to home due to beneficiary revocation	1 with occurrence code 42
Still a patient	30
Died	40, 41, 42
Transferred to another hospice	50, 51 (no condition code)
Transferred to another hospice because patient moved out of service area	50, 51 with condition code 52

TABLE C-4. DIAGNOSIS CATEGORIES

DIAGNOSIS CATEGORY	ICD-9-CM DIAGNOSIS CODE RANGE ¹	ICD-10-CM DIAGNOSIS CODE RANGE ¹
Cancer	140-239	C00-D49
Heart/circulatory system (other than brain)	390-429, 440-459	I00-I59, I70-I99
Cerebrovascular disease	430-439	I60-I69
Respiratory system	460-519	J00-J99
Degenerative diseases of nervous system (Dementia)	331, 290, 294, 797	G30-G32
Other diseases of nervous system	320-330, 332-389	G00-G29, G33-G99
Chronic kidney disease	585, 586	N18, N19, E112
Infection	001-139, 9959	A00-B99, R651, R652
Cirrhosis	571, 572	K740-K746, K760-K769, K700-K709, K729
Anorexia/malnutrition/dysphagia	262, 263, 783, 784, 7993, 7994, 7872X, 2699	E40-E46, R630, R633, R634, R636, R64, E639, R131
Acute kidney disease	578	K922
Gastrointestinal hemorrhage	584	N170-N179
Other	All other	All other

¹The values in the ICD diagnosis code range represent prefixes. Any code starting with a value in these ranges will be classified accordingly.

TABLE C-5. COST REPORT FIELD MAPPING

GENERAL ITEMS		
ITEM	HOSPICE TYPE	LOCATION ON COST REPORT
Ownership status	Freestanding (2014-)	Worksheet S1, row 7
	Freestanding (2015+)	Worksheet S1, row 19
	Hospital-based	Worksheet S2, row 21
	SNF-based	Worksheet S2, row 15
	HHA-based	Worksheet S2, row 8
Medicare margin		Calculated from hospice revenue and costs, with non-reimbursable costs excluded
Hospice costs (used to calculate Medicare margin)	Freestanding (2014-)	Worksheet D, row 4,5
	Freestanding (2015+)	Worksheet C, rows 5,10,15,20
	Hospital-based	Worksheet K6, row 5 (Oct 2015-); Worksheet O8 row 5,10,15,20
	SNF-based	Worksheet K6, row 5 (Oct 2015-); Worksheet O8 row 5,10,15,20
	HHA-based	Worksheet K6, row 5 (Oct 2015-); Worksheet O8 row 5,10,15,20
Non-reimbursable hospice costs	Freestanding (2014-)	Worksheet A
	Freestanding (2015+)	Worksheet A
	Hospital-based	Worksheet K (Oct 2015-); Worksheet O
	SNF-based	Worksheet K (Oct 2015-); Worksheet O
	HHA-based	Worksheet K (Oct 2015-); Worksheet O
Location (state)		Provider location mapped from CCN
Rural vs urban (Zip)	Freestanding (2014-)	Mapped from zip code Worksheet S-1, row 1
	Freestanding (2015+)	Mapped from zip code Worksheet S-1, row 3
	Hospital-based	Mapped from zip code Worksheet S-2, row 2
	SNF-based	Mapped from zip code Worksheet S-2, row 2
	HHA-based	Mapped from zip code Worksheet S-2, row 1.01
Rural vs urban (CBSA)	Freestanding (2014-)	Not Available
	Freestanding (2015+)	Worksheet S1, rows 21
	Hospital-based	Worksheet S2, rows 14
	SNF-based	Worksheet S4, rows 22
	HHA-based	Worksheet S3, rows 29
Mix of hospice services (RHC, GIP, CHC, IRC days)	Freestanding (2014-)	Worksheet S1, rows 8-12
	Freestanding (2015+)	Worksheet S1, rows 30-34
	Hospital-based	Worksheet S9, rows 1-5, 10-14
	SNF-based	Worksheet S8, rows 1-5, 10-14
	HHA-based	Worksheet S5, rows 1-5, 10-14
CCN	Freestanding (2014-)	Worksheet S1, rows 5
	Freestanding (2015+)	Worksheet S1, rows 6
	Hospital-based	Worksheet S2, rows 14
	SNF-based	Worksheet S2, rows 12
	HHA-based	Worksheet S2, rows 3.5
DETAILED REIMBURSABLE COST ITEMS		
ITEM	HOSPICE TYPE	LOCATION ON COST REPORT
Volunteer service coordination	Freestanding (2014-)	Worksheet A, row 5
	Freestanding (2015+)	Worksheet A, row 13
	Hospital-based	Worksheet K, row 5 (Oct15-); Worksheet O, row 13
	SNF-based	Worksheet K, row 5 (Oct15-); Worksheet O, row 13
	HHA-based	Worksheet K, row 5 (Oct15-); Worksheet O, row 13
ITEM	HOSPICE TYPE	LOCATION ON COST REPORT
General service costs	Freestanding (2014-)	Worksheet A, row 1-6
	Freestanding (2015+)	Worksheet A, row 1-17

	Hospital-based	Worksheet K, row 1-6 (Oct15-); Worksheet O, row 1-17
	SNF-based	Worksheet K, row 1-6 (Oct15-); Worksheet O, row 1-17
	HHA-based	Worksheet K, row 1-6 (Oct15-); Worksheet O, row 1-17
Inpatient care-contracted	Freestanding (2014-)	Worksheet A, row 10-11
	Freestanding (2015+)	Worksheet A, row 25
	Hospital-based	Worksheet K, row 7-8 (Oct15-); Worksheet O, row 25
	SNF-based	Worksheet K, row 7-8 (Oct15-); Worksheet O, row 25
	HHA-based	Worksheet K, row 7-8 (Oct15-); Worksheet O, row 25
Nursing care	Freestanding (2014-)	Worksheet A, row 16-16.2
	Freestanding (2015+)	Worksheet A, row 27-29
	Hospital-based	Worksheet K, row 10-11 (Oct15-); Worksheet O, row 27-29
	SNF-based	Worksheet K, row 10-11 (Oct15-); Worksheet O, row 27-29
	HHA-based	Worksheet K, row 10-10.2(Oct15-); Worksheet O, row 27-29
Physical therapy	Freestanding (2014-)	Worksheet A, row 17
	Freestanding (2015+)	Worksheet A, row 30
	Hospital-based	Worksheet K, row 12 (Oct15-); Worksheet O, row 30
	SNF-based	Worksheet K, row 12 (Oct15-); Worksheet O, row 30
	HHA-based	Worksheet K, row 11 (Oct15-); Worksheet O, row 30
Occupational therapy	Freestanding (2014-)	Worksheet A, row 18
	Freestanding (2015+)	Worksheet A, row 31
	Hospital-based	Worksheet K, row 13 (Oct15-); Worksheet O, row 31
	SNF-based	Worksheet K, row 13 (Oct15-); Worksheet O, row 31
	HHA-based	Worksheet K, row 12 (Oct15-); Worksheet O, row 31
Speech-language pathology	Freestanding (2014-)	Worksheet A, row 19
	Freestanding (2015+)	Worksheet A, row 32
	Hospital-based	Worksheet K, row 14 (Oct15-); Worksheet O, row 32
	SNF-based	Worksheet K, row 14 (Oct15-); Worksheet O, row 32
	HHA-based	Worksheet K, row 13 (Oct15-); Worksheet O, row 32
Medical social services	Freestanding (2014-)	Worksheet A, row 20
	Freestanding (2015+)	Worksheet A, row 33
	Hospital-based	Worksheet K, row 15 (Oct15-); Worksheet O, row 33
	SNF-based	Worksheet K, row 15 (Oct15-); Worksheet O, row 33
	HHA-based	Worksheet K, row 14 (Oct15-); Worksheet O, row 33
Spiritual counseling	Freestanding (2014-)	Worksheet A, row 21
	Freestanding (2015+)	Worksheet A, row 34
	Hospital-based	Worksheet K, row 16 (Oct15-); Worksheet O, row 34
	SNF-based	Worksheet K, row 16 (Oct15-); Worksheet O, row 34
	HHA-based	Worksheet K, row 15 (Oct15-); Worksheet O, row 34
Dietary counseling	Freestanding (2014-)	Worksheet A, row 22
	Freestanding (2015+)	Worksheet A, row 35
	Hospital-based	Worksheet K, row 17 (Oct15-); Worksheet O, row 35
	SNF-based	Worksheet K, row 17 (Oct15-); Worksheet O, row 35
	HHA-based	Worksheet K, row 16 (Oct15-); Worksheet O, row 35
Counseling - other	Freestanding (2014-)	Worksheet A, row 23
	Freestanding (2015+)	Worksheet A, row 36
	Hospital-based	Worksheet K, row 18 (Oct15-); Worksheet O, row 36
	SNF-based	Worksheet K, row 18 (Oct15-); Worksheet O, row 36
	HHA-based	Worksheet K, row 17 (Oct15-); Worksheet O, row 36
ITEM	HOSPICE TYPE	LOCATION ON COST REPORT
Palliative radiation therapy	Freestanding (2014-)	Worksheet A, row 37
	Freestanding (2015+)	Worksheet A, row 44
	Hospital-based	Worksheet K, row 32 (Oct15-); Worksheet O, row 44
	SNF-based	Worksheet K, row 32 (Oct15-); Worksheet O, row 44
	HHA-based	Worksheet K, row 27 (Oct15-); Worksheet O, row 44

Palliative chemotherapy	Freestanding (2014-)	Worksheet A, row 38
	Freestanding (2015+)	Worksheet A, row 45
	Hospital-based	Worksheet K, row 33 (Oct15-); Worksheet O, row 45
	SNF-based	Worksheet K, row 33 (Oct15-); Worksheet O, row 45
	HHA-based	Worksheet K, row 28 (Oct15-); Worksheet O, row 45
Direct patient costs	Freestanding (2014-)	Worksheet A, row 10-39
	Freestanding (2015+)	Worksheet A, row 25-46
	Hospital-based	Worksheet K, row 7-34 (Oct15-); Worksheet O, row 25-46
	SNF-based	Worksheet K, row 7-34 (Oct15-); Worksheet O, row 25-46
	HHA-based	Worksheet K, row 7-29 (Oct15-); Worksheet O, row 25-46

DETAILED NON-REIMBURSABLE COST ITEMS

ITEM	HOSPICE TYPE	LOCATION ON COST REPORT
Bereavement program	Freestanding (2014-)	Worksheet B, row 50
	Freestanding (2015+)	Worksheet A, row 60
	Hospital-based	Worksheet K, row 35 (Oct15-); Worksheet O, row 60
	SNF-based	Worksheet K, row 35 (Oct15-); Worksheet O, row 60
	HHA-based	Worksheet K, row 35 (Oct15-); Worksheet O, row 60
Volunteer program	Freestanding (2014-)	Worksheet A, row 51
	Freestanding (2015+)	Worksheet A, row 61
	Hospital-based	Worksheet K, row 36 (Oct15-); Worksheet O, row 61
	SNF-based	Worksheet K, row 36 (Oct15-); Worksheet O, row 61
	HHA-based	Worksheet K, row 31 (Oct15-); Worksheet O, row 61
Fundraising	Freestanding (2014-)	Worksheet A, row 52
	Freestanding (2015+)	Worksheet A, row 62
	Hospital-based	Worksheet K, row 37 (Oct15-); Worksheet O, row 62
	SNF-based	Worksheet K, row 37 (Oct15-); Worksheet O, row 62
	HHA-based	Worksheet K, row 32 (Oct15-); Worksheet O, row 62
Hospice/palliative care fellows	Freestanding (2014-)	Not available on old form
	Freestanding (2015+)	Worksheet A, row 63
	Hospital-based	Worksheet O, row 63 (only post Oct 2015)
	SNF-based	Worksheet O, row 63 (only post Oct 2015)
	HHA-based	Worksheet O, row 63 (only post Oct 2015)
Palliative care program	Freestanding (2014-)	Not available on old form
	Freestanding (2015+)	Worksheet A, row 64
	Hospital-based	Worksheet O, row 64 (only post Oct 2015)
	SNF-based	Worksheet O, row 64 (only post Oct 2015)
	HHA-based	Worksheet O, row 64 (only post Oct 2015)
Other physician services	Freestanding (2014-)	Not available on old form
	Freestanding (2015+)	Worksheet A, row 65
	Hospital-based	Worksheet O, row 65 (only post Oct 2015)
	SNF-based	Worksheet O, row 65 (only post Oct 2015)
	HHA-based	Worksheet O, row 65 (only post Oct 2015)

ITEM	HOSPICE TYPE	LOCATION ON COST REPORT
Residential care	Freestanding (2014-)	Not available on old form
	Freestanding (2015+)	Worksheet A, row 66
	Hospital-based	Worksheet O, row 66 (only post Oct 2015)
	SNF-based	Worksheet O, row 66 (only post Oct 2015)
	HHA-based	Worksheet O, row 66 (only post Oct 2015)
Advertising	Freestanding (2014-)	Not available on old form
	Freestanding (2015+)	Worksheet A, row 67
	Hospital-based	Worksheet O, row 67 (only post Oct 2015)

	SNF-based	Worksheet O, row 67 (only post Oct 2015)
	HHA-based	Worksheet O, row 67 (only post Oct 2015)
Telehealth/telemonitoring	Freestanding (2014-)	Not available on old form
	Freestanding (2015+)	Worksheet A, row 68
	Hospital-based	Worksheet O, row 68 (only post Oct 2015)
	SNF-based	Worksheet O, row 68 (only post Oct 2015)
	HHA-based	Worksheet O, row 68 (only post Oct 2015)
Thrift store	Freestanding (2014-)	Not available on old form
	Freestanding (2015+)	Worksheet A, row 69
	Hospital-based	Worksheet O, row 69 (only post Oct 2015)
	SNF-based	Worksheet O, row 69 (only post Oct 2015)
	HHA-based	Worksheet O, row 69 (only post Oct 2015)
Nursing facility room & board	Freestanding (2014-)	Not available on old form
	Freestanding (2015+)	Worksheet A, row 70
	Hospital-based	Worksheet O, row 70 (only post Oct 2015)
	SNF-based	Worksheet O, row 70 (only post Oct 2015)
	HHA-based	Worksheet O, row 70 (only post Oct 2015)
Other non-reimbursable	Freestanding (2014-)	Worksheet A, row 53
	Freestanding (2015+)	Worksheet A, row 71
	Hospital-based	Worksheet K, row 38 (Oct15-); Worksheet O, row 71
	SNF-based	Worksheet K, row 38 (Oct15-); Worksheet O, row 71
	HHA-based	Worksheet K, row 33 (Oct15-); Worksheet O, row 71
Non-reimbursable costs	Freestanding (2014-)	Worksheet A, row 50-53
	Freestanding (2015+)	Worksheet A, row 60-71
	Hospital-based	Worksheet K, row 35-38 (Oct15-); Worksheet O, row 60-71
	SNF-based	Worksheet K, row 35-38 (Oct15-); Worksheet O, row 60-71
	HHA-based	Worksheet K, row 30-33 (Oct15-); Worksheet O, row 60-71

APPENDIX D: SUPPLEMENTAL DATA

D-1. DIAGNOSIS CATEGORY GROUPINGS USED FOR REGRESSION

GROUPING FOR REGRESSION	DIAGNOSIS CATEGORIES INCLUDED IN GROUPING ¹
Cancer	Cancer
Nervous system disorders	Degenerative diseases of nervous system (Dementia) Other diseases of nervous system
Chronic conditions	Heart/Circulatory System (other than brain) Cerebrovascular Disease Respiratory System Chronic kidney disease Cirrhosis
Acute conditions	Anorexia/Malnutrition/Dysphagia Acute kidney disease Gastrointestinal Hemorrhage Infection Other

¹See Table C-4 for definitions of the diagnosis categories.

D-2. VARIABLES CONSIDERED IN STEPWISE SELECTION FOR REGRESSION

VARIABLES INCLUDED IN THE FINAL MODEL ARE BOLDED

VARIABLE

Hospital-based

Rural

HHA-based

SNF-based

For-profit status

Governmental status

Percent of patients with dual eligibility

Percent of patients with main location of care at an assisted living facility

Percent of patients with main location of care at a nursing facility

Percent of patients with cancer as diagnosis category

Percent of patients with nervous system conditions diagnosis category

Live discharge percent

Median length of stay

Percent of stays over 365 days

Percent of live discharges with IP admissions within 7 days

Percent of stays with IP admissions within 7 days before hospice admission

Nursing visits per patient day

VARIABLE

Social worker visits per patient day

Therapy visits per patient day

Ownership of an inpatient unit

D-3: ADDED INTERACTION AND NON-LINEAR TERMS FOR REGRESSION

VARIABLE

For-profit*Hospital-based

For-profit*Percent of patients with main location of care at an assisted living facility

For-profit*Median length of stay

For-profit*% of patients with LOS over 365 days

For-profit*Percent of live discharges with IP admissions within 7 days

For-profit*Average number of nursing visits per day

Governmental*Percent of patients with main location of care at an assisted living facility

Governmental*Median length of stay

Governmental*% of Patients with LOS over 365 days

Governmental*Percent of live discharges with IP admissions within 7 days

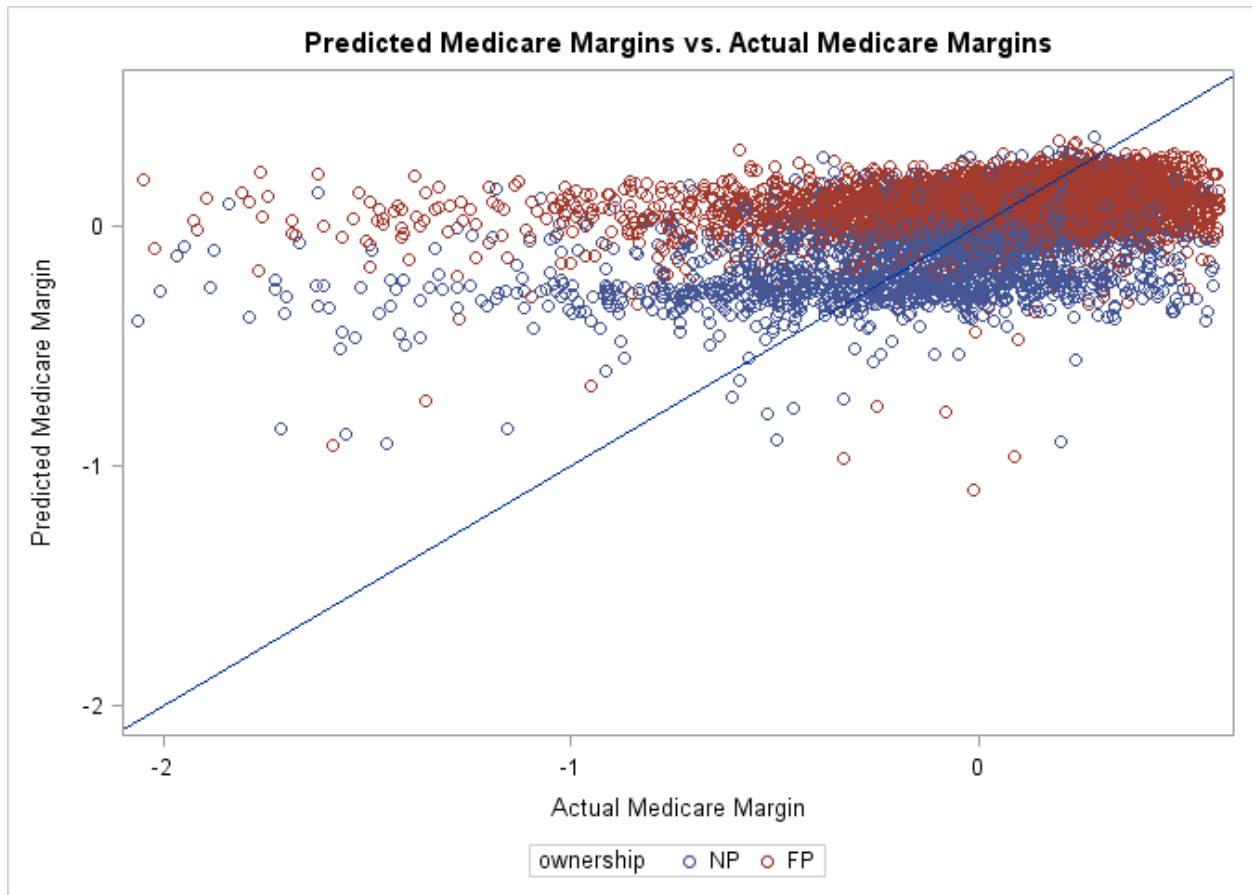
Governmental*Average number of nursing visits per day

(Percent of stays over 365 days) squared

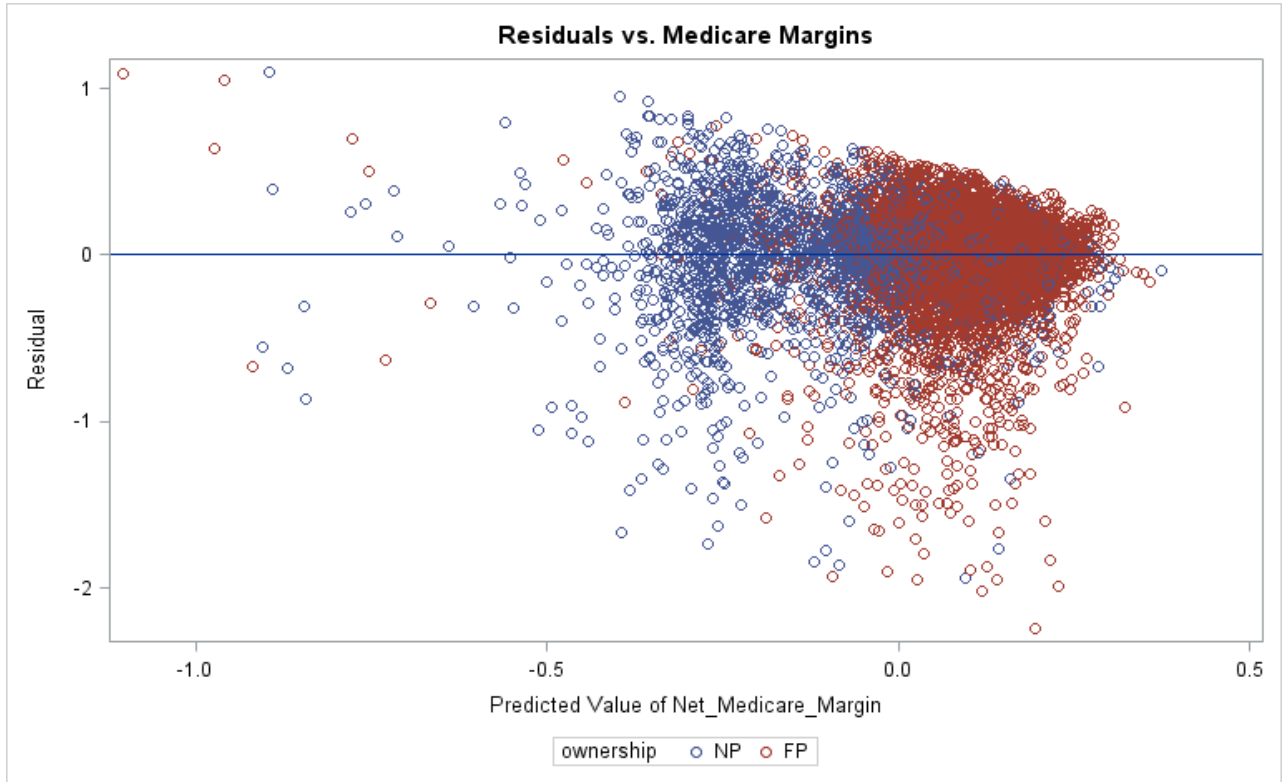
(Percent of patients with main location of care at an assisted living facility) squared

(Percent of patients with main location of care at a nursing facility) squared

D-4: PREDICTED VS. CALCULATED NET MEDICARE MARGINS FROM REGRESSION MODEL



D-5: RESIDUAL PLOT FROM REGRESSION MODEL



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