

Association of Hospice Agency Profit Status With Patient Diagnosis, Location of Care, and Length of Stay

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DURING THE PAST 10 YEARS, the for-profit hospice sector has increased substantially.¹ From 2000 to 2007, the number of for-profit hospices more than doubled from 725 to 1660, while the number of nonprofit hospices remained essentially the same—1193 in 2000 and 1205 in 2007.² Overall, for-profit hospices have significantly higher profit margins than nonprofit hospices, varying from 12% to 16% between 2001 and 2004, compared with -2.9% and -4.4% for nonprofit hospices.² This rapid increase in the for-profit hospice sector and the differential profit margins have raised questions about potential financial incentives in hospice reimbursement.

Medicare payment policy is a key determinant of hospice reimbursement. Medicare beneficiaries compose 84% of patients in hospice,³ and about 40% of Medicare decedents use hospice annually.² Medicare reimburses hospices a per diem rate (\$142.91/d in 2010) for routine care, which can be provided at home or in a nursing home.³ This capitated rate is fixed regardless of the care needs of individual patients or the services that they receive and may create a financial incentive to select patients requiring less resource-intensive services. Moreover, longer hospice stays are thought to be more profitable than

Context Medicare's per diem payment structure may create financial incentives to select patients who require less resource-intensive care and have longer hospice stays. For-profit and nonprofit hospices may respond differently to financial incentives.

Objective To compare patient diagnosis and location of care between for-profit and nonprofit hospices and examine whether number of visits per day and length of stay vary by diagnosis and profit status.

Design, Setting, and Patients Cross-sectional study using data from the 2007 National Home and Hospice Care Survey. Nationally representative sample of 4705 patients discharged from hospice.

Main Outcome Measures Diagnosis and location of care (home, nursing home, hospital, residential hospice, or other) by hospice profit status. Hospice length of stay and number of visits per day by various hospice personnel.

Results For-profit hospices (1087 discharges from 145 agencies), compared with nonprofit hospices (3618 discharges from 524 agencies), had a lower proportion of patients with cancer (34.1%; 95% CI, 29.9%-38.6%, vs 48.4%; 95% CI, 45.0%-51.8%) and a higher proportion of patients with dementia (17.2%; 95% CI, 14.1%-20.8%, vs 8.4%; 95% CI, 6.6%-10.6%) and other noncancer diagnoses (48.7%; 95% CI, 43.2%-54.1%, vs 43.2%; 95% CI, 40.0%-46.5%; adjusted $P < .001$). After adjustment for demographic, clinical, and agency characteristics, there was no significant difference in location of care by profit status. For-profit hospices compared with nonprofit hospices had a significantly longer length of stay (median, 20 days; interquartile range [IQR], 6-88, vs 16 days; IQR, 5-52 days; adjusted $P = .01$) and were more likely to have patients with stays longer than 365 days (6.9%; 95% CI, 5.0%-9.4%, vs 2.8%; 95% CI, 2.0%-4.0%) and less likely to have patients with stays of less than 7 days (28.1%; 95% CI, 23.9%-32.7%, vs 34.3%; 95% CI, 31.3%-37.3%; $P = .005$). Compared with cancer patients, those with dementia or other diagnoses had fewer visits per day from nurses (0.50 visits; IQR, 0.32-0.87, vs 0.37 visits; IQR, 0.20-0.78, and 0.41 visits; IQR, 0.26-0.79, respectively; adjusted $P = .002$) and social workers (0.15 visits; IQR, 0.07-0.31, vs 0.11 visits; IQR, 0.04-0.27, and 0.14 visits; IQR, 0.07-0.31, respectively; adjusted $P < .001$).

Conclusion Compared with nonprofit hospice agencies, for-profit hospice agencies had a higher percentage of patients with diagnoses associated with lower-skilled needs and longer lengths of stay.

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shorter stays,^{2,4} and emerging evidence suggests that hospice costs tend to be U-shaped with considerable fixed costs at the time of enrollment and again near death.⁵⁻⁸ Thus, hospices can reduce their average daily costs by attracting patients with longer lengths of

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stay (LOS).^{7,9} Some data suggest that for-profit hospices are less likely to admit patients with shorter expected LOS,¹⁰ while other data suggest no difference in mean LOS between for-profit and nonprofit hospices.¹¹ The Balanced Budget Act of 1997 relaxed the previous 210-day cap on Medicare hospice coverage, allowing for an unlimited number of 60-day periods, provided patients are recertified (ie, deemed to have 6 months or less to live if their disease runs its normal course).² This policy change allowed for longer reimbursable stays in hospice and may have contributed to the rise of for-profit hospices.

In this context, we compared patient diagnosis and location of care between for-profit and nonprofit hospices and examined whether LOS and the number of visits per day by hospice personnel vary by diagnoses and by profit status.

METHODS

We examined a nationally representative sample of patients discharged from hospice, primarily due to death (84%), using the 2007 National Home and Hospice Care Survey (NHHCS).¹² The 2007 NHHCS used a stratified 2-stage sampling design. A representative sample of US home health and hospice care agencies was selected after being stratified by agency type and metropolitan statistical area. From more than 15 000 agencies, 1545 agencies were randomly sampled from the strata with probability proportional to size. Overall, 1461 selected agencies were eligible (95%), and 1036 agreed to participate (unweighted, 71%; weighted, 59%).¹³

A computer algorithm randomly selected up to 10 current patients per home health agency, up to 10 hospice discharges per hospice agency, or a combination of up to 10 current home health patients and hospice discharges for a mixed agency. Hospice discharges during the 3-month period before the agency interview were eligible. Our study focused solely on the sample of 4733 patients discharged

from hospice. We excluded 28 discharges with any missing data on our main factors of interest (LOS, diagnosis, and location of care). Our final sample consisted of 4705 hospice discharges.

Data were collected through in-person interviews with the hospice staff member who knew each sampled patient best; questions were answered in consultation with the patient's medical record or other records. No patients or family members were interviewed. This study was deemed exempt by the Beth Israel Deaconess Medical Center institutional review board because we used publicly available deidentified data.

Hospice profit status was obtained from the agencies' administrators. The agency was considered for-profit if it was owned by an individual, partnership, or corporation and nonprofit if owned by a nonprofit organization, religious group, or government agency.

Patient Characteristics

We classified patients' primary admission diagnoses into the following 3 groups using codes from the *International Classification of Diseases, Ninth Revision, Clinical Modification*: cancer (140-239), dementia (290.0, 290.42, 294.8, 294.9, 331.0, 331.11, 331.4, 331.82, and 331.9), and other (all remaining codes, such as congestive heart failure). We categorized location of care as home, nursing home, hospital, residential hospice, or other. Length of stay was measured from date of hospice enrollment until discharge or death, whichever came first. We also assessed LOS in categories of less than 7 days, 7 to 30 days, 31 to 180 days, 181 to 364 days, and 365 days or longer. We measured number of visits per day by each of the following hospice personnel: nurses, social workers, and home health aides. We computed each measure by dividing the total number of visits by the patient's LOS.

We used the following demographic characteristics as covariates: age at hospice entry (<50 y, 50-64 y, 65-74 y, 75-84 y, 85-89 y, ≥90 y), sex,

race/ethnicity (non-Hispanic white, non-Hispanic black, Hispanic, other), marital status (married/partnered, not married), primary payment source (Medicare, Medicaid, private, other), and presence of a primary caregiver (yes/no). The NHHCS collected race/ethnicity data using predetermined categories through interviews with the hospice staff members who knew the participants.

The available clinical characteristics other than diagnosis included the number of activities of daily living needing assistance (eating, bathing, dressing, toileting, transferring: categorized as 0, 1-3, 4, or all 5) and mobility impairment (required no assistance, required assistance with walking, and did not walk). Data were only available for 2 agency characteristics other than profit status: whether the hospice agency was part of a chain (yes/no) and metropolitan statistical area, defined by the US Census as metropolitan (at least 1 urban area with a population ≥50 000), micropolitan (an area with a population of 10 000-49 999), or "neither," eg, rural (did not meet criteria for metropolitan or micropolitan).

Statistical Analyses

All analyses were performed using SAS-callable SUDAAN version 10 (RTI International, Research Triangle Park, North Carolina) to account for the complex sampling design. Data were weighted to reflect national estimates of hospice discharges. We report weighted percentages with corresponding 95% confidence intervals (CIs). Statistical tests were 2-sided.

We used Pearson χ^2 tests and *t* tests to examine the association between profit status and patient and agency characteristics, hospice LOS, and number of visits per day. We used log transformation for our outcomes of LOS and number of visits per day to approximate normal distributions and fit unadjusted linear regression models to examine the association between profit status and each outcome. For patients with no visits of a particular

type, we imputed a visit rate of 0.5 divided by the patient's LOS to avoid taking the logarithm of zero. We then repeated these analyses stratifying by diagnosis to assess differences by profit status within each diagnosis group. We further assessed whether

number of visits per day varied by categories of LOS.

We used logistic regression to determine whether diagnosis and location of care were independent correlates of having been in a for-profit vs non-profit hospice after adjusting for demo-

graphic, clinical, and agency covariates. We used linear regression to examine the association between profit status and log(LOS) adjusted for all covariates, including diagnosis and location of care. We used linear regression models to examine differences in num-

Table 1. Characteristics of Hospice-Discharged Patients and Hospice Agencies by Hospice Profit Status^a

	All Patients (N = 4705)		Patients From For-Profit Hospices (n = 1087) ^b		Patients From Nonprofit Hospices (n = 3618) ^b		P Value
	No.	Weighted % (95% CI)	No.	Weighted % (95% CI)	No.	Weighted % (95% CI)	
Age, y							
<50	175	3.5 (2.7-4.5)	39	4.1 (2.5-6.6)	136	3.2 (2.4-4.4)	.20
50-64	638	13.6 (12.1-15.3)	147	12.1 (9.6-15.2)	491	14.3 (12.5-16.3)	
65-74	785	14.8 (13.0-16.7)	168	12.8 (9.7-16.9)	617	15.6 (13.6-17.8)	
75-84	1459	29.6 (27.3-32.0)	323	29.9 (25.6-34.6)	1136	29.4 (26.8-32.2)	
85-89	828	19.5 (17.7-21.6)	185	18.5 (15.3-22.2)	643	20.0 (17.8-22.4)	
≥90	820	19.0 (17.0-21.2)	225	22.6 (18.8-26.9)	595	17.5 (15.1-20.0)	
Female sex	2600	54.9 (52.1-57.6)	627	57.4 (52.7-62.0)	1973	53.8 (50.4-57.1)	.22
Race/ethnicity ^c							
Non-Hispanic white	4080	86.4 (83.8-88.7)	845	79.6 (73.5-84.6)	3235	89.4 (86.9-91.5)	.02
Non-Hispanic black	310	7.7 (6.0-9.9)	135	10.6 (7.0-15.8)	175	6.4 (4.7-8.7)	
Hispanic	147	4.2 (3.0-5.9)	55	7.5 (4.5-12.3)	92	2.7 (1.8-4.1)	
Other	79	1.7 (1.2-2.6)	25	2.2 (1.1-4.5)	54	1.5 (0.9-2.4)	
Marital status ^c							
Married/partnered	2045	45.3 (42.2-48.5)	419	40.1 (33.3-47.4)	1626	47.7 (44.4-51.0)	.06
Not married	2497	54.7 (51.5-57.8)	638	59.9 (52.6-66.7)	1859	52.3 (49.1-55.6)	
Primary payment source ^c							
Medicare	3816	82.6 (80.6-84.4)	875	82.0 (78.6-84.9)	2941	82.8 (80.3-85.1)	.36
Medicaid	190	4.0 (3.1-5.2)	52	5.7 (1.2-3.7)	138	3.4 (2.5-4.5)	
Private insurance	354	9.3 (7.9-11.0)	57	8.2 (6.0-11.2)	297	9.8 (8.0-11.9)	
Other	222	4.1 (3.1-5.4)	50	4.2 (2.5-7.0)	172	4.0 (2.9-5.5)	
Has a primary caregiver ^c							
Yes	4328	91.5 (89.3-93.2)	1027	93.8 (89.6-96.4)	3301	90.4 (87.8-92.5)	.10
No	365	8.5 (6.8-10.7)	59	6.2 (3.6-10.4)	306	9.6 (7.5-12.3)	
No. of ADLs needing assistance ^c							
0	441	9.4 (7.6-11.7)	83	6.7 (3.7-12.0)	358	10.6 (8.5-13.2)	.11
1-3	614	13.1 (11.1-15.4)	137	12.6 (9.0-17.5)	477	13.3 (11.0-15.9)	
4	1003	19.6 (17.1-22.4)	223	17.3 (13.1-22.6)	780	20.6 (17.6-23.9)	
5	2097	57.9 (54.2-61.5)	543	63.3 (55.9-70.2)	1554	55.5 (51.3-59.6)	
Mobility							
No assistance needed	721	15.1 (12.8-17.6)	134	11.6 (8.1-16.3)	587	16.7 (13.9-19.8)	.14
Needs assistance	1970	50.0 (45.7-54.4)	517	51.4 (42.2-60.4)	1453	49.4 (44.6-54.2)	
Not mobile	1431	34.9 (30.6-39.4)	332	37.0 (28.7-46.2)	1099	34.0 (29.1-39.2)	
Agency characteristics							
MSA							
Metropolitan	1722	87.3 (85.5-88.9)	479	91.0 (86.9-94.0)	1243	85.6 (83.1-87.8)	.11
Micropolitan	1749	9.1 (7.8-10.6)	352	6.6 (4.2-10.1)	1397	10.2 (8.4-12.3)	
Neither	1234	3.6 (2.9-4.5)	256	2.4 (1.2-4.7)	978	4.2 (3.3-5.3)	
Chain status							
Yes	894	26.8 (20.9-33.7)	587	74.0 (61.1-83.7)	307	5.9 (3.5-9.8)	<.001
No	3811	73.2 (66.4-79.1)	500	26.0 (16.3-38.9)	3311	94.2 (90.2-96.6)	

Abbreviations: ADLs, activities of daily living; CI, confidence interval; MSA, metropolitan statistical area.

^aNo. indicates sample size, and percentages are weighted to reflect national estimates. Columns may not add to 100% because of rounding.

^bDischarges were from 145 for-profit agencies and 524 nonprofit agencies.

^cData were unknown or missing for race/ethnicity (n=89), marital status (n=163), primary payment source (n=123), caregiver status (n=12), No. of ADLs needing assistance (n=550), and mobility needs (n=583).

Table 2. Diagnosis and Location of Care of Patients by Hospice Profit Status^a

Diagnosis ^c	All Patients (N = 4705)		Patients From For-Profit Hospices (n = 1087)		Patients From Nonprofit Hospices (n = 3618)		Adjusted OR of For-Profit Status (95% CI) ^b
	No.	Weighted % (95% CI)	No.	Weighted % (95% CI)	No.	Weighted % (95% CI)	
Cancer	2092	44.0 (41.2-46.9)	364	34.1 (29.9-38.6)	1728	48.4 (45.0-51.8)	1 [Reference]
Dementia	462	11.1 (9.4-13.1)	150	17.2 (14.1-20.8)	312	8.4 (6.6-10.6)	2.32 (1.44-3.72)
Other	2151	44.9 (42.1-47.7)	573	48.7 (43.2-54.1)	1578	43.2 (40.0-46.5)	1.62 (1.17-2.24)
Location of care ^d							
Home	2834	55.4 (52.1-58.7)	655	51.5 (44.6-58.3)	2179	57.1 (53.5-60.7)	1 [Reference]
Hospital	393	10.3 (7.8-13.4)	69	8.4 (5.3-12.9)	324	11.1 (8.0-15.3)	0.72 (0.30-1.75)
Nursing home	1201	26.5 (23.7-29.6)	319	34.2 (27.9-41.0)	882	23.1 (20.4-26.1)	1.32 (0.88-1.96)
Hospice residence	240	6.7 (5.2-8.6)	40	5.6 (3.2-9.5)	200	7.2 (5.5-9.5)	0.73 (0.34-1.58)
Other	37	1.1 (0.5-2.3)	4	0.4 (0.1-1.4)	33	1.4 (0.7-3.1)	0.27 (0.05-1.58)

Abbreviations: CI, confidence interval; OR, odds ratio.

^aNo. indicates sample size and percentages are weighted to reflect national estimates.

^bAdjusted ORs and 95% CIs were derived from a single model that adjusted for age, sex, race/ethnicity, primary payment source, having a primary caregiver, No. of ADLs needing assistance, mobility needs, and metropolitan statistical area.

^c $P < .001$ for unadjusted comparison by profit status. $P < .001$ for adjusted comparison by profit status.

^d $P = .01$ for unadjusted comparison by profit status.

ber of visits per day by profit status and diagnosis after adjustment. To determine whether the association between diagnosis and number of visits per day varied by profit status, we used the Wald χ^2 test to further assess the interaction between profit status and diagnosis group. We performed similar multivariable analyses to examine differences in number of visits per day by profit status and LOS categories.

All statistical testing was 2-sided. Our 3 main factors of interest (profit status, diagnosis, and location of care) were defined a priori, and our study was considered hypothesis generating rather than definitive testing. However, we did calculate a Bonferroni-corrected critical value of $P < .017$, given our 3 factors of interest.

RESULTS

Our sample included 4705 patients discharged from hospice in 2007, of which 1087 patients (30.7%) were discharged from 145 for-profit agencies and 3618 patients (69.3%) were discharged from 524 nonprofit agencies. Our sample was representative of an estimated 1.03 million patients discharged from hospice in 2007. TABLE 1 presents characteristics by agency profit status. Patients from for-profit and nonprofit hospices were similar except that those from for-

profit hospices compared with nonprofit hospices were more likely to be non-Hispanic black (10.6%; 95% CI, 7.0%-15.8%, vs 6.4%; 95% CI, 4.7%-8.7%, respectively) or Hispanic (7.5%; 95% CI, 4.5%-12.3%, vs 2.7%; 95% CI, 1.8%-4.1%; $P = .02$). For-profit agencies compared with nonprofit agencies were also more likely to be part of a chain (74.0%; 95% CI, 61.1%-83.7%, vs 5.9%; 95% CI, 3.5%-9.8%, respectively; $P < .001$).

TABLE 2 demonstrates that diagnosis and location of care both varied by profit status. Compared with nonprofit hospices, for-profit hospices had a lower proportion of patients with cancer (48.4%; 95% CI, 45.0%-51.8%, vs 34.1%; 95% CI, 29.9%-38.6%, respectively) and higher proportions of patients with dementia (8.4%; 95% CI, 6.6%-10.6%, vs 17.2%; 95% CI, 14.1%-20.8%) and other diagnoses (43.2%; 95% CI, 40.0%-46.5%, vs 48.7%; 95% CI, 43.2%-54.1%). These differences remained significant after adjustment ($P < .001$). Compared with nonprofit hospices, for-profit hospices also had a higher proportion of patients residing in nursing homes (23.1%; 95% CI, 20.4%-26.1%, vs 34.2%; 95% CI, 27.9%-41.0%, respectively) and a lower proportion residing at home (57.1%; 95% CI, 53.5%-60.7%, vs 51.5%; 95% CI, 44.6%-58.3%). However, there was no

independent association of location of care with profit status after adjustment for all covariates, most notably diagnosis.

Reasons for discharge among for-profit hospices and nonprofit hospices were, respectively, death (77.7% vs 87.3%), condition stabilized or improved (6.7% vs 4.3%), obtained more aggressive therapy (7.7% vs 3.2%), moved to a different geographic region (2.3% vs 1.6%), and other reasons (5.2% vs 3.5%). Also, for-profit hospices had a higher proportion of discharges based on readmissions than nonprofit hospices (9.3% vs 5.5%, respectively).

TABLE 3 presents the median LOS in hospice with corresponding 25th and 75th percentiles by profit status of all patients and stratified by diagnosis. Median LOS was 4 days longer in for-profit hospices as compared with nonprofit hospices (20 days; interquartile range, [IQR], 6-88, vs 16 days; IQR, 5-52; $P = .002$). The unadjusted LOS was 41.0% longer (95% CI, 13.5%-75.1%) in for-profit hospices vs nonprofit hospices. After full adjustment, LOS remained significantly longer in for-profit hospices compared with nonprofit hospices (26.2%; 95% CI, 4.9%-51.9%; $P = .01$). A model adjusting for only diagnosis and location of care was nearly identical, suggesting

Table 3. Hospice Length of Stay by Profit Status

	All Patients (N = 4705)	Patients From For-Profit Hospices (n = 1087)	Patients From Nonprofit Hospices (n = 3618)	Unadjusted P Value
Patients by Category				
LOS categories, No. of patients (%) [95% CI] ^a				
<7 d	1375 (32.4) [29.9-34.9]	245 (28.1) [23.9-32.7]	1130 (34.3) [31.3-37.3]	.005 ^b
7-30 d	1442 (30.5) [28.4-32.7]	311 (27.9) [24.4-31.8]	1131 (31.6) [29.2-34.2]	
31-180 d	1340 (26.7) [24.3-29.2]	342 (30.4) [26.3-34.8]	998 (25.0) [22.2-28.1]	
181-364 d	323 (6.4) [5.1-8.0]	99 (6.7) [4.3-10.3]	224 (6.2) [4.8-8.1]	
≥365 d	225 (4.1) [3.2-5.2]	90 (6.9) [5.0-9.4]	135 (2.8) [2.0-4.0]	
LOS per Patient				
LOS, median (IQR), d				
Overall	17 (5-62)	20 (6-88)	16 (5-52)	.002 ^c
Stratified by diagnosis ^d				
Cancer	16 (6-40)	15 (6-44)	16 (6-39)	
Dementia	35 (7-161)	43 (10-161)	26 (6-135)	
Other	17 (4-85)	23 (6-100)	14 (4-70)	

Abbreviations: CI, confidence interval; IQR, interquartile range; LOS, length of stay.
^aNo. indicates sample size and percentages are weighted to reflect national estimates.
^bComparing LOS categories between profit and nonprofit hospices using a χ^2 test.
^cOutcome was log transformed; unadjusted model based on 1-unit increase in log(LOS).
^dP values are based on a single model that also adjusts for age, location of care, sex, race/ethnicity, type of insurance, primary caregiver, No. of ADLs needing assistance, mobility needs, and metropolitan statistical area. In analyses of LOS, $P = .01$ comparing profit status and $P < .001$ comparing diagnoses.

Table 4. Visits per Day by Hospice Personnel by Profit Status, Overall and Stratified by Diagnosis

	Median (IQR)			Unadjusted P Value
	All Patients (N = 4705)	Patients From For-Profit Hospices (n = 1087)	Patients From Nonprofit Hospices (n = 3618)	
Overall^a				
Nursing visits	0.45 (0.28-0.83)	0.45 (0.27-0.82)	0.45 (0.28-0.83)	.75
Social worker visits	0.14 (0.07-0.31)	0.12 (0.06-0.25)	0.15 (0.07-0.34)	.006
Home health aide visits	0.26 (0.09-0.49)	0.33 (0.15-0.50)	0.25 (0.07-0.45)	.004
Stratified by Diagnosis^b				
Nursing visits ^c				
Cancer	0.50 (0.32-0.87)	0.58 (0.34-0.94)	0.50 (0.31-0.83)	
Dementia	0.37 (0.20-0.78)	0.38 (0.19-0.65)	0.36 (0.23-0.89)	
Other	0.41 (0.26-0.79)	0.41 (0.26-0.79)	0.41 (0.25-0.78)	
Social work visits ^d				
Cancer	0.15 (0.07-0.31)	0.15 (0.07-0.31)	0.15 (0.09-0.30)	
Dementia	0.11 (0.04-0.27)	0.07 (0.04-0.21)	0.12 (0.05-0.37)	
Other	0.14 (0.07-0.31)	0.11 (0.06-0.24)	0.15 (0.07-0.37)	
Home health aide visits ^e				
Cancer	0.22 (0.05-0.44)	0.26 (0.05-0.55)	0.19 (0.05-0.42)	
Dementia	0.35 (0.16-0.50)	0.39 (0.24-0.57)	0.30 (0.08-0.44)	
Other	0.28 (0.12-0.50)	0.37 (0.21-0.50)	0.26 (0.12-0.49)	

Abbreviation: IQR, interquartile range.
^aOutcome was log transformed; unadjusted model based on 1-unit increase in log(visits/d).
^bOutcome was log transformed; model based on 1-unit increase in log(visits/d). P values are based on a single model that also adjusted for age, sex, race/ethnicity, location of care, primary payment source, having a primary caregiver, No. of ADLs needing assistance, mobility needs, and metropolitan statistical area.
^cFor analyses of nursing visits, $P = .78$ comparing profit status and $P = .002$ comparing diagnoses.
^dFor analyses of social work visits, $P = .03$ comparing profit status and $P < .001$ comparing diagnoses.
^eFor analyses of home health aide visits, $P = .02$ comparing profit status and $P = .80$ comparing diagnoses.

that these 2 factors account for most of the variation in LOS.

Compared with nonprofit hospices, median LOS in for-profit hospices was similar for patients with cancer (16 days; IQR, 6-39, vs 15 days; IQR, 6-44,

respectively) and longer for patients with dementia (26 days; IQR, 6-135, vs 43 days; IQR, 10-161) and other non-cancer diagnoses (14 days; IQR, 4-70, vs 23 days; IQR, 6-100). In adjusted analyses, patients with dementia had

longer median LOS than patients with cancer and other diagnoses (35 days; IQR, 7-161, vs 16 days; IQR, 6-40, and 17 days; IQR, 4-85, respectively; $P < .001$). Compared with patients in nonprofit hospices, patients in for-profit hospices were more likely to have stays longer than 365 days (2.8%; 95% CI, 2.0%-4.0%, vs 6.9%; 95% CI, 5.0%-9.4%) and were less likely to have stays less than 7 days (34.3%; 95% CI, 31.3%-37.3%, vs 28.1%; 95% CI, 23.9%-32.7%; $P = .005$).

TABLE 4 presents the median number of visits per day by nurses, social workers, and home health aides overall and stratified by diagnosis. Overall, for-profit and nonprofit hospices provided similar numbers of nursing visits per day (0.45 visits; IQR, 0.27-0.82, vs 0.45 visits; IQR, 0.28-0.83, respectively). However, for-profit hospice agencies compared with nonprofit agencies provided fewer social work visits per day (0.12 visits; IQR, 0.06-0.25, vs 0.15 visits; IQR, 0.07-0.34; unadjusted $P = .006$; adjusted $P = .03$) and more home health aide visits per day (0.33 visits; IQR, 0.15-0.50, vs 0.25 visits; IQR, 0.07-0.45; unadjusted $P = .004$; adjusted $P = .02$). Compared with cancer patients, those with dementia or other diagnoses had fewer visits per day from nurses (0.50

visits; IQR, 0.32-0.87, vs 0.37 visits; IQR, 0.20-0.78, and 0.41 visits; IQR, 0.26-0.79, respectively; adjusted $P = .002$) and social workers (0.15 visits; IQR, 0.07-0.31, vs 0.11 visits; IQR, 0.04-0.27, and 0.14 visits; IQR, 0.07-0.31, respectively; adjusted $P < .001$). No significant interaction was observed between diagnosis and hospice profit status for any of the types of visits examined. TABLE 5 presents the median number of visits per day by each personnel type, stratified by LOS categories. Although patients with stays less than 7 days had more visits per day by nurses and social workers than patients with longer stays, this did not differ by profit status.

COMMENT

The recent increase in the for-profit hospice sector raises critical questions about potential financial incentives in hospice reimbursement. Using nationally representative data, we found notable differences in the types of patients enrolled in for-profit hospices compared with nonprofit hospices. For-profit hospices had a disproportionate number of patients with noncancer diagnoses, dementia in particular. For-profit hospices also had a greater proportion of patients with prolonged LOS (≥ 365 days).

We also found that patients with noncancer diagnoses and those with prolonged LOS received fewer visits per day from skilled personnel (ie, nurses and social workers). Despite these differences in case mix, we found that patients received similar rates of nursing visits regardless of hospice profit status. On the other hand, patients in for-profit hospices received fewer social work visits and more home health aide visits per day than those in nonprofit hospices as would be expected given the observed case-mix differences. Our findings have potentially important implications both for clinicians taking care of patients at the end of life and for policy makers in the area of Medicare hospice payment.

The current Medicare Hospice Benefit reimburses hospices at a fixed per

Table 5. Median Visits per Day by Hospice Personnel by Profit Status, Stratified by Length of Stay

	Median (IQR) ^a	
	Patients From For-Profit Hospices (n = 1087)	Patients From Nonprofit Hospices (n = 3618)
Nursing visits ^b		
LOS <7 d	1.09 (0.74-1.41)	1.07 (0.71-1.43)
LOS 7-30 d	0.58 (0.36-0.83)	0.49 (0.36-0.73)
LOS 31-180 d	0.32 (0.22-0.43)	0.29 (0.21-0.40)
LOS 181-364 d	0.19 (0.15-0.33)	0.20 (0.15-0.28)
LOS ≥ 365 d	0.19 (0.15-0.27)	0.19 (0.14-0.28)
Social worker visits ^c		
LOS <7 d	0.37 (0.26-0.63)	0.43 (0.27-0.73)
LOS 7-30 d	0.16 (0.12-0.25)	0.16 (0.16-0.27)
LOS 31-180 d	0.07 (0.04-0.10)	0.07 (0.05-0.11)
LOS 181-364 d	0.04 (0.03-0.07)	0.05 (0.03-0.08)
LOS ≥ 365 d	0.04 (0.03-0.05)	0.04 (0.03-0.07)
Home health aide visits ^d		
LOS <7 d	0.37 (0.17-0.66)	0.25 (0.14-0.56)
LOS 7-30 d	0.36 (0.16-0.55)	0.21 (0.04-0.43)
LOS 31-180 d	0.33 (0.05-0.45)	0.22 (0.02-0.37)
LOS 181-364 d	0.29 (0.11-0.43)	0.11 (0.00-0.32)
LOS ≥ 365 d	0.29 (0.07-0.36)	0.30 (0.12-0.40)

Abbreviations: IQR, interquartile range; LOS, length of stay.

^aOutcome was log transformed; model based on 1-unit increase in log(visits/d). P values are based on a single model that also adjusted for age, sex, race/ethnicity, diagnosis, location of care, primary payment source, having a primary caregiver, No. of ADLs needing assistance, mobility needs, and metropolitan statistical area.

^bFor analyses of nursing visits, $P = .56$ comparing profit status and $P < .001$ comparing LOS.

^cFor analyses of social work visits, $P = .19$ comparing profit status and $P < .001$ comparing LOS.

^dFor analyses of home health aide visits, $P = .006$ comparing profit status and $P < .001$ comparing LOS.

diem rate that does not consider the patient's diagnosis, location of care, or hospice LOS. Under this system, profit can be maximized by caring for patients with certain diagnoses that require fewer skilled services, patients residing in nursing homes, or patients with longer hospice stays.^{2,4,6,10,14} Although other studies have found that patients with noncancer diagnoses were significantly more likely than cancer patients to be in for-profit hospices,^{10,11} we further examined the subset of patients with dementia and found that they were even more likely to be enrolled in for-profit hospices. Our findings indicate that approximately two-thirds of patients in for-profit hospices have dementia and other noncancer diagnoses, whereas only about half of patients in nonprofit hospices have these diagnoses.

We also found that these diagnoses were associated with longer stays in hospice, which are known to be more profitable, and that overall patients with these diagnoses had fewer visits per day

by skilled personnel (nurses and social workers), which could be financially advantageous for hospices under a capitated reimbursement system. For-profit hospices were also less likely than nonprofit hospices to have patients enrolled for fewer than 7 days, and these patients had more visits from skilled personnel, which is costly for hospices. Our findings build on previous research that has shown that LOS in hospice and services delivered correlate with patients' terminal diagnoses.^{7,15,16}

Previous studies examining the association of profit status or diagnosis with LOS or care intensity have used proprietary data^{5,7} or data limited to a single state.^{11,17} Lorenz et al¹¹ used 1997 California data to show that 46% of patients in for-profit hospices had noncancer diagnoses, compared with 28% in nonprofits. We find a similar difference, although of smaller magnitude—which may be partially due to the fact that our 2007 data show a substantial increase in noncancer diagnoses in both

for-profit and nonprofit hospices, compared with their 1997 study.¹¹ Our study also examined dementia specifically and demonstrated an even stronger association between profit status and dementia. Another study,¹⁸ which used an earlier version of the NHHCS, could only document whether patients had ever received services from a given type of provider because it lacked information on the frequency of visits. Our study, using the most recent NHHCS, expands on prior work by quantifying the number of visits per day delivered by core members of the hospice team and thus provides an improved, albeit imperfect, measure of care intensity. Our study also builds on a study of nursing home patients in a for-profit hospice that found that cancer patients received more visits than noncancer patients.⁵

For-profit hospices had significantly more patients with stays exceeding 365 days and fewer patients with stays less than 7 days. Although hospice is intended for patients with a prognosis of less than 6 months, research demonstrates¹⁹⁻²² that it is difficult for clinicians to prognosticate, especially for patients with noncancer diagnoses. Therefore, stays that exceed 6 months may have been appropriate at the time of enrollment. While it is unknown whether hospice patients with stays exceeding 1 year were enrolled inappropriately early in the course of their illnesses, these admissions can be particularly lucrative for hospices in a per diem reimbursement system because, as we found, they receive fewer visits per day from skilled hospice personnel.

Our study has several important limitations. First, the NHHCS includes only patients who were discharged from hospice and therefore underestimates LOS because patients with longer LOS have a lower likelihood of having been discharged and are therefore underrepresented in the sample. Nonetheless, we found that for-profit hospices were more likely than nonprofit hospices to have prolonged LOS (ie, >1 year). This undersampling of long LOS means that

our study on the whole probably underestimates the differences in median LOS by profit status.

Second, we lacked data on important agency characteristics beyond metropolitan statistical area and chain status, such as the hospices' geographic location, which may explain the observed differences in racial composition. We also do not know whether hospices were part of a larger system of care, which could facilitate coordination of and transitions in care and thus increase hospice LOS. Third, we lacked data on costs and revenue, and therefore, we do not demonstrate that differences in the diagnostic composition of hospices resulted in lower costs or greater revenue. Fourth, diagnosis is an imperfect measure of disease severity.

Finally, and perhaps most importantly, we are unable to assess the relationship between profit status and quality of care. While our study improves on previous research by assessing the number of visits per day by various hospice personnel, we lacked important information on the length of each visit and care provided. For example, we could not distinguish between a home health aide visit that consisted of a 5-minute "check-in" and a half-day visit providing assistance with activities of daily living. We are also unable to determine whether higher rates of home health aide visits in for-profit hospices reflect additional care or substitution of other types of unmeasured (and potentially more expensive) clinical services. We also could not distinguish between visits delivered by registered nurses and licensed vocational nurses; past research^{11,17} suggests that registered nurses, who are more skilled and more expensive, deliver a lower proportion of nursing visits in for-profit hospices vs nonprofit hospices.

Clinicians caring for patients considering hospice can be reassured that for-profit hospices appear to provide as many nursing visits and more home health aide visits (although fewer social work visits) than nonprofit hos-

pices. However, there are important policy implications if hospice agencies differentially enroll more patients with dementia and other noncancer diagnoses, who require fewer visits from skilled personnel such as nurses and social workers. Patient selection of this nature leaves nonprofit hospice agencies disproportionately caring for the most costly patients—those with cancer and those tending to begin hospice very late in their course of illness; as a result, those hospices serving the neediest patients may face difficult financial obstacles to providing appropriate care in this fixed per-diem payment system.

Our findings are timely, complement the findings of the Medicare Payment Advisory Committee (MedPAC) reports,^{2,16} and can help inform the current debate around payment reform in the Medicare Hospice Benefit. MedPAC has recommended that, as of 2013, reimbursement rates for hospice reflect a U-shaped pattern that considers the intensity of care required at the beginning and end of hospice, with higher per diem rates during the first 30 days of enrollment and a standard payment at the time of death. Given that approximately 1 million Medicare beneficiaries use hospice each year and that the for-profit hospice industry continues to expand rapidly, future research is needed to understand more fully the association of profit status with quality of care and patient and caregiver experiences at the end of life.

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Study concept and design: Wachterman, McCarthy.

Acquisition of data: Wachterman, McCarthy.

Analysis and interpretation of data: Wachterman, Marcantonio, Davis, McCarthy.

Drafting of the manuscript: Wachterman, McCarthy.

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In our flowing affairs a decision must be made—the best, if you can, but any is better than none. There are twenty ways of going to a point, and one is the shortest; but set out at once on one. A man who has that presence of mind which can bring to him on the instant all he knows, is worth for action a dozen men who know as much but can only bring it to light slowly.

—Ralph Waldo Emerson (1803-1882)