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Differences in Services Provided by Hospices Based on Home Health Agency Certification Status

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Abstract

Background—Similar patient populations and favorable regulations have led many home health agencies to become Medicare and/or Medicaid certified as hospice agencies (mixed), but home health and hospice programs differ in focus and scope. Little research has been performed examining the differences between mixed hospices and those agencies only certified as hospices (non-mixed).

Objectives—To describe the differences in agency characteristics between mixed and non-mixed agencies; and to compare frequencies of service provision by mixed and non-mixed agencies.

Research Design—Cross-sectional study using data from the 2000 National Home and Hospice Care Survey.

Subjects—760 Medicare and/or Medicaid certified hospice agencies providing services during the survey, including 393 mixed agencies (52% of sample) and 367 non-mixed hospices.

Measures—Survey responses by administrators about services provided by agency

Results—Non-mixed agencies were significantly more likely than mixed agencies to provide many types of services, including: volunteers (96.1% vs. 77.4%, respectively, OR 7.27, 95% CI (5.26-10.05)), social services (96.1% vs. 93.5%, OR 1.70 (1.20-2.40)), spiritual care (95.1% vs. 77.8%, OR 5.53 (4.13-7.41)), bereavement care (93.5% vs. 79.8%, OR 3.63 (2.80-4.72)), counseling (89.5% vs. 70.2%, OR 3.62 (2.92-4.48)), and physician services (87.2% vs. 52.0%, OR 6.30 (5.18-7.66)). In logistic regression models, these differences remained significant after adjustment for census region, operation by a hospital, number of patients and number of hospice patients, and Medicare and Medicaid hospice certification status.

Conclusions—Mixed agencies provide a narrower range of services to hospice patients than non-mixed agencies, including fewer services considered cornerstones of hospice treatment.

Keywords

hospice & palliative medicine; Medicare; Medicaid; home care; care delivery system

Introduction

Overlapping patient populations and favorable regulations have led many home health agencies (HHAs) to become certified as hospices and hospices to become certified as

HHAs.¹⁻³ As of January 2007, 21% of hospices were mixed (certified as both hospices and HHAs).⁴ Such overlap may be efficient, since many HHA patients eventually become eligible for hospice care.^{1,5}

However, home health and hospice programs differ in focus and scope. Hospice care focuses on symptom control and provides comprehensive care, while the HHA model is more medicalized and focuses on skilled nursing and rehabilitative therapies.⁶ Medicare requirements for agency certification formalize these differences, with many services required for hospices⁷ and only a few required for HHAs.⁸

It is unclear whether mixed agencies have adopted the hospice philosophy or whether they function as “traditional health care service[s] with hospice overtones.”⁹ One way to examine whether mixed agencies are adopting the hospice philosophy is to analyze their service provision. Given the emphasis on comprehensive care, agencies that adopt the hospice philosophy would be expected to offer a wide array of services. Agencies that did not adopt this philosophy would be expected to maintain the service provision pattern typical for HHAs, focusing themselves primarily on skilled nursing and rehabilitative therapies. Little research has examined the differences between mixed and non-mixed hospice agencies (certified as hospices but not as HHAs),^{2,3,5,6,10-13} and most of it has discussed the differences in regulations or the relative benefits of these types of agencies, without the use of empirical data. The two prior empirical studies did not examine service provision as an outcome.^{5,13}

Other differences between mixed and non-mixed hospices may affect the agencies’ ability to provide services. For example, large agencies are able to distribute costs of expensive therapies across patients,¹⁴ particularly based on Medicare’s per diem hospice reimbursement, so they may provide services that smaller agencies could not afford. We hypothesize that mixed agencies have more patients but that non-mixed agencies have a larger census of hospice patients. It is unclear how mixed and non-mixed hospices differ by characteristics such as certification, profit-making, ownership, or location.

By describing differences between mixed and non-mixed hospices, we can examine whether care to hospice patients is consistent across agency type. This study aimed to describe the differences in agency characteristics between mixed and non-mixed agencies and to compare the services offered by mixed and non-mixed agencies.

Methods

Study Population

Data for this study came from the 2000 National Home and Hospice Care Survey, a survey of a nationally representative sample of HHAs and hospice agencies and their patients conducted by the National Center for Health Statistics.¹⁵ Data were collected using a 2-stage sampling design; this analysis is limited to data asked on the agency level. Sampling of agencies was stratified based on: agency type (HHAs, hospices, mixed), Metropolitan Statistical Area (MSA) status, and census region (Northwest, Midwest, South, West).

Of the 1,800 sampled agencies (from a frame of 15,451), 322 were not in the scope of the study, either because they were not providing home health or hospice services at the time of the survey or because they duplicated other sampled agencies. Of the in-scope agencies, 96% (n=1,425) agreed to participate.

As part of the NHHCS, data were collected by a questionnaire completed by the agency administrator or a person designated by the administrator. Agencies that were neither

Medicare nor Medicaid certified (or were not pending certification) as hospices (n=643) and agencies missing certification information (n=22) were dropped from this analysis; the final sample size was 760 agencies. The protocol for this analysis was determined to be exempt from Institutional Review Board review at the University of Maryland School of Medicine, since the data set was de-identified and for public use.

Measures

The primary dependent variables were dichotomous indicators for agency provision of each service. The specific survey question was: “Does this agency provide any of the following services?” Services provided by less than 6% of the weighted study sample (dental treatment, vocational therapy) and services that were unspecified (other high tech care, other services) were excluded from the analysis.

Summary dependent variables were created based on the federal regulations governing Medicare hospices and HHAs.^{7,8} These regulations require that certain “core hospice services” be provided directly by hospice staff: volunteers, social services, spiritual care, bereavement care, counseling, dietary/nutritional, physician, and skilled nursing services. “Non-core hospice services” that must be provided but may be outsourced include medications, respite care, durable medical equipment and supplies, continuous home care, homemaker/household services, personal care, and physical, occupational, speech and intravenous therapy. Medicare regulations for HHAs require that skilled nursing services be provided directly by staff, as well as at least 1 of the following: social services, or physical, occupational, or speech therapy. These services were considered “core HHA services”. These summary variables were then dichotomized (8 vs. 0-7 core hospice services, 9-10 vs. 0-8 non-core hospice services, 5 vs. 0-4 core HHA services) because the distributions were highly skewed.

The primary independent variable was a dichotomous indicator for whether the agency was certified as mixed. Mixed agencies were those that answered “yes” or “pending” to Medicare and/or Medicaid certification for home health. Certification as a hospice agency was required to enter the study sample, so this new variable identified agencies that were also certified as home health agencies (i.e., mixed).

Other measures included Medicare hospice certified (or pending), Medicaid hospice certified (or pending), agency size, profit-making status, operation by a hospital, chain affiliation, census region, and urban status (i.e., located in an MSA). Sampled agencies could be certified as hospices by Medicare, Medicaid, or both; we examined certification from Medicare and Medicaid separately. Agency size was categorized by quartiles of both number of current patients and number of current hospice patients.

Statistical Analysis

The complexity of the study design required the use of multistage estimation procedures to provide unbiased national estimates. The 3 components of estimation used were: (1) inflation by the inverse of the probability of selecting a particular agency; (2) adjustment for non-response; and (3) adjustment for over- or under-sampling of agencies reported in the sampling frame.¹⁵ All results were weighted to represent national estimates.

Frequencies by agency type and p-values of chi-square were computed for organizational characteristics and service provision. Logistic regression models were run using SAS, version 9.1 (SAS Institute, Inc., Cary, NC) to determine an odds ratio (OR) and 95% confidence interval (CI) for each service by agency type, using mixed agencies as the reference group. Bivariate models were run to determine unadjusted estimates; multivariable models adjusted for all covariates found to be significant in bivariate analyses were run to

assess the independent effect of agency type on service provision. Based on the importance of hospice size to the economics of care, the interaction between agency type and size (based on number of hospice patients 0-50 vs. >50) was examined for significance in the multivariable models. For those services with significant interactions, ORs and 95% CIs are reported by agency size (0-50 hospice patients vs. >50 such patients).

Results

Organizational Characteristics by Agency Type

The sample included 393 mixed agencies (corresponding to 2,476 with weighting) and 367 non-mixed agencies (1,076 with weighting). Thus, mixed agencies represented 52% of the sample of certified hospice agencies. Mixed agencies were significantly less likely than non-mixed agencies to be Medicare certified as hospices (93.4% vs. 97.6%, $p < .001$, Table 1) and significantly more likely to be Medicaid certified as hospices (93.6% vs. 90.1%, $p = .002$).

Mixed agencies were significantly more likely than non-mixed agencies to have a large number of current patients but significantly less likely to have a large number of hospice patients, based on quartiles of each ($p < .001$ for each). There was no significant difference by agency type in whether agencies were non-profit ($p = .83$) or whether they were part of a group ($p = .68$). Mixed hospices were significantly more likely than non-mixed agencies to be operated by a hospital (42.8% vs. 26.1%, $p < .001$), significantly more likely to be in the Northeast or Midwest and less likely to be in the South or West ($p < .001$).

Service Provision by Agency Type

On average, mixed agencies provided about 19 (mean 18.8, standard deviation 4.7), while non-mixed agencies provided about 22 of the 26 services examined (mean 21.6, standard deviation 3.8). Mixed hospices were significantly less likely than non-mixed agencies to provide all core hospice services (Table 2) and to provide 9-10 non-core hospice services, and they were significantly more likely to provide all core HHA services ($p < .001$ for each). Mixed hospices were significantly less likely than non-mixed agencies to provide most services. Of the core hospice services, only skilled nursing care was not significantly more common among non-mixed hospices. Mixed agencies were significantly more likely than non-mixed hospices to provide skilled nursing services (97.9% vs. 89.0%, $p < .001$), as well as all other services included in the Medicare certification requirements for HHAs (physical therapy, speech therapy, and occupational therapy).

Table 2 also shows the unadjusted and adjusted ORs and 95% CIs for the association between agency type and each of these services, with mixed agencies as the reference group. These associations remained significant even after adjustment for all agency characteristics that were significant in bivariate analyses (Medicare certification, Medicaid certification, agency size by total patients and hospice patients, operated by a hospital, census region). Particularly strong associations were found for provision of volunteers (OR 6.90, 95% CI 4.21, 11.30) and pastoral care (OR 7.14, 95% CI 4.37, 11.66), which were more common among non-mixed agencies, and for skilled nursing services (OR 0.20, 95% CI 0.12, 0.32) and physical therapy (OR 0.11, 95% CI 0.07, 0.18), which were more common among mixed agencies.

Interactions between agency type and agency size in multivariable models were significant for many services, as well as all summary variables for service provision (Table 3). In most cases, ORs for service provision by agency type among agencies with 0-50 hospice patients were consistent with the results without the interaction term, but results for agencies with >50 hospice patients were substantially different. The association between agency type and provision of all core hospice services was not significant among these large agencies,

although the associations for the individual services did not change in a consistent way. Association between agency type and service provision varied only in magnitude for agencies in both size categories, for 9-10 non-core hospice services and all core HHA services. Among the agencies with >50 hospice patients, the overwhelming majority (>95%) of both agency types provided the core hospice services of: volunteers, spiritual care, bereavement care, counseling, and social services (results not shown).

Discussion

To our knowledge, this is the first study analyzing national differences between mixed and non-mixed hospice agencies. We found that mixed agencies were significantly less likely than non-mixed agencies to provide most services, including many services considered cornerstones of hospice care. Most core and non-core hospice services were significantly less likely to be provided by mixed agencies than by non-mixed agencies, even after adjustment for all agency characteristics associated with agency type. The only exceptions were social services and skilled nursing care, both core HHA services. All other core HHA services were significantly more likely to be provided by mixed agencies than non-mixed agencies.

This pattern of service provision suggests that many mixed agencies may not be fully adopting the hospice philosophy and its focus on comprehensive care. Agency type may serve as important determinant of service provision, as have other important agency characteristics such as ownership status¹⁶ or setting of care.¹⁷ Yet the difference in service provision may also be due to targeting agencies' services to different patient populations or due to other patient differences such as length of stay or type of insurance. For example, while Stevenson et al. found that service provision to hospice patients varied by setting, patients in the 2 care settings also varied by length of stay, diagnoses, and number of comorbidities.¹⁷ Interpretation of these results is complicated as these agencies differed significantly in most characteristics examined. It should be noted that several non-core hospice services were infrequently provided in either type of agency, including psychological services, transportation services, and companion services.

Mixed agencies differed from non-mixed agencies in certification, size, number of hospice patients, and census region. Agency size is an important determinant of the economics of care, with larger hospices more likely to provide complex services.¹⁸ As expected, non-mixed agencies were significantly more likely than mixed agencies to have a small total census but a large hospice census. The association between agency type and service provision were significantly modified by hospice census for most hospice services. Results among agencies with 0-50 hospice patients were generally consistent with the pattern described above, while associations among agencies with >50 hospice patients were less consistent (but overall provision in these agencies was higher). Large hospice census may serve as an important determinant for provision of more comprehensive services among mixed agencies, perhaps enabling the agencies to spread a per diem hospice reimbursement across patients and provide more expensive services.

Mixed agencies were more likely than non-mixed agencies to be Medicaid certified and less likely to be Medicare certified as hospices, limiting access of hospice patients to these mixed agencies. (Only 5.3% of hospice patients were served by Medicaid in 2006, with 83.7% served by Medicare.¹⁹) As Medicare and Medicaid agency certification requirements are identical,²⁰⁻²³ it is not surprising that adjustment for certification status had little effect on the association between service provision and agency type.

This study should be considered a preliminary investigation of this topic, as these results have several important limitations. Interpretation of these results is limited due to the self-report methodology. Though respondents were given descriptions of the services, it is unclear whether respondents interpreted questions consistently. For example, some respondents may have responded only about services provided directly by the agency, while others may have assumed that the question referred to all services provided. Responses may also have been biased if responses were based on the agency's service providers, rather than specific services. Although the interpretation of study results assumes that mixed agencies began as HHAs, this study was not able to distinguish mixed hospices that began as HHAs from those that began as hospices. This study was unable to determine whether the difference in service provision affected patient outcomes. In part, this is due to the study's inability to account for many potential confounding variables, particularly case-mix. Agency service provision should be tied to patients' needs, which could not be evaluated in this study. Mixed agencies may have a different case-mix than non-mixed hospices, based on the agencies' self-referrals. Further studies should account for patient-level variables to determine how service provision corresponds to patients' need. This study was also unable to account for many organizational variables that may influence the quality of care provided by the agencies. This study is also limited due to the age of the data, as hospice care delivery has changed substantially since 2000, but this data was the most current available to study.

This study found that mixed agencies were significantly less likely than those certified only as hospices to provide many services, including some services important to hospice care. Prior to enrollment, patients should examine the array of services provided by available hospices to ensure that all of their needs can be met, particularly given the substantial variability in service provision between hospices as seen in a study using patient-level data.²⁴ Greater enforcement of the service provision requirements may be needed, as several required hospice services appear to be unavailable from many mixed agencies.

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References

1. Paradis LF, Schultz J, Hollers K, Markstrom K. Home health agencies and hospices--stronger together or alone? *Nurs Health Care*. 1987; 8:167-172. [PubMed: 3645351]
2. Hansen M, Evashwick C. Hospice: Staffing and cost implications for home health agencies. *Home Health Care Serv Q*. 1981; 2:61-81. [PubMed: 10253110]
3. Buck J. Home hospice versus home health: Cooperation, competition, and cooptation. *Nurs Hist Rev*. 2004; 12:25-46. [PubMed: 14608846]
4. Hospice Association of America. [October 11, 2007] Hospice Facts & Statistics. Available at: <http://www.nahc.org/facts/hospicex07.pdf>.
5. Banaszak-Holl J, Mor V. Differences in patient demographics and expenditures among Medicare hospice providers. *Hosp J*. 1996; 11:1-19. [PubMed: 8920312]
6. Pitorak EF. Hospice or home health-which does the patient need? *Home Healthc Nurse*. 2003; 21:224-227. [PubMed: 12695694]

7. [November 21, 2007] Social Security Act §1861 (dd)-- Definition of Services, Institutions, Etc.: Hospice Care; Hospice Program. Available at: http://www.ssa.gov/OP_Home/ssact/title18/1861.htm.
8. Medicare program; Medicare coverage of home health services, Medicare conditions of participation, and home health aide supervision-- HCFA. final rule. Fed Regist. 1994; 59:65482–65498. [PubMed: 10139258]
9. Abel EK. The hospice movement: Institutionalizing innovation. Int J Health Serv. 1986; 16:71–85. [PubMed: 3514497]
10. Peterschmidt VA. Home health and hospice in rural America. Caring. 2006; 25:26–32. [PubMed: 16468588]
11. Oldenquist GW, Scott L, Finucane TE. Home care: What a physician needs to know. Cleve Clin J Med. 2001; 68:433–440. [PubMed: 11352323]
12. Smith HL, Reid RA. Integrating hospice and home health services: Analysis of strategic factors. Home Health Care Serv Q. 1987; 8:87–102. [PubMed: 10282206]
13. Ryan CW. Association between administrative and ownership characteristics of hospices and their proportion of inpatient deaths. Hosp J. 2000; 15:63–74. [PubMed: 11249382]
14. US Government Accountability Office. Medicare hospice care: Modifications to payment methodology may be warranted. 2004; GAO-05-42:14–15.
15. Haupt BJ. Characteristics of hospice care discharges and their length of service: United States, 2000. Vital Health Stat [13]. 2003:1–36.
16. Carlson MD, Gallo WT, Bradley EH. Ownership status and patterns of care in hospice: Results from the National Home and Hospice Care Survey. Med Care. 2004; 42:432–438. [PubMed: 15083103]
17. Stevenson DG, Huskamp HA, Grabowski DC, Keating NL. Differences in hospice care between home and institutional settings. J Palliat Med. 2007; 10:1040–1047. [PubMed: 17985958]
18. Lorenz KA, Asch SM, Rosenfeld KE, Liu H, Ettner SL. Hospice admission practices: Where does hospice fit in the continuum of care?. J Am Geriatr Soc. 2004; 52:725–730. [PubMed: 15086652]
19. National Hospice and Palliative Care Organization. [December 6, 2007] NHPCO Facts and Figures: Hospice Care in America. Available at: http://www.nhpco.org/files/public/Statistics_Research/NHPCO_facts-and-figures_Nov2007.pdf.
20. [November 27, 2007] 42 USC 1396d(o)(1)(A) (2000). Definitions-- Optional hospice benefits. Available at: <http://frwebgate6.access.gpo.gov/cgi-bin/waisgate.cgi?WAISdocID=18285138614+8+0+0&WAIAction=retrieve>.
21. Comparison of the Medicare and Medicaid Hospice Benefits. Iowa Hospice; 2003. Available from: <http://www.iowahospice.org/advocacylegis/Hospice%20Medicaid%20chart.pdf>. [March 31, 2008]
22. Vickery, AM.; Bumpers, B. [March 31, 2008] RE: Comparison of the medicare and medicaid hospice benefits. 2003. Available from: <http://www.iowahospice.org/advocacylegis/Mcaid-Mcare%20Memo.pdf>.
23. Rutkow L. Optional or optimal?: The Medicaid hospice benefit at twenty. J Contemp Health Law Policy. 2005; 22:107–142. [PubMed: 16680991]
24. Carlson MD, Morrison RS, Holford TR, Bradley EH. Hospice care: What services do patients and their families receive? Health Serv Res. 2007; 42:1672–1690. [PubMed: 17610443]

Table 1

Organizational Characteristics by Agency Type, Unadjusted Analysis *

Agency Characteristic	Mixed Agencies (n=2476) %	Non-Mixed Agencies (n=1076) %	p-value
Medicare-certified as hospice †	93.4	97.6	<.001
Medicaid-certified as hospice †	93.6	90.1	.002
Number of current patients			<.001
0-30	16.7	46.6	
31-70	20.2	29.4	
71-145	29.4	17.1	
>145	33.8	6.9	
Number of current hospice patients			<.001
0-5	35.6	10.7	
6-15	22.0	20.3	
16-50	23.4	37.0	
>50	19.0	32.0	
Non-profit	74.4	74.0	.83
Operated by hospital	42.8	26.1	<.001
Part of a group	41.3	42.1	.68
Urban (MSA)	64.5	63.9	.77
Census region			<.001
Northeast	24.9	11.4	
Midwest	30.9	26.3	
South	27.7	41.4	
West	16.6	21.0	

All values weighted to provide national estimates. Percentages within a variable may not sum to 100 based on rounding.

* MSA: Metropolitan Statistical Area

† Includes agencies pending certification

Table 2

Agency Service Provision by Agency Type*

Service Provided by Agency	Mixed Agencies (n=2476)	Non-Mixed Agencies (n=1076)	Unadjusted Models [†]	Adjusted Models [‡]
	%	%	OR (95% CI)	OR (95% CI)
All core hospice services	34.0	65.4	3.66 (3.15, 4.26)	1.97 (1.59, 2.44)
9-10 non-core hospice services	37.2	65.9	3.27 (2.81, 3.80)	2.23 (1.82, 2.72)
All core HHA services [§]	83.0	65.8	0.39 (0.33, 0.46)	0.34 (0.27, 0.44)
Core hospice services				
Volunteers	77.4	96.1	7.27 (5.26, 10.05)	6.90 (4.21, 11.30)
Physician services	52.0	87.2	6.30 (5.18, 7.66)	2.14 (1.66, 2.76)
Spiritual care	77.8	95.1	5.53 (4.13, 7.41)	3.08 (1.98, 4.81)
Bereavement care	79.8	93.5	3.63 (2.80, 4.72)	4.62 (2.60, 8.20)
Counseling	70.2	89.5	3.62 (2.92, 4.48)	3.03 (2.23, 4.10)
Dietary and nutritional services	70.5	87.6	2.95 (2.42, 3.61)	2.71 (2.10, 3.49)
Social services [§]	93.5	96.1	1.70 (1.20, 2.40)	2.82 (1.67, 4.78)
Skilled nursing services [§]	97.9	89.0	0.17 (0.13, 0.24)	0.20 (0.12, 0.32)
Non-core hospice services				
Medications	53.7	91.0	8.70 (7.96, 10.87)	3.32 (2.43, 4.53)
Durable medical equipment & supplies	53.5	89.3	7.21 (5.85, 8.88)	3.14 (2.46, 4.02)
Continuous home care	64.3	80.6	2.30 (1.94, 2.73)	2.17 (1.73, 2.73)
Respite care	82.4	90.7	2.08 (1.65, 2.62)	2.23 (1.57, 3.17)
Personal care	94.2	95.6	1.34 (0.96, 1.88)	1.42 (0.90, 2.23)
Homemaker/Household services	61.6	65.3	1.17 (1.01, 1.36)	1.39 (1.14, 1.69)
Intravenous therapy	80.8	81.7	1.06 (0.88, 1.28)	0.91 (0.72, 1.16)
Speech therapy/Audiology [§]	89.8	80.3	0.46 (0.38, 0.56)	0.54 (0.41, 0.71)
Occupational therapy [§]	92.6	80.4	0.33 (0.26, 0.40)	0.36 (0.28, 0.48)
Physical therapy [§]	96.2	87.8	0.28 (0.22, 0.37)	0.11 (0.07, 0.18)
Other services				
Pastoral care	76.8	95.9	7.11 (5.19, 9.76)	7.14 (4.37, 11.66)
Transportation	13.3	35.4	3.56 (3.00, 4.22)	3.15 (2.48, 3.99)
Respiratory therapy	46.0	67.2	2.40 (2.07, 2.79)	2.10 (1.72, 2.57)
Psychological services	46.2	50.6	1.20 (1.04, 1.38)	0.92 (0.76, 1.11)
Enterostomal therapy	60.1	62.7	1.12 (0.96, 1.30)	1.40 (1.16, 1.71)
Referral services	80.5	79.0	0.91 (0.76, 1.09)	0.96 (0.75, 1.24)
Companion services	43.0	38.5	0.83 (0.72, 0.96)	0.99 (0.82, 1.21)
Meals on wheels	12.6	5.7	0.42 (0.31, 0.56)	0.28 (0.20, 0.39)

All values weighted to provide national estimates.

* OR: odds ratio; CI: confidence interval; SD: standard deviation; NA: Not applicable; HHA: home health agencies

[†]N for unadjusted models was 3551 due to missing data. Mixed agencies are the reference group for OR.

[‡]N for adjusted models was 3223 due to missing data. Mixed agencies are the reference group for OR, and all models are adjusted for covariates of Medicare hospice certification, Medicaid hospice certification, quartiles of number of current total patients, quartiles of number of current hospice patients, operated by a hospital, and census region.

[§]Core HHA services included: skilled nursing services, physical therapy, occupational therapy, and speech therapy.

Sample size was too small for a reliable estimate of Meals on Wheels frequency (both mixed and non-mixed agencies) and transportation frequency (mixed agencies).

Table 3

Agency Service Provision by Agency Type, Stratified by Number of Current Hospice Patients*

Service Provided by Agency	0-50 Current Hospice Patients		>50 Current Hospice Patients		P-value for Interaction of Agency Type with Size [†]	Adjusted Models for Agencies with 0-50 Hospice Patients [‡]		Adjusted Model for Agencies with >50 Hospice Patients [‡]	
	Mixed Agencies (n=1,819)	Non-Mixed Agencies (n=694)	Mixed Agencies (n=426)	Non-Mixed Agencies (n=327)		OR (95% CI)	OR (95% CI)	OR (95% CI)	
All core hospice services	25.7	66.5	69.8	66.6	<.001	3.92 (3.03, 5.06)	0.78 (0.56, 1.10)		
9-10 non-core hospice services	33.8	67.5	52.4	66.0	<.001	2.75 (2.15, 3.52)	1.61 (1.18, 2.20)		
All core HHA services [§]	76.3	67.3	87.5	57.3	<.001	0.57 (0.44, 0.75)	0.21 (0.14, 0.31)		
Volunteers	71.8	94.3	100.0	99.4	.98	NA	NA		
Physician services	45.4	83.9	79.7	92.8	.79	NA	NA		
Spiritual care	72.7	93.0	99.7	98.7	.01	3.65 (2.30, 5.80)	0.22 (0.03, 1.52)		
Bereavement care	77.3	94.1	100.0	99.0	.98	NA	NA		
Counseling	65.2	89.1	96.5	97.6	.52	NA	NA		
Dietary and nutritional services	66.8	86.6	87.6	87.4	.01	3.27 (2.44, 4.39)	1.62 (1.02, 2.56)		
Social services [§]	94.5	94.4	95.2	99.0	<.001	1.25 (0.69, 2.28)	32.44 (8.84, 119.08)		
Skilled nursing services [§]	97.9	90.0	99.7	85.1	.002	0.39 (0.23, 0.68)	0.02 (0.00, 0.11)		
Medications	44.8	89.5	81.9	93.2	.001	4.50 (3.10, 6.52)	1.52 (0.88, 2.60)		
Durable medical equipment & supplies	47.2	90.4	82.6	84.9	<.001	5.24 (3.84, 7.14)	1.10 (0.74, 1.64)		
Continuous home care	60.8	82.3	76.5	81.5	<.001	2.80 (2.13, 3.68)	1.25 (0.85, 1.83)		
Respite care	80.1	91.9	96.3	94.8	.001	2.97 (1.99, 4.42)	0.78 (0.38, 1.61)		
Personal care	97.1	93.8	84.1	99.2	<.001	0.18 (0.09, 0.36)	39.10 (10.26, 148.98)		
Homemaker/Household services	62.2	66.2	58.5	60.6	.16	NA	NA		
Intravenous therapy	83.5	83.2	83.2	76.0	.51	NA	NA		
Speech therapy/Audiology [§]	90.2	81.3	94.4	75.3	<.001	0.83 (0.60, 1.16)	0.20 (0.12, 0.34)		

Service Provided by Agency	0-50 Current Hospice Patients		>50 Current Hospice Patients		P-value for Interaction of Agency Type with Size [†]	Adjusted Models for Agencies with 0-50 Hospice Patients [‡]		Adjusted Model for Agencies with >50 Hospice Patients [‡]	
	Mixed Agencies (n=1,819)	Non-Mixed Agencies (n=694)	Mixed Agencies (n=426)	Non-Mixed Agencies (n=327)		OR (95% CI)	OR (95% CI)	OR (95% CI)	
Occupational therapy [§]	93.1	79.5	93.0	79.5	.65	NA	NA	NA	
Physical therapy [§]	96.0	87.1	99.8	87.4	.01	0.17 (0.11, 0.28)	0.01 (0.00, 0.08)		
Pastoral care	72.0	93.8	99.7	99.7	.20	NA	NA	NA	
Transportation	12.4	29.2	¶	45.2	.79	NA	NA	NA	
Respiratory therapy	37.3	70.2	74.8	67.4	<.001	3.43 (2.69, 4.38)	0.79 (0.57, 1.10)		
Psychological services	40.2	47.0	67.8	55.0	<.001	1.16 (0.92, 1.46)	0.60 (0.43, 0.82)		
Enterostomal therapy	65.4	62.4	53.7	60.3	.03	1.20 (0.94, 1.52)	1.85 (1.35, 2.52)		
Referral services	82.1	82.3	87.3	78.0	.03	1.17 (0.86, 1.58)	0.67 (0.45, 1.01)		
Companion services	42.7	35.2	¶	42.6	.15	NA	NA	NA	
Meals on wheels	¶	¶	¶	¶	NA	NA	NA	NA	

All values weighted to provide national estimates.

* OR: odds ratio; CI: confidence interval; SD: standard deviation; NA: Not applicable; HHA: home health agencies

[†]P-value derived from Chi-square test of interaction between agency type and dummy variable for >50 current hospice patients, in models adjusted for covariates of Medicare hospice certification, Medicaid hospice certification, quartiles of number of current total patients, quartiles of number of current hospice patients, operated by a hospital, and census region and the interaction between agency type and dummy variable for >50 current hospice patients.

[‡]N for models was 708 due to missing data. Mixed agencies are the reference group for OR. All models are adjusted for covariates as in [†].

[§]Core HHA services included: skilled nursing services, social services, physical therapy, occupational therapy, and speech therapy.

¶Sample size was too small for a reliable estimate.

¶Sample size was too small for a reportable estimate.