

Quality Measures for the U.S. Hospice System

Kelly Noe
Ph.D. Student
kelly.noe@utsa.edu

Pamela C. Smith, Ph.D. *
Associate Professor
pamela.smith@utsa.edu

The University of Texas at San Antonio
Department of Accounting
College of Business
One UTSA Circle
San Antonio, TX 78249-0632
Phone: 210-458-4320
Fax: 210-458-4322

* Corresponding author

Quality Measures for the U.S. Hospice System

ABSTRACT:

Objectives: Academic research analyzing hospice quality and performance is limited. The purpose of this exploratory study is to investigate potential measurements to address quality within the U.S. hospice system.

Methods: We endeavor to use Medicare Hospice Cost Report data for 2000 through 2007 to operationalize three constructs of quality – operational, labor, and clinical. These constructs are an attempt to answer the call for quality measures that focus on the following areas: (1) how the organization is functioning, (2) how the workforce is improving, and (3) how to measure changes in the patient’s condition. We examine these hospice quality measures in both nonprofit (NP) and for-profit (FP) hospice providers. Our sample includes 7,039 observations for the investigation period.

Results: Our results indicate that hospice quality significantly improves for our sample. These findings also hold when separately examining for-profit and nonprofit hospice providers.

Discussion/Conclusion: To our knowledge, research has not fully explored potential measures of hospice quality. Our exploratory study is an attempt to bridge dialogue between research and practice to further the discussion of quality in hospice care. Quality is a difficult concept to measure when referring to hospice care especially since the patients are terminally ill and are expected to die. Quality care consists of keeping the patient comfortable as he/she goes through the dying process. For this reason typically quality standards are not applicable, and our findings assist in the development of performance-related hospice quality measures.

Keywords: Hospice; Quality; Medicare; Cost; Nonprofit

Quality Measures for the U.S. Hospice System

Introduction

According to the U.S. Census Bureau, there were 37.9 million people age 65 and older on July 1, 2007¹. This age group represents approximately thirteen percent of the total population, and it is projected that by the year 2050, there will be 88.5 million Americans in this age group. Projections also indicate there will be over 1.6 billion people age 65 or older in the world. This dramatic increase in the ageing population contributes to the need to examine healthcare issues for this population segment.

The hospice care industry is an often overlooked segment in academic research. In the U.S., the Medicare hospice benefit was established in 1983, pursuant to the Tax Equity and Fiscal Responsibility Act of 1982, to provide terminally ill beneficiaries with an alternative to conventional medical interventions. Hospice benefits cover “palliative and support services for terminally ill beneficiaries who have a life expectancy of six months or less if the terminal disease follows its normal course” (MedPac June 2008, page 207). Hospice care has a significant impact on the healthcare industry in the U.S. According to the Medicare Payment Advisory Commission (MedPac), it was estimated that Medicare spending under the hospice benefit exceeded \$10 billion in the 2007 fiscal year². Furthermore, the number of hospice providers in the U.S. grew approximately five percent per year from 2000 to 2007 (MedPac 2009). According to O’Neill et al. (2008), “hospice is the primary means available to help Americans achieve better late life care...” (page 1002). Research also indicates that hospice is one of the fastest growing benefits in the U.S. Medicare system (Conner 2007).

Considering the significant growth of the hospice industry and services, definitive measures of hospice quality do not exist. Hospice quality is of major concern to many constituents, including those receiving benefits and government regulators. According to MedPac (2008), “developing standardized

¹ Information available at: <http://www.census.gov/Press-Release/www/releases/archives/population/011910.html>

² MedPac is an independent Congressional agency established by the Balanced Budget Act of 1997 to advise the US Congress on issues affecting the Medicare Program (MedPac 2008).

empirical quality measures that can be used for program administration—either to compare provider performance or to adjust payments under future pay-for-performance programs—presents unique challenges” (page 227). Standardized measures of quality of hospice care do not exist, therefore program evaluation and oversight is difficult for regulators and other stakeholders (MedPac 2008). Also, the Centers for Medicare and Medicaid Services (CMS) report that it did not believe sufficient information was available to establish national quality benchmarks for hospice (CMS 2008).

Academic research has called for better ways to define and measure quality in the hospice system (Pasman et al., 2009; von Gunten, 2008; Conner, 2007). The purpose of this study is to investigate potential measurements to address quality within the hospice system. Specifically, we expand upon the call by Conner (2007) to develop hospice quality measures that focus on the following areas: (a) how the organization is functioning, (b) how the workforce is improving, and (c) how to measure changes in the patient’s condition. It is very difficult to quantify changes in the patient’s condition; we are attempting to measure the quality of care that the patient is receiving, given that this is difficult to do as well. This study is a first attempt to bridge the dialogue between government regulators and stakeholders concerning hospice quality. This exploratory study focuses on the following three constructs for hospice quality: (1) operational quality, (2) labor quality, and (3) clinical quality. To our knowledge, research has not fully explored potential measures of hospice quality. These three areas of hospice quality are an attempt to allow regulators and stakeholders to compare hospice performance across entity type – particularly nonprofit (NP) and for-profit (FP) hospice providers. Research indicates that the number of FP hospice providers has increased over the past few decades (Conner 2009). This growth lends support to examining how quality compares between NP and FP hospice entities.

Using Medicare Hospice Cost Report data for 2000 through 2007, our results indicate hospice quality significantly improves for our sample. These findings also hold when separately examining FP and NP hospice providers. We did not find significant differences when comparing NP and FP providers during 2000, and only limited differences in quality between the entity types for the 2007 reporting year.

The remainder of the paper is organized as followed: Section 2 provides an overview of hospice care and discusses literature addressing hospice quality and performance; section 3 outlines our methodology, while section 4 presents our results; and section 5 provides concluding remarks.

2. Prior Literature

What is Hospice?

Hospice agencies provide supportive and palliative care in order to bring comfort for those nearing the end of life. “Hospice care” is defined in Section 1861 (dd) of the Social Security Act to mean services provided to a terminally ill individual by a hospice program under a written plan. These services include nursing care, physical or occupational therapy, medical social services under the direction of a physician, home health aide services, homemaker services, medical supplies, physician services, short-term inpatient care, and counseling.

In order for hospice facilities to receive Medicare and Medicaid payments, they must meet requirements under Conditions of Participation (COP) (See Conner (2009) for further discussion of COP requirements). One of the new requirements for Medicare-certified hospices is an emphasis on quality assessment and performance improvement (QAPI). According to CMS (2008), the COP requirements “continue to reflect the unique interdisciplinary view of patient care and allow hospices flexibility in meeting quality standards” (page 32088). Furthermore, these requirements are meant to “bring about improvements in the quality of care furnished to hospice patients” (CMS 2008, page 32089).

Tremendous growth in the hospice industry has occurred over the last decade. According to the National Hospice and Palliative Care Organization (NHPCO), there were over 4,700 hospice providers in the U.S. in 2007 (NHPCO, 2008). Between 2000 and 2007, there was a five percent per year growth in the number of hospice providers. Morrison et al. (2005) report growth in palliative care programs is attributable to larger U.S. hospitals. Approximately 58 percent of the U.S. hospice providers are independent, freestanding agencies, while 20 percent are hospital-based (NHPCO, 2008). In terms of entity-types, approximately 48.6 percent of U.S. hospice agencies are NP, while 47.1 percent are FP (NHPCO, 2008). Government owned facilities account for 4.3 percent of the hospice agencies. The

number of FP providers has grown approximately 12 percent from 2000 to 2007, while there has been virtually no growth in the number of NP providers (NHPCO, 2008).

Hospice Quality and Performance

Research indicates that hospice improves the quality of remaining life for patients (Kane et al. 1984; Miller et al. 2003). Hudson (2006) notes that care at the end of life presents exceedingly difficult challenges, and Travis et al. (2002) document several barriers to quality in end-of-life situations – including the failure to implement a timely plan, and a lack of agreement on a course of care. However, from an administrative perspective the issue of quality is often debated. MedPac (2008) argues the development of standardized empirical quality measures is a unique challenge. From a practice perspective, the NHPCO has recently focused efforts on the importance of quality. Through its national performance improvement initiative, the NHPCO provides hospice facilities tools to assess and monitor the quality of care and services provided. In order to align efforts to meet the QAPI requirements under the Medicare system, the NHPCO suggests there are numerous components of quality, including clinical excellence and safety, organizational excellence, workforce excellence and performance measurement (NHPCO 2006). From an academic research perspective, von Gunten (2008) argues researchers must better define quality and its measurement in the hospice industry. The Pasman et al. (2009) literature review documents several domains of quality in palliative care, including physical aspects of care, and the process of care, which most often focuses on the assessment and treatment of pain. Conner (2007) describes efforts to document and improve hospice quality often focus on patient and family feedback. However, he argues that quality should look beyond feedback and focus on organizational function.

Existing research in the hospice arena often focuses on the relationship between performance (financial and nonfinancial) and ownership status. Lorenz et al. (2002) evaluate ownership status and patient selection and service delivery. Based on a sample of 176 licensed California hospices, FP hospice providers serve a higher percentage of patients with noncancer diagnoses. FP facilities also provide more total nursing visits than NP facilities. Carlson et al. (2004) examine differences in the pattern of care between for-profit and nonprofit providers. Their results indicate that patients of FP facilities receive a

significantly narrower range of services. In terms of financial performance, McCue and Thompson (2005) focus on investor-owned, publicly traded hospice providers. Their descriptive analysis of financial statements reveals higher profit margins for publicly traded providers as compared to other FP facilities. O'Neill et al. (2008) evaluate factors that affect financial performance of California hospices. They conclude that overall profitability is low, yet FP providers experience higher profitability than NPs. Furthermore, they call for future research to examine the relationship between service patterns and patient quality.

3. Methodology

In this exploratory study, we seek to determine whether Medicare hospice cost report data permit an analysis of the following three constructs of hospice quality: (1) operational quality, (2) labor quality, and (3) clinical quality. We develop these three constructs based on Conner's (2007) call for the development of quality measures that focus on the following areas: (a) how the organization is functioning, (b) how the workforce is improving, and (c) how to measure changes in the patient's condition. We rely on prior research in the hospice quality domain to develop the following variables of interest:

Operational quality

We argue operational quality focuses on the services provided by the hospice facility, and its overall financial performance. Our first measure of operational quality addresses the age of the hospice facility. AGE represents how long the provider has been in existence, while CERTAGE represents how long the facility has been Medicare-certified. Following the work of McCue et al. (2005) and Carlson et al. (2004), operational quality measures also include core and noncore service expense per day. Core services (COREPD) include the costs of physician services, nursing, physical therapy, occupational therapy, medical social services and spiritual counseling services. Noncore services expense (NONCOREPD) includes drugs, durable medical equipment, imaging services, medical supplies, radiation therapy and chemotherapy. Following O'Neill et al. (2008) we use average length of stay (LOS) as a measure of operational performance. Financial performance is measured using total profit margin

(TPM) and inpatient revenue per day (INPATREVPD). Hospice operational quality also includes nursing cost per day (NURSEPD). Based on the work of Huskamp et al. (2008) we also include the cost of medication (DRUGS) as an operational quality measure. We argue these measures of operational quality align directly with the NHPCO's components of quality in hospice care – performance measurement and organizational excellence (NHPCO 2006).

Labor Quality

Our measures of labor quality focus on the hospice workforce that is skilled labor and has direct patient care. Therefore, we include physician service salaries (PSPD), nursing salaries (NSPD), counseling salaries (COUNSELPD), and home health aid salaries (HHAPD). These expenses are analyzed on a per day basis. These variables correspond to the workforce excellence component of the NHPCO's measurement of quality (NHPCO 2006).

Clinical Quality

Clinical quality measures focus on utilization and include the percentage of Medicare days (%MEDICAREDAYS), which is a common measure of utilization (see McCue et al. 2005). We also include inpatient care services (INPATSERV), which includes both general care and respite care provided on an inpatient basis. O'Neill et al. (2008) argue that clinical performance outcomes should include provider visits. Following their methodology, our variable visiting services per day (VISITPD) includes visits by all types of providers – physicians, nursing, physical therapy, occupational therapy, speech/language therapy, medical social services, spiritual counseling, dietary counseling, home health aid and continuous home health aid. We feel these three variables adequately address the NHPCO's clinical excellence and safety component of hospice quality (NHPCO, 2006).

We also include other descriptive variables to examine hospice performance – total hospice enrollment days (DAYS); total Medicare days (MEDDAYS), and the total number of patients receiving hospice care (PATIENTS). See Table 1 for all variable definitions.

Insert Table 1

Data

The data used for this exploratory study is based on Medicare Hospice Cost Reports for the years 2000 through 2007. This information is self-reported by hospice providers on Form CMS-1984-99. In accordance with 42 CFR 418.310, hospice providers participating in the Medicare program are required to submit annual information for health care services rendered to Medicare beneficiaries³. Providers receiving Medicare reimbursement must provide adequate cost data based on financial and statistical records which can be verified by qualified auditors. Due to the self-reported nature of the data, limitations to the data do exist. Kane and Magnus (2001) argue Medicare Cost Report data, in general, are unreliable and lack critical detail that is necessary to adequately evaluate financial performance.

Our sample includes 7,039 observations for the period 2000 through 2007. The complete Medicare Hospice Cost Report dataset includes 9,418 observations – of which we eliminated 1,765 due to missing observations, 429 for extreme values, and 185 observations for the years 1999 and 2008. Table 2 includes a description of our sample selection criteria for the final sample, and the sample by year.

Insert Table 2 here

4. Results

Descriptive statistics for each reporting period are provided in Table 3. Overall, the sample hospice providers experienced negative TPM. The highest average TPM is in 0.21 in 2004. Another financial measure, INPATREVPD, averaged 135.43 in 2000 and 296.38 in 2007. Average spending on DRUGS by hospice providers increases from 196,951.06 in 2000 to 236,006.01 in 2007. This upward trend is also seen in average %MEDICARE DAYS (0.84 in 2000 and 0.90 in 2007). Average VISITPD (services provided to hospice patients by visiting staff) was 41.87 in 2000 and 58.55 in 2007.

Insert Table 3 here

We analyze potential differences in quality for the entire sample between the 2000 and 2007 reporting periods in Table 4. All quality variables increase from 2000 to 2007 except for noncore services per day (NONCOREPD), which drop from 16.36 to 14.78. These differences in operational quality are

³ See Form CMS-1984-99 Instructions and Provider Reimbursement Manual, available at: <http://www.cms.hhs.gov/Manuals/PBM/itemdetail.asp?filterType=none&filterByDID=-99&sortByDID=1&sortOrder=ascending&itemID=CMS021935>

statistically significant. For example, the average length of stay increases from 56.76 days to 77.83 days ($t = 12.34$). Inpatient revenue per day (INPATREVPD) increases from 135.40 in 2000 to 296.40 in 2007 ($t = 3.12$). For labor quality, there is a significant increase in physician service salaries, nursing salaries, counseling salaries, and home health aid salaries. Clinical quality variables also significantly increase between 2000 and 2007, particularly inpatient care services (INPATSERV) ($t = 4.00$).

Insert Table 4 here

We next explore any differences in quality over time for the nonprofit and for-profit providers separately. Table 5 reports significant differences in quality for NP providers between the 2000 and 2007 reporting periods. For operational quality variables, our analysis reveals a significant increase in the average LOS, total nursing cost per day (NURSEPD) and core services per day (COREPD). All four labor quality variables are significantly higher for the NP providers in 2007. This finding also holds for all three clinical quality variables.

Insert Table 5 here

For the FP provider sample, all quality variables, except TPM, are significantly different between the 2000 and 2007 reporting periods. FP providers experience negative profitability in both years, but the difference was not statistically significant. All operational quality variables increase significantly, except noncore service expense per day (NONCOREPD), which decrease from 16.43 in 2000 to 14.75 in 2007. The FP providers also experience significant increases in all three clinical quality variables.

Insert Table 6 here

This study also explores any potential differences in quality between FP and NP providers, based on prior research documenting differences in financial performance between the two entity types. We focus our quality comparisons between NP and FP providers in two separate years – 2000 and 2007. This way we can also investigate whether there is any trend in quality over time. Table 7, Panel A, presents the NP- FP comparison for the year 2000. Results indicate similar lengths of stay (57.84 days for NP; 56.15 days for FP). Both entity types experience negative TPM (-0.01 for NP; -0.05 for FP). Overall, no significant differences are discovered on any operational quality variables. For labor quality, NP report

average PSPD of 0.35 and 0.40 for FPs. The two groups also report similar amounts for COUNSELPD (5.89 for NP and 5.76 for FP) and HHAPD (5.51 for NP and 5.50 for FP). In terms of clinical quality, each group has similar average %MEDICAREDAYS (0.85 for NP; 0.84 for FP). NP providers report average INPATSERV of 170,701, but this is not significantly different from that of FP providers (148,680). Overall, results indicate no significant differences between the two groups for our quality variables during 2000.

Insert Table 7 here

Panel B of Table 7 reports results for NP-FP comparisons in 2007. FP providers spent significantly less on DRUGS (215,835) than NP providers (285,272). Furthermore, nursing salaries per day (NSPD) and home health aid salaries per day (HHAPD) of NP providers are significantly lower than that of FP providers. For the 2007 year, inpatient care services in FP providers (223,241) are significantly lower than that of NP providers (398,407).

5. Concluding Remarks

Our exploratory study is an attempt to bridge dialogue between research and practice to further the discussion of quality in hospice care. Quality is a difficult concept to measure when referring to hospice care especially since the patients are terminally ill and are expected to die. Quality care consists of keeping the patient comfortable as he/she goes through the dying process. For this reason typically quality standards are not applicable. We endeavor to use Medicare Hospice Cost Report data to operationalize three constructs of quality – operational, labor, and clinical. Our findings indicate that quality, based on these measures, is significantly different for our sample between the 2000 and 2007 reporting periods.

Our study only considers hospice providers that are Medicare certified; therefore our results may not generalize to non-Medicare certified hospice providers. Medicare certified providers make up 93% of the total hospice care providers. Our study also does not consider hospice providers that are not freestanding facilities. Therefore, our results may not generalize to hospice providers that are hospital-based, part of a home-health agency or nursing facility-based. There are also data limitations, considering

the data is self-reported. Despite arguments that Medicare data is unreliable, it is subject to Medicare audit and is based on audited financial information.

Further academic research is necessary to provide potential explanations of differences in quality. It is possible that rising healthcare costs over the past decade contribute to the increasing costs expended toward hospice care. We did not find significant differences between nonprofit and for-profit providers during 2000, and only limited differences between entity types during 2007. Future research in this area should also examine the service patterns between types of providers. Furthermore, discovering patient related differences between providers may greatly advance hospice research in the United States.

References

- Carlson, M.D., W.T. Gallo, and E.H. Bradley. (2004). Ownership status and patterns of care in hospice: results from the national home and hospice care survey. *Medical Care*, 42: 432-438.
- Conner, S.R. (2007). Development of hospice and palliative care in the United States. *Omega – Journal of Death and Dying*, 56(1): 89-99
- Conner, S.R. (2009). U.S. hospice benefits. *Journal of Pain and Symptom Management*, 38 (1): 105-109.
- Centers for Medicare and Medicaid Services (CMS). (2008). *42 CFR Part 418 - Medicare and Medicaid Programs: Hospice Conditions of Participation; Final Rule*. Federal Register, Vol. 73, No. 109 (June 5, 2008). Available from: <http://edocket.access.gpo.gov/2008/pdf/08-1305.pdf>
- Hudson, R. (2006). Nurturing hope at the end of life. *Ageing International*, 31 (3): 241-252.
- Huskamp, H.A., J.P. Newhouse, J.C. Norcini, and N.L. Keating. (2008). Variation in patients' hospice costs. *Inquiry* 45: 232-244
- Kane, R.L., J. Wales and L. Bernstein. (1984). A randomized controlled trial of hospice care. *Lancet*, 890-894
- Kane, N.M. and S.A. Magnus. (2001). The Medicare cost report and the limits of hospital accountability: improving financial accounting data. *Journal of Health Politics, Policy and Law* 26 (1): 81-105.
- Lorenz, K.A., S.L. Ettner, K.E. Rosenfeld, D.M. Carlisle, B. Leake and S.M. Asch. (2002). Cash and compassion: profit status and the delivery of hospice services. *Journal of Palliative Medicine*, 5(4): 507-514.
- Medicare Payment Advisory Commission (MedPac). (2008). *Report to the Congress: Reforming the Delivery System*. Washington, DC: MedPac 2008. Available from: http://www.medpac.gov/documents/Jun08_EntireReport.pdf
- McCue, M.J. and J.M. Thompson. (2005). Operational and financial performance of publicly traded hospice companies. *Journal of Palliative Medicine*, 8 (6): 1196-1206.
- Miller, S.C., O. Intrator, J. Burdzovic Andreas. (2003). *Factors associated with hospice utilization. Report for the Agency for Healthcare Research and Quality*. AHRQ-2005-27. Rockville, MC: AHRQ.
- Morrison, R.S., C. Maroney-Galin, P.D. Kravlovec and D. E. Meier. (2005). The growth of palliative care programs in United States hospitals. *Journal of Palliative Medicine*, 8 (6): 1127-1134.
- National Hospice and Palliative Care Organization (NHPCO). (2006). *NHPCO Quality Partners – an Introduction*. Alexandria, VA: NHPCO. Available at: http://www.nhpc.org/files/public/quality/quality_introbchure.pdf
- National Hospice and Palliative Care Organization (NHPCO). (2008). *NHPCO Facts and Figures: Hospice Care in America*. Alexandria, VA: NHPCO.

O'Neill, S.M., M. Phil, S.L. Ettner, K. Lorenz. (2008). Paying the price at the end of life: a consideration of factors that affect the profitability of hospice. *Journal of Palliative Medicine*, 11 (7): 1002-1008.

Pasman, H.R.W., H.E. Brandt, L. Deliens, A.L. Francke. (2009). Quality indicators for palliative care: a systematic review. *Journal of Pain and Symptom Management*, 38 (1): 145-156.

Travis, S., Bernard, M., Dixon, S., McAuley, W., Loving, G., & McClanahan, L. (2002). Obstacles to palliation and end-of-life care in a long-term care facility. *The Gerontologist*, 42(3), 343-349.

von Gunten. (2008). Profit or not-for-profit: who cares? *Journal of Palliative Medicine*, 11 (7): 954.

Table 1
Variable Definitions

OPERATIONAL QUALITY

AGE =	Length of time provider has been in existence
CERTAGE =	Length of time provider has been Medicare-certified
LOS =	Length of stay: average number of days patient received hospice care
TPM =	Total profit margin
NURSEPD =	Total nursing cost per day
INPATREVPD =	Inpatient revenue per day
COREPD =	Core service expense per day
DRUGS =	Total drug expense
NONCOREPD =	Noncore service expense per day

LABOR QUALITY

PSPD =	Physician service salaries per day
NSPD =	Nursing salaries per day
COUNSELPD =	Counseling salaries per day
HHAPD =	Home health aid salaries per day

CLINICAL QUALITY

% MEDICARE DAYS =	Medicare days/total days
INPATSERV =	Inpatient care services
VISITPD =	Visiting services per day

OTHER

DAYS =	Total hospice enrollment days
MEDDAYS =	Total Medicare days
PATIENTS =	Total number of patients receiving hospice care

Table 2
Sample Selection Criteria

Full dataset	9,418
Missing observations	(1,765)
Extreme values (i.e. negative revenue, negative expense)	(429)
Years 1999 and 2008 observations	<u>(185)</u>
Total observations in sample	7,039

Observations by Year:

2000	609
2001	697
2002	774
2003	947
2004	1,075
2005	144
2006	1,256
2007	<u>1,537</u>
Total	7,039

Table 3
Descriptive Statistics By Year

Panel A: 2000						
VARIABLE	N	Mean	Median	Std Dev	Min	Max
AGE	609	8.87	6.00	7.03	0.00	30.00
CERTAGE	609	6.96	6.00	5.28	0.00	30.00
LOS	609	56.76	51.00	29.45	10.00	424.00
DAYS	609	20,382.07	13,219.00	28,714.08	308.00	422,086.00
MEDDAYS	609	17,095.66	11,168.00	23,691.23	190.00	359,354.00
PATIENTS	609	399.93	247.00	562.67	8.00	5,839.00
TPM	609	-0.03	0.04	0.77	-15.33	1.49
NURSEPD	609	25.83	23.57	11.97	4.13	96.56
INPATREVPD	609	135.43	106.91	244.68	9.02	4,037.15
COREPD	609	33.89	31.44	13.98	5.17	116.63
DRUGS	609	196,951.06	118,531.00	350,424.58	0.00	5,852,032.00
NONCOREPD	609	16.36	15.95	7.12	0.00	62.34
PSPD	609	0.38	0.00	0.87	0.00	6.72
NSPD	609	19.77	18.28	9.02	2.79	81.65
COUNSELPD	609	5.80	5.19	3.18	0.11	25.17
HHAPD	609	5.48	4.86	5.25	0.00	106.93
% MEDICARE DAYS	609	0.84	0.86	0.12	0.08	1.00
INPATSERV	609	156,620.10	11,970.00	452,725.85	0.00	4,889,663.00
VISITPD	609	41.87	39.27	17.29	7.21	252.61

Panel B: 2001						
VARIABLE		Mean	Median	Std Dev	Min	Max
AGE	697	9.45	7.00	6.86	0.00	29.00
CERTAGE	697	7.47	7.00	5.09	0.00	23.00
LOS	697	70.72	53.00	274.09	12.00	7,257.00
DAYS	697	22,333.63	14,574.00	31,005.74	120.00	437,677.00
MEDDAYS	697	19,219.20	12,701.00	26,260.97	120.00	379,080.00
PATIENTS	697	426.69	262.00	616.96	1.00	6,019.00
TPM	697	0.00	0.04	0.91	-9.99	16.87
NURSEPD	697	26.73	23.90	14.70	3.90	211.70
INPATREVPD	697	156.47	112.26	358.74	9.66	6,758.69
COREPD	697	35.80	32.22	19.46	5.59	265.52
DRUGS	697	221,570.88	128,879.00	372,566.95	0.00	5,688,310.00
NONCOREPD	697	16.74	16.34	7.30	0.00	67.14
PSPD	697	0.50	0.00	1.56	0.00	17.83
NSPD	697	20.83	18.63	11.60	3.07	176.28
COUNSELPD	697	6.15	5.23	4.50	0.01	54.00

HHAPD	697	5.77	4.99	5.10	0.00	100.55
% MEDICARE DAYS	697	0.87	0.88	0.09	0.27	1.00
INPATSERV	697	184,850.24	12,336.00	538,063.02	0.00	5,292,348.00
VISITPD	697	44.14	39.87	22.52	10.02	294.64

Panel C: 2002						
VARIABLE		Mean	Median	Std Dev	Min	Max
AGE	774	9.67	7.00	7.42	0.00	32.00
CERTAGE	774	7.75	7.00	5.52	0.00	32.00
LOS	774	65.52	54.00	92.55	0.00	2,453.00
DAYS	774	24,989.10	16,158.00	36,458.23	5.00	502,281.00
MEDDAYS	774	21,807.59	14,037.00	31,258.45	5.00	439,521.00
PATIENTS	774	476.46	264.50	855.42	1.00	14,535.00
TPM	774	-1.21	0.05	30.87	-852.91	2.26
NURSEPD	774	38.26	25.34	272.53	0.60	7,596.80
INPATREVPD	774	171.99	119.58	383.47	0.09	6,206.98
COREPD	774	50.04	34.46	337.23	3.25	9,402.00
DRUGS	774	242,496.71	151,814.50	410,701.88	0.00	6,022,977.00
NONCOREPD	774	21.07	16.32	105.07	0.00	2,932.00
PSPD	774	0.51	0.00	1.56	0.00	17.59
NSPD	774	31.88	19.84	274.51	0.52	7,651.40
COUNSELPD	774	8.07	5.77	41.21	0.02	1,145.80
HHAPD	774	6.83	5.39	19.86	0.20	546.40
% MEDICARE DAYS	774	0.88	0.88	0.09	0.16	1.00
INPATSERV	774	216,609.12	13,214.00	679,136.03	0.00	7,196,913.00
VISITPD	774	59.83	42.98	356.72	8.86	9,948.40

Panel D: 2003						
VARIABLE		Mean	Median	Std Dev	Min	Max
AGE	947	9.58	8.00	7.59	0.00	33.00
CERTAGE	947	7.96	7.00	5.93	0.00	33.00
LOS	947	63.05	56.00	33.31	7.00	484.00
DAYS	947	26,036.06	15,842.00	39,380.64	248.00	564,943.00
MEDDAYS	947	22,881.39	14,027.00	33,974.85	8.00	476,304.00
PATIENTS	947	456.80	260.00	669.91	6.00	7,151.00
TPM	947	0.05	0.07	0.61	-12.44	8.02
NURSEPD	947	30.12	26.33	18.63	1.19	239.64
INPATREVPD	947	206.46	123.00	739.21	21.55	19,099.05
COREPD	947	40.43	35.68	25.92	2.35	430.18
DRUGS	947	250,739.98	144,473.00	431,353.49	0.00	6,703,514.00
NONCOREPD	947	17.66	16.71	10.23	0.00	147.75

PSPD	947	0.47	0.00	1.44	0.00	18.50
NSPD	947	23.11	20.32	14.20	0.90	193.79
COUNSELPD	947	7.07	5.87	8.25	0.00	209.41
HHAPD	947	6.65	5.60	6.00	0.02	98.31
% MEDICARE DAYS	947	0.88	0.90	0.10	0.00	1.00
INPATSERV	947	236,955.08	11,204.00	749,611.96	0.00	9,253,289.00
VISITPD	947	50.02	44.32	31.37	6.39	506.33

Panel E: 2004						
VARIABLE		Mean	Median	Std Dev	Min	Max
AGE	1075	9.09	7.00	7.76	0.00	34.00
CERTAGE	1075	7.71	6.00	6.33	0.00	34.00
LOS	1075	67.71	61.00	29.51	10.00	250.00
DAYS	1075	29,904.11	18,750.00	42,772.77	141.00	663,387.00
MEDDAYS	1075	26,614.70	16,524.00	37,258.61	206.00	569,039.00
PATIENTS	1075	492.51	279.00	711.37	6.00	8,481.00
TPM	1075	0.21	0.08	4.58	-5.74	149.55
NURSEPD	1075	30.23	27.41	21.09	1.70	501.94
INPATREVPD	1075	179.18	127.82	558.43	10.49	17,333.78
COREPD	1075	40.60	36.60	29.52	3.95	786.65
DRUGS	1075	283,685.88	163,993.00	487,657.73	0.00	8,351,960.00
NONCOREPD	1075	17.19	16.11	9.01	0.00	142.22
PSPD	1075	0.50	0.00	1.30	0.00	13.52
NSPD	1075	22.81	20.89	16.35	1.52	425.27
COUNSELPD	1075	7.03	5.95	8.58	0.09	241.17
HHAPD	1075	6.78	5.95	4.72	0.01	70.23
% MEDICARE DAYS	1075	0.89	0.90	0.08	0.00	1.00
INPATSERV	1075	286,203.86	18,106.00	926,658.06	0.00	11,726,085.00
VISITPD	1075	50.39	45.92	33.13	5.99	869.55

Panel F: 2005						
VARIABLE		Mean	Median	Std Dev	Min	Max
AGE	144	10.29	8.00	7.93	1.00	30.00
CERTAGE	144	8.74	8.00	6.30	1.00	22.00
LOS	144	59.90	50.50	49.40	17.00	408.00
DAYS	144	20,761.00	13,459.00	20,728.95	51.00	104,324.00
MEDDAYS	144	18,642.24	11,995.00	18,924.15	34.00	98,661.00
PATIENTS	144	406.71	238.00	419.86	3.00	1,926.00
TPM	144	-0.36	0.06	1.91	-11.88	0.83
NURSEPD	144	42.09	35.33	33.85	5.66	240.90
INPATREVPD	144	198.37	147.32	189.11	5.07	1,326.80

COREPD	144	59.03	46.17	65.70	9.67	571.24
DRUGS	144	202,116.06	129,410.50	209,619.50	0.00	930,331.00
NONCOREPD	144	17.90	17.04	8.75	0.00	58.69
PSPD	144	0.41	0.00	1.08	0.00	5.94
NSPD	144	32.12	26.38	26.35	5.30	195.83
COUNSELDPD	144	11.94	6.83	28.99	0.13	274.33
HHAPD	144	7.58	5.36	8.62	0.24	73.81
% MEDICARE DAYS	144	0.89	0.90	0.10	0.21	1.00
INPATSERV	144	173,650.07	38,607.00	371,118.36	0.00	2,557,316.00
VISITPD	144	69.98	53.80	76.18	13.60	652.91

Panel G: 2006						
VARIABLE		Mean	Median	Std Dev	Min	Max
AGE	1256	8.66	5.00	9.56	0.00	101.00
CERTAGE	1256	7.36	5.00	6.74	0.00	36.00
LOS	1256	74.60	69.00	38.50	7.00	952.00
DAYS	1256	30,190.51	18,170.50	39,741.71	103.00	386,469.00
MEDDAYS	1256	27,024.01	16,244.00	35,023.66	60.00	335,601.00
PATIENTS	1256	451.83	245.00	693.49	4.00	10,501.00
TPM	1256	0.10	0.07	2.93	-11.18	92.45
NURSEPD	1256	32.75	29.02	22.51	0.05	313.62
INPATREVPD	1256	212.19	132.77	781.71	8.31	23,183.87
COREPD	1256	44.46	39.64	29.77	6.79	374.60
DRUGS	1256	241,419.04	130,402.00	371,729.25	0.00	5,606,474.00
NONCOREPD	1256	15.64	15.04	8.52	0.00	168.12
PSPD	1256	0.66	0.00	2.06	0.00	35.84
NSPD	1256	24.70	21.76	16.99	0.05	262.17
COUNSELDPD	1256	7.72	6.21	7.65	0.04	91.98
HHAPD	1256	7.66	6.51	5.82	0.03	83.07
% MEDICARE DAYS	1256	0.90	0.92	0.09	0.24	1.00
INPATSERV	1256	274,189.62	5,417.50	1,008,790.93	0.00	15,912,290.00
VISITPD	1256	55.44	49.10	34.74	11.25	482.57

Panel H: 2007						
VARIABLE		Mean	Median	Std Dev	Min	Max
AGE	1537	8.94	5.00	9.24	0.00	102.00
CERTAGE	1537	7.63	5.00	6.85	0.00	37.00
LOS	1537	77.83	72.00	47.89	1.00	1,168.00
DAYS	1537	30,438.03	19,471.00	39,838.97	24.00	414,278.00
MEDDAYS	1537	27,303.38	17,085.00	35,492.13	24.00	346,647.00
PATIENTS	1537	450.71	250.00	662.09	1.00	7,857.00

TPM	1537	-0.25	0.06	9.77	-381.55	13.30
NURSEPD	1537	35.58	30.09	47.28	0.05	1,505.02
INPATREVPD	1537	296.38	138.42	1,984.53	0.54	53,961.95
COREPD	1537	47.50	41.47	51.04	5.68	1,533.05
DRUGS	1537	236,006.01	127,108.00	369,598.65	0.00	4,927,731.00
NONCOREPD	1537	14.78	14.52	6.66	0.00	60.36
PSPD	1537	0.65	0.00	1.81	0.00	21.55
NSPD	1537	26.56	22.91	28.84	0.05	618.49
COUNSELPD	1537	7.68	6.59	7.07	0.13	122.92
HHAPD	1537	7.73	6.77	4.84	0.01	69.89
% MEDICARE DAYS	1537	0.90	0.92	0.09	0.22	1.00
INPATSERV	1537	277,819.22	10,203.00	945,654.26	0.00	18,200,739.00
VISITPD	1537	58.55	52.06	55.10	6.30	1,649.47

See Table 1 for variable descriptions

Table 4
Quality Comparisons by Year
2000 vs. 2007
Full Sample

	Mean			<i>t</i> - statistic	Wilcoxon Two Sample Test	
	2007	2000	Diff		Z	Pr > Z
Number of observations	1537	609				
LOS	77.83	56.76	21.06	12.34*	-16.32	<.0001*
TPM	-0.25	-0.03	-0.23	-0.90	-2.26	0.0237*
NURSEPD	35.58	25.83	9.75	7.50*	-11.53	<.0001*
INPATREVPD	296.40	135.40	161.00	3.12*	-20.10	<.0001*
COREPD	47.50	33.89	13.60	9.58*	-13.67	<.0001*
DRUGS**	236,006.00	196,951.00	39,055.00	2.24*	-1.54	0.1245
NONCOREPD	14.78	16.36	-1.58	4.70*	4.76	<.0001*
PSPD	0.65	0.38	0.27	4.59*	0.38	0.7039
NSPD	26.56	19.77	6.79	8.27*	-11.00	<.0001*
COUNSELPD	7.68	5.80	1.88	8.48*	-9.27	<.0001*
HHAPD	7.73	5.48	2.25	9.15*	-15.25	<.0001*
% MEDICARE DAYS	0.90	0.84	0.06	10.33*	-12.73	<.0001*
INPATSERV	277,819.00	156,620.00	121,199.00	4.00*	1.12	0.2612
VISITPD	58.55	41.87	16.69	10.63	-15.86	<.0001*

* significant at the 5 % level

used satterthwaite test due to folded F test indicating that the variances were not equal

**used pooled variance t-statistic due to folded F test indicating that the variances were equal

See Table 1 for variable descriptions

Table 5
Quality Comparison by Year
Nonprofit Hospice Providers

	Mean			<i>t</i> - statistic	Wilcoxon Two Sample Test	
	NP 2007	NP 2000	Diff		Z	Pr > Z
Number of observations	413	274				
LOS	77.17	57.84	19.33	5.32*	-9.19	<.0001*
TPM	0.05	-0.01	0.06	1.01	-0.76	0.4473
NURSEPD	33.25	25.70	7.55	6.77*	-7.45	<.0001*
INPATREVPD	354.80	138.80	216.00	1.88	-12.69	<.0001*
COREPD	45.18	33.79	11.39	8.46*	-8.85	<.0001*
DRUGS**	285,272.00	221,906.00	63,366.00	1.67	-2.27	.0234*
NONCOREPD**	14.84	16.30	-1.45	-2.81	3.00	.0027*
PSPD	0.71	0.35	0.36	3.34*	0.36	0.7220
NSPD	24.64	19.57	5.07	6.54*	-6.75	<.0001*
COUNSELPD	7.66	5.89	1.77	5.37*	-6.22	<.0001*
HHAPD**	7.39	5.51	1.88	6.33*	-8.61	<.0001*
% MEDICARE DAYS	0.90	0.85	0.05	5.77*	-7.29	<.0001*
INPATSERV	398,407.00	170,701.00	227,706.00	2.98*	-0.74	0.4622
VISITPD	55.79	41.65	14.14	9.32*	-10.07	<.0001*

* significant at the 5 % level

used satterthwaite test due to folded F test indicating that the variances were not equal

**used pooled variance t-statistic due to folded F test indicating that the variances were equal

See Table 1 for variable descriptions

Table 6
Quality Comparison by Year
For-Profit Hospice Providers

	Mean			<i>t</i> - statistic	Wilcoxon Two Sample Test	
	FP 2007	FP 2000	Diff		Z	Pr > Z
Number of observations	1095	320				
LOS	78.34	56.15	22.19	11.36*	-12.89	<.0001*
TPM	-0.38	-0.05	-0.33	-0.94	-1.94	.0520*
NURSEPD	36.44	25.91	10.53	5.87*	-8.42	<.0001*
INPATREVPD	276.10	132.70	143.40	2.46*	-14.67	<.0001*
COREPD	48.30	33.96	14.34	7.36*	-9.96	<.0001*
DRUGS	215,835.00	179,553.00	36,282.00	2.34*	-0.23	0.8202
NONCOREPD	14.75	16.43	-1.68	-3.63*	3.40	.0007*
PSPD	0.61	0.40	0.20	2.77*	0.16	0.8728
NSPD	27.29	19.88	7.42	6.51*	-8.27	<.0001*
COUNSELPD	7.66	5.76	1.90	6.53*	-6.61	<.0001*
HHAPD	7.89	5.50	2.39	6.16*	-12.18	<.0001*
% MEDICARE DAYS	0.90	0.84	0.06	8.38*	-9.94	<.0001*
INPATSERV	223,241.00	148,680.00	74,561.00	2.50*	1.54	0.1247
VISITPD	59.57	42.04	17.53	8.03*	-11.71	<.0001*

* significant at the 5 % level

used satterthwaite test due to folded F test indicating that the variances were not equal

See Table 1 for variable descriptions

Table 7
Quality Comparisons
For-profit vs. Nonprofit Hospice Providers

Panel A: 2000	Mean			<i>t</i> - statistic	Wilcoxon Two Sample Test	
	NP 2000	FP 2000	Diff		Z	Pr > Z
Number of observations	274	320				
LOS	57.84	56.15	1.69	0.68	0.03	0.9790
TPM	-0.01	-0.05	0.03	0.50	-0.09	0.9295
NURSEPD**	25.70	25.91	-0.21	-0.21	-0.13	0.8983
INPATREVPD**	138.80	132.70	6.10	0.30	-0.44	0.6634
COREPD**	33.79	33.96	-0.17	-0.14	0.06	0.9520
DRUGS	221,906.00	179,553.00	42,353.00	1.39	-0.45	0.6512
NONCOREPD**	16.30	16.43	-0.13	-0.22	0.44	0.6564
PSPD	0.35	0.40	-0.05	-0.69	0.31	0.7587
NSPD	19.57	19.88	-0.31	-0.41	0.09	0.9280
COUNSELPD**	5.89	5.76	0.13	0.48	0.32	0.7463
HHAPD	5.51	5.50	0.01	0.03	0.88	0.3766
% MEDICARE DAYS	0.85	0.84	0.01	0.34	1.04	0.2979
INPATSERV	170,701.00	148,680.00	22,021.00	0.57	0.70	0.4852
VISITPD	41.65	42.04	-0.39	-0.27	0.04	0.9650
Panel B: 2007	Mean			<i>t</i> - statistic	Wilcoxon Two Sample Test	
	NP 2007	FP 2007	Diff		Z	Pr > Z
Number of observations	413	1095				
LOS	77.17	78.34	-1.17	-0.36	-0.85	0.3967
TPM	0.05	-0.38	0.42	1.19	-1.20	0.2305
NURSEPD	33.25	36.44	-3.19	-1.71	-0.01	0.9893
INPATREVPD	354.80	276.10	78.70	0.62	-0.66	0.5074
COREPD	45.18	48.30	-3.12	-1.51	0.39	0.6934
DRUGS	285,272.00	215,835.00	69,437.00	2.63*	2.46	.0137*
NONCOREPD**	14.84	14.75	0.09	0.24	0.25	0.8057
PSPD	0.71	0.61	0.11	0.98	0.10	0.9204
NSPD	24.64	27.29	-2.65	-2.28*	-0.68	0.4962
COUNSELPD	7.66	7.66	0.00	0.00	1.54	0.1229
HHAPD	7.39	7.89	-0.50	-2.03*	-1.33	0.1851
% MEDICARE DAYS**	0.90	0.90	0.00	-0.59	-1.08	0.2782
INPATSERV	398,407.00	223,241.00	175,166.00	2.42*	3.12	0.0018
VISITPD	55.79	59.57	-3.78	-1.68	0.01	0.9941

* significant at the 5 % level

used satterthwaite test due to folded F test indicating that the variances were not equal

**used pooled variance t-statistic due to folded F test indicating that the variances were equal

See Table 1 for variable descriptions