

# Earlier Palliative Care Referrals Associated with Reduced Length of Stay and Hospital Charges

Patrick J. Macmillan, MD,<sup>1</sup> Brandon Chalfin, MD,<sup>2</sup> Alireza Soleimani Fard, MD,<sup>3</sup> and Susan Hughes, MS<sup>4</sup>

## Abstract

**Background:** Inpatient palliative care consultation services have been shown to have a dramatic impact on the time cancer patients spend in the hospital, which directly affects overall health care charges and expenditures.

**Objective:** Our study looks at early palliative care consults in patients with a variety of chronic medical conditions as well as cancer.

**Design:** This is a retrospective case–control study of patients referred to the palliative care department from April 2014 to June 2016.

**Setting/Subjects:** This study took place at a university-affiliated community-based urban tertiary care hospital. Cases were patients with a referral placed for a palliative care consult <24 hours after registration into the hospital. Controls were chosen on a one-to-one basis from all other patients referred 24 or more hours after registration. Participants were matched on underlying disease, Charlson comorbidity index, and date of referral.

**Measurements:** Primary outcomes were hospital length of stay and total hospital charges.

**Results:** The median (interquartile range) length of stay was 4.2 days (2.0–7.2) for cases and 9.7 days (6.0–18.3) for the control group;  $p < 0.001$ . Total hospital charges in U.S. dollars for cases and controls was \$38,600 (\$22,700–\$66,900) and \$95,300 (\$55,200–\$192,700), respectively;  $p < 0.001$ . Similar differences were seen for cancer and chronic disease cases and controls.

**Conclusions:** Our study demonstrates a significant association between reduced length of stay and hospital charges when consults for palliative care were initiated within 24 hours of hospital admission regardless of underlying disease.

**Keywords:** end-of-life care; high-value care; length of stay; palliative care

## Introduction

EXPLORATIONS of early inpatient palliative care consultations and their benefits are abundant.<sup>1</sup> The positive effects on length of stay and reduction in health care expenditures are well described, including hospital admission metrics.<sup>2</sup> Patients admitted to the hospital were reported to have shorter lengths of stay when palliative care consultations were requested from the emergency department (ED) versus later consultations.<sup>2</sup> Another study reported 30-day readmission rates also decreased when patients received palliative care consults. This reduction was attributed to palliative care consultations facilitating discussions of goals of care.<sup>3</sup>

In addition to improving admission metrics, palliative care consultations also decreased health care costs. A recent article in *JAMA Internal Medicine* reported palliative care consults reduced costs of care when a palliative care consultation occurs within three days of hospital admission.<sup>4</sup> In addition, the cost of care for adults with life-limiting illnesses decreased with earlier palliative care involvement. The researchers reported on an analysis of pooled data from six studies. The decrease in cost was greater in cancer patients than in those with noncancer diagnoses, with median savings of \$4,251 for the former and \$2,105 for the latter group individuals. Lastly, inpatient palliative care units have shown an association with cost savings in hospital settings.<sup>5</sup>

<sup>1</sup>Department of Internal Medicine, Hospice and Palliative Medicine, University of California San Francisco Fresno, Fresno, California.

<sup>2</sup>Department of Emergency Medicine, Hospice and Palliative Medicine, University of California San Francisco Fresno, Fresno, California.

<sup>3</sup>Department of Family and Community Medicine, Hospice and Palliative Medicine, University of California San Francisco Fresno, Fresno, California.

<sup>4</sup>Department of Family and Community Medicine, Hospice and Palliative Medicine, University of California San Francisco Fresno, Fresno, California.

Accepted June 21, 2019.

Most published studies focused on palliative care consultations for patients with advanced cancer<sup>6,7</sup>; however, few data are available to address the effects of consultations on other patient cohorts. We hypothesized that chronically or critically ill patients seen by the palliative care team earlier in the hospital course could possibly help avoid unnecessary admissions and allow for an early goals of care discussion, therefore avoiding unnecessary admissions, decreasing length of stay, and reducing hospital costs.<sup>8–11</sup> Our study looks at early palliative care consults in patients with a variety of chronic medical conditions as well as advanced cancer.

## Methods

This study took place at a central California university-affiliated community-based urban tertiary care hospital with ~700 beds. The inpatient palliative care team responds to consults throughout the hospital, including the ED, intensive care units (ICUs), and general floors. Records maintained within the palliative care department on all referrals and consults made from April 2014 to June 2016 were included in this case-control study. Cases were identified as those patients with a palliative care referral placed <24 hours after registration into the hospital. Controls were chosen on a one-to-one basis from all other patients referred 24 or more hours after registration.

To reduce bias, matching of controls to cases was done on three variables: underlying diagnosis, comorbidities, and date of referral. For example, a patient admitted for pneumonia who had lung cancer would be categorized as having an underlying cancer diagnosis. This routine assessment of underlying problem as compared with billable diagnosis is regularly done by palliative care team members. The Charlson comorbidity index,<sup>12</sup> a validated tool to measure disease burden, was used to match controls to cases using a score within three points on a scale from 0 to 36. The index includes age as part of the score, with older patients scoring more points. Controls were also matched for referral dates within six months (before or after) of the case.

Data for processing information to match cases to controls taken from palliative care records were as follows: underlying disease (malignancy type or chronic/terminal illness), admission date and time, discharge date and time, and palliative care order date and time. Data necessary to calculate the Charlson comorbidity index score were obtained by chart review. Potential patient-specific confounders taken from palliative care records included age, gender, race/ethnicity, referring physician, and patient department at the time of referral. Information on potential differences in the way the palliative care team treated the cases and controls were measured using discharge disposition, code status on admission, and code status on discharge. Primary outcome variables were hospital length of stay and total charges. In addition, a secondary outcome measure of ED visits that did not result in hospital admission was verified in the chart.

## Statistical analysis

Chi-squared tests were used to compare categorical data to test for differences between cases and controls. Nonparametric Wilcoxon rank sum tests were used to compare continuous data. Matching variables were tested to check on effectiveness of the match process. Basic demographics that

were not part of the match were tested for differences between cases and controls. Variables that could be impacted by a palliative care team consult were tested for differences. Finally, separate comparisons were done for cancer and chronic disease cases and controls. A two-sided *p*-value of <0.05 was considered statistically significant. SAS software (version 9.4; Cary, NC) was used for all analyses.

## Results

Two hundred ninety-five cases were identified and matched to 295 controls. Cases had 12 different diagnoses with nonhematologic malignancy as the most prevalent at 37% (Table 1). The average Charlson comorbidity index score was 7, with half of all patients having a score between 5 and 9. No differences were found between cases and controls for the matching variables of diagnosis, Charlson comorbidity index score or date of referral.

Demographics of cases and controls were not statistically different (Table 2). Median age was 72 years for cases and 70 for controls. About half of cases were female, whereas slightly fewer controls (44%) were female. Approximately 46% had a race/ethnicity of white and 35% Hispanic. The only difference in characteristics of cases and controls before palliative care consultation was the patient department at the time of the palliative consult request. Eighty-four percent of cases had the consult ordered when they were in the ED, whereas 67% of controls were on a general floor. The total number of palliative care consults originating from multiple medical specialties included 7% emergency medicine, 3% family medicine, 77% internal medicine, and 13% oncology (data not shown).

Other differences were seen after the palliative care consult, except in the case of change in code status (Table 3). More than half of all patients changed their code status to a lower level after their consult, but this was done for both cases and controls. The number of emergency room visits that were not admitted to the hospital was quite small, but all

TABLE 1. MATCHING INFORMATION FOR CASES AND CONTROLS

<i>Matching criteria</i>	<i>n</i>	<i>Percentage<sup>a</sup></i>
Sample size	295	
Diagnosis		
Congestive heart failure	30	10
Cirrhosis	14	5
Chronic obstructive pulmonary disease	12	4
Coronary vascular syndrome	36	12
Debility/frailty	13	4
Dementia	43	15
End-stage renal disease	11	4
HIV/AIDS	2	1
Malignancy (hematologic)	5	2
Malignancy (nonhematologic)	108	37
Multisystem organ failure	11	4
Neurological injury	10	3
Charlson score (median, IQR)	7 (5–9)	

<sup>a</sup>Percentages do not equal 100% due to round-off error. IQR, interquartile range.

TABLE 2. CHARACTERISTICS OF CASES AND CONTROLS BEFORE PALLIATIVE CARE CONSULTATION

Characteristic	Cases	Controls	P
Age, years (median, IQR)	72 (61–84)	70 (58–82)	0.07
Gender (%)			0.10
Male	49	56	
Female	51	44	
Race/ethnicity (% <sup>a</sup> )			0.65
Asian	8	10	
Black	6	7	
Hispanic	35	36	
White	46	45	
Other	4	2	
Department at the time of PC order (% <sup>a</sup> )			<0.001
Critical care unit	2	15	
Emergency	84	17	
Ward	14	67	

<sup>a</sup>Percentages do not equal 100% due to round-off error. PC, palliative care.

occurred in the cases and were a statistically significant finding. Discharge diagnosis was also different with fewer cases going to a skilled nursing facility than controls. The primary outcomes, median (interquartile range), for length of stay and hospital charges, were dramatically different between cases and controls. The median length of stay was 4.2 days (2.0–7.2) for cases and 9.7 days (6.0–18.3) for the control group ( $p < 0.001$ ). Total hospital charges (U.S. dollars) for cases and controls were \$38,600 (\$22,700–\$66,900) and \$95,300 (\$55,200–\$192,700), respectively ( $p < 0.001$ ).

Table 4 gives details after separating the cancer and chronic disease patients. Demographics of cancer patients were similar between cases and controls, whereas the median length of stay was 5.3 days (2.5–9.0) for cases and 9.6 days (5.9–17.9) for the control group;  $p < 0.001$ . Total hospital charges for cancer cases and controls was \$40,900 (\$27,200–\$77,600) and

\$89,200 (\$51,400–\$164,800), respectively;  $p < 0.001$ . Chronic disease patients' demographics showed a significant difference in age, with cases being older than controls ( $p = 0.02$ ). Chronic disease patients' median length of stay was 3.7 days (1.8–6.4) for cases and 10.0 days (6.0–18.7) for controls;  $p < 0.001$ . Chronic disease total hospital charges for cases and controls was \$37,700 (\$21,300–\$59,200) and \$97,700 (\$57,600–\$196,300), respectively;  $p < 0.0001$ .

### Discussion

Often patients on hospice care are sent to the hospital by panicked family members, and palliative care involvement in the ED can aid in sorting out if the patient actually needs admission or can be referred back home with hospice care. In addition, we often respond to intracranial hemorrhages or other traumatic events in the ED that often involve grief-stricken families with difficult end-of-life decisions.

We have cultivated a collaborative relationship with the ED and attempt to prioritize consults that originate from the ED if time allows. We recruited one of our fellows, who trained in emergency medicine, to join our palliative medicine faculty in hopes of placing them exclusively in the ED to respond to urgent consults and help avoid unnecessary admissions. In our study, we noted six cases that were seen in the ED who were not admitted to the hospital. In each case the palliative care service ultimately helped to avoid those admissions. Although statistically significant, the number of these types of patients was too low to draw any real conclusions. This remains an area where we would like to have a more dramatic impact on hospital admissions.

In looking at the origin of consults based on specialty we found that our hospitalists or internists generated more than three-fourths of the consults. Several hospitalists accounted for a significant number of consults, whereas most hospitalists provided one consult each to the total. As noted in the results, additional consults originated from emergency medicine, family medicine, and oncology.

TABLE 3. CHARACTERISTICS OF CASES AND CONTROLS AFTER PALLIATIVE CARE CONSULTATION

Characteristic	Cases	Controls	P
Discharge disposition (%)			<0.001
Died	19	16	
Home	35	30	
Hospice	23	25	
Skilled nursing facility	19	29	
Other <sup>a</sup>	4	0	
Code status change (% <sup>b</sup> )			0.75
Stayed comfort	8	8	
Stepped down to comfort	21	25	
Stayed No CPR	17	15	
Stepped down to No CPR	26	22	
Stayed limited	2	2	
Stayed full treatment	25	27	
ED visit with no admission, yes (%)	2	0	0.03
Length of stay, days (median, IQR)	4.2 (2.0–7.2)	9.7 (6.0–18.3)	<0.001
Total charges, U.S. dollars (median, IQR)	38,600 (22,700–66,900)	95,300 (55,200–192,700)	<0.001

<sup>a</sup>Other includes transfer hospital, left against medical advice, and incarcerated.

<sup>b</sup>Percentages do not equal 100% due to round-off error.

CPR, cardiopulmonary resuscitation; ED, emergency department.

TABLE 4. CHARACTERISTICS OF CASES AND CONTROLS BY DISEASE TYPE

Characteristic		Cases	Controls	p
Cancer	Sample size	113	113	
	Gender (%)			
	Female	50	47	0.69
	Male	50	53	
	Age, years (median, IQR)	64 (54–73)	64 (52–75)	0.73
	Race/ethnicity (% <sup>a</sup> )			
	Asian	8	9	0.19
	Black	4	8	
	Hispanic	36	43	
	White	46	39	
	Other	5	1	
Length of stay, days (median, IQR)	5.3 (2.5–9.0)	9.6 (5.9–17.9)	<0.001	
Total charges, U.S. dollars (median, IQR)	40,900 (27,200–77,600)	89,200 (51,400–164,800)	<0.001	
Chronic disease	Sample size	182	182	
	Gender (%)			
	Female	52	43	0.07
	Male	48	57	
	Age, years (median, IQR)	81 (66–88)	75 (62–86)	0.02
	Race/ethnicity (%)			
	Asian	9	10	0.93
	Black	7	6	
	Hispanic	35	32	
	White	46	49	
	Other	3	3	
Length of stay, days (median, IQR)	3.7 (1.8–6.4)	10.0 (6.0–18.7)	<0.001	
Total charges, U.S. dollars (median, IQR)	37,700 (21,300–59,200)	97,700 (57,600–196,300)	<0.001	

<sup>a</sup>Percentages do not equal 100% due to round-off error.

We were also interested in how early consults affected parts of the goals of care discussion. The code status discussions and changes were not affected by the timing of the consult. This is not too surprising as we often get consulted later in the admission and our goals of care discussions are no different than when we come on board earlier. Unfortunately, a consult is generated without the reason clearly delineated in the electronic health record. Oftentimes all the boxes are checked (e.g., goals of care, pain, symptom management, and hospice information) as reasons for a consult. We typically approach each consult with the understanding that all needs of the patient require attention, regardless of what the consulting provider lists as the reason for consult. In addition, we do not have so-called triggers for palliative care consults so we are limited from that standpoint as well when determining reasons for consult.

Our findings show a decrease in length of stay and hospital charges are associated with earlier palliative care interventions. This seems intuitive; however, the degree of difference is profound. Similar to the recent study in the *Journal of Palliative Medicine*, which showed an association between early inpatient palliative consults and a reduction in hospital costs, our study corroborates this phenomenon in a community hospital.<sup>13</sup> As high-value care becomes more dominant for hospital bottom lines these metrics and data collections are critical for palliative care teams when justifying their roles in the hospital. Our study includes patients with multiple medical conditions rather than the typical focus of advanced malignancy, which we feel adds benefit to the study.

When separating out chronically ill patients from patients with advanced malignancy we found that the length of stay was

more dramatically affected by early palliative care consults in patients with chronic illness. We can speculate that patients with advanced malignancy are subject to longer stays when being provided chemotherapy or awaiting biopsy results.

There seems to be a perception at our hospital, at least at the time the data were collected, that palliative care consultations are more appropriately indicated for individuals with a cancer diagnosis, as indicated by the number of consults we got for advanced cancer. More than one-third of patients seen on our inpatient consult service were cancer patients. As this perception wanes, we are hopeful that individuals with other chronic medical conditions begin to experience the benefits of palliative care interventions. It will continue to be important to track the timing of consults made for advanced cancer versus other chronic and life-limiting medical conditions.

The Charlson comorbidity index lends an amount of credibility to our study as well. This prognostic tool estimates the likelihood a person with a particular illness will survive for a specified number of years. The index accounts for patient's age, illness, and utilization of resources in a variety of chronic diseases. Matching our cohorts using this tool adds value to our study.

Limitations of our study include the retrospective design, relatively small sample size compared with other studies, and a single site execution. Although prospective studies in this population are difficult, more research with a prospective design needs to be pursued and studied. Attempting to measure quality-of-life metrics could also be included in this type of study. Also, exploring the impact of early referrals on high-value care will be important in the outpatient palliative clinic and home-based palliative care settings.

Our arbitrary designation of <24 hours to consult represents a difference in design and may not allow for a direct comparison of our findings with other studies. Other studies have used other time designations (e.g., within three days) to constitute an “early consult.” It would be valuable to measure if the difference between our measure and that of other studies is significant. This could be critical when making the case to hospital administrators when negotiating for more staff and resources. The implications could be subtle or profound to both length of stay and hospital costs when considering what constitutes an early consult. Our thinking was that earlier is better. Myriad things can transpire in that gap of time before the palliative care team arrives. ICU admissions, multiple unnecessary and costly tests, as well as emotional trauma to the patient and family can occur. We have seen dying elderly patients who were subjected to the cardiac laboratory and more aggressive measures in the ICU before our arrival.

In summary, our study looks at the effects of earlier palliative care intervention on length of stay and hospital charges. We intend to look at this association further by matching cases that did not get a palliative care consult. By doing this we can get an even deeper look at how our interventions influence length of stay and hospital charges.

### Conclusions

Our study at one university-affiliated community-based hospital in central California demonstrates that consults for palliative care initiated within 24 hours of hospital admission demonstrate a significant association in reduction of length of stay and hospital charges in patients regardless of their underlying disease.

### Acknowledgments

The authors thank Duc Chung, MD, Shane Lieberman, MD, John Thompson, MD, and Christine Swift, RN, MSN, for their contributions during the early development of our study. In addition, we extend our appreciation to Stephen A. Geraci, MD, for his guidance and editing expertise.

Previously presented at the 2017 Center to Advance Palliative Care National Seminar Poster Session in Phoenix, Phoenix, Arizona.

### Author Disclosure Statement

No competing financial interests exist for any of the authors.

### References

1. Kistler EA, Sean Morrison R, Richardson LD, et al.: Emergency department-triggered palliative care in advanced

cancer: Proof of concept. *Acad Emerg Med* 2015;22:237–239.

2. Wu FM, Newman JM, Lasher A, Brody AA: Effects of initiating palliative care consultation in the emergency department on inpatient length of stay. *J Palliat Med* 2013;16:1362–1367.
3. O'Connor NR, Moyer ME, Behta M, Casarett DJ: The impact of inpatient palliative care consultations on 30-day hospital readmissions. *J Palliat Med* 2015;18:956–961.
4. May P, Normand C, Cassel JB, et al.: Economics of palliative care for hospitalized adults with serious illness: A meta-analysis. *JAMA Intern Med* 2018;178:820–829.
5. Nathaniel JD, Garrido MM, Chai EJ, et al.: Cost savings associated with an inpatient palliative care unit: Results from the first two years. *J Pain Symptom Manage* 2015;50:147–154.
6. May P, Garrido MM, Cassel JB, et al.: Prospective cohort study of hospital palliative care teams for inpatients with advanced cancer: Earlier consultation is associated with larger cost-saving effect. *J Clin Oncol* 2015;33:2745–2752.
7. May P, Garrido MM, Cassel JB, et al.: Palliative care teams' cost-saving effect is larger for cancer patients with higher numbers of comorbidities. *Health Aff (Millwood)* 2016;35:44–53.
8. Gunjur A: Early in-patient palliative care consultation saves costs. *Lancet Oncol* 2015;16:e321.
9. May P, Normand C, Morrison RS: Economic impact of hospital inpatient palliative care consultation: Review of current evidence and directions for future research. *J Palliat Med* 2014;17:1054–1063.
10. Starks H, Wang S, Farber S, et al.: Cost savings vary by length of stay for inpatients receiving palliative care consultation services. *J Palliat Med* 2013;16:1215–1220.
11. Smith TJ, Cassel JB: Cost and non-clinical outcomes of palliative care. *J Pain Symptom Manage* 2009;38:32–44.
12. Charlson M, Szatrowski TP, Peterson J, Gold J: Validation of a combined comorbidity index. *J Clin Epidemiol* 1994;47:1245–1251.
13. Fitzpatrick J, Mavissakalian M, Luciani T, et al.: Economic impact of early inpatient palliative care intervention in a community hospital setting. *J Palliat Med* 2018;21:933–939.

Address correspondence to:

*Patrick J. Macmillan, MD*

*Department of Internal Medicine*

*Hospice and Palliative Medicine*

*University of California San Francisco Fresno*

*155 N Fresno Street*

*Fresno, CA 93701*

*E-mail: pmacmillan@fresno.ucsf.edu*