

# Physician Factors in the Timing of Cancer Patient Referral to Hospice Palliative Care

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**BACKGROUND.** Although physicians state that patients ideally should receive hospice care for 3 months before death, the majority of patients survive < 1 month in hospice care. In the current study, the authors attempted to determine whether the attributes of referring physicians were associated with the survival of terminally ill cancer patients in hospice.

**METHODS.** Using a prospective cohort study design, the authors observed the survival of 326 terminally ill cancer patients who were referred by 258 different physicians to 5 outpatient hospice programs in Chicago. The authors evaluated associations between patient, physician, and patient-physician relationship factors and patient survival.

**RESULTS.** Of the 326 participating patients, 313 (96%) had known dates of death. For these patients, the median survival was 26 days. Controlling for patient demographic and disease factors, there were several physician factors found to be associated with the length of patient survival after hospice referral. For example, when a physician had referred  $\geq 2$  patients to hospice care in the previous 3 months, the patient survived 17 days longer in hospice compared with those patients whose physician referred fewer patients to hospice. When a physician estimated patient survival accurately (estimate obtained at the time of referral), the patient lived 20 days longer in hospice compared with those patients whose physicians made inaccurate survival estimates. The practice specialty of the physician also was found to be associated with patient survival after hospice referral, with patients referred by general internists and geriatricians living 18 days longer in hospice compared with those patients who were referred by oncologists.

**CONCLUSIONS.** In the current study, referring physician factors were found to be associated with the survival of terminally ill cancer patients after referral to hospice. *Cancer* 2002;94:2733–7. © 2002 American Cancer Society.

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**KEYWORDS:** terminal illness, prognostic accuracy, hospice, palliative care, survival.

Although physicians state that patients ideally should receive hospice care for 3 months before death,<sup>1</sup> the majority of patients survive < 1 month in hospice care.<sup>2,3</sup> Some have argued that physicians' prognostic inaccuracy, specifically their tendency toward optimistic survival estimates, may be responsible in part for this difference between physicians' idealized patient survival in hospice and their actual survival in hospice.<sup>3</sup> We sought to determine the effect of physicians' prognostic accuracy on the length of their patients' survival after referral to hospice. More generally, we sought to evaluate the possible role of physician characteristics in influencing the timing of the referral of a terminally ill cancer patient to hospice. Insofar as attributes of referring physicians are associated with patient survival, they are likely being mediated by referral. Although extensive

prior studies have documented a variety of patient factors associated with survival after hospice referral (a proxy for timing of hospice referral),<sup>4-12</sup> to our knowledge there currently are few studies documenting physician characteristics.<sup>5,13-15</sup> In the current study, we attempted to evaluate the possible role of physician factors in the survival of cancer patients receiving hospice palliative care.

## MATERIALS AND METHODS

### Sample

The current study cohort was comprised of all consenting patients admitted to 5 outpatient hospice programs in Chicago during 130 consecutive days in the winter and spring of 1996. Participating hospices usually notified us regarding patients on the day of admission. We contacted the referring physicians as soon as possible and administered a 4-minute phone survey collecting a variety of information. The median time between notification and survey administration was 48 hours. This research was approved and conducted in accordance with the institutional review board regulations at each participating hospice.

A total of 767 patients who consented to the current study were referred by 502 physicians during the study period. The 5 hospices contributed 13%, 14%, 17%, 22%, and 34%, respectively, of the sample. Of the total of 767 patients, 325 did not meet entry criteria for this cohort, either because they had a noncancer diagnosis ( $n = 285$ ) (an expected percentage based on national data)<sup>1,2</sup> or because their physician was not an appropriate subject ( $n = 40$ ) (e.g., because he/she already had responded to 6 cases). Through this latter exclusion, we sought to keep cluster sizes small to reduce respondent burden and to optimize our subsequent estimates of effect size in the statistical analyses. An additional 30 patients had died before we were notified of their admission to hospice. For the remaining 412 eligible patients, we reached 38 physicians (9.2%) after the patient had died (and so could not obtain a meaningful prognostic estimate), we reached 8 physicians (1.9%) before the patient died but the physician refused to participate, and we failed to reach 40 physicians (9.7%). We still obtained basic patient and physician information and time of death for the foregoing patients. We therefore were successful in completing surveys with physicians who were caring for 326 of the eligible patients (a completion rate 79.1%), and our analytic sample is comprised of these 326 patients referred by 258 different physicians. In general, these physicians were community-based physicians who had cared for the patients prior to hospice referral. Comparison of these 326 patients with the 86 cancer patients who were excluded did not

reveal statistically significant differences in terms of such attributes as patient age, gender, race, cancer type, or disease duration, or with regard to their physicians' gender, practice experience, or specialty.

### Variables and Sources of Data

From the hospice, we obtained data regarding the patients' age, gender, race, religion, marital status, diagnosis, and comorbidities. From the physician survey, we obtained patient information, including Eastern Cooperative Oncology Group (ECOG) performance status,<sup>16</sup> duration of illness, how accepting the patient was of the hospice referral, and an estimate of how long the patient had to live (we termed this the "predicted survival.") as well as physician information, including the number of prior hospice referrals and information regarding the physician/patient relationship (including the date of first meeting and who had initiated the hospice referral). From public records, we obtained other physician data such as specialty, years in practice, and board certification. From public death registries or the hospices, we obtained patient death dates and therefore were able to calculate each patient's observed survival in hospice.

We created a "physicians' prognostic accuracy" variable for each patient by dividing the observed survival by the predicted survival in a manner described previously.<sup>3</sup> We deemed physicians' prognoses "accurate" if this quotient was between 0.67 and 1.33. Values  $< 0.67$  were termed "optimistic" prognostic errors and those  $> 1.33$  were termed "pessimistic" prognostic errors. We conducted analyses involving different cutpoints or more categories, as well as analyses that treated this quotient as a continuous measure, but these analyses did not contravene the results presented.

### Statistical Analyses

To evaluate associations between survival after referral to hospice and categorical and continuous variables, we used analysis of variance and single-term simple linear regression, respectively. We used multiple linear regression to model the multivariate impact of patient and physician variables on survival after hospice referral. Because we were interested in relative survival differences as expressed in days rather than relative hazards and because our data did not have any censoring, our regression model was a simple linear regression, not a Cox proportional hazards model. All analyses were performed using STATA 7.0 software (Stata, College Station, TX).

**RESULTS**

**Cohort Characteristics**

Table 1 provides descriptive information regarding the patient ( $n = 326$ ) and physician sample ( $n = 258$ ). The patients had a mean age of 69.2 years ( $\pm 14.1$  years standard deviation), 39.6% were male, and the leading principal diagnoses were lung carcinoma (28.5%), colorectal carcinoma (10.7%), breast carcinoma (9.5%), and pancreatic carcinoma (8.0%). The median ECOG performance status was 3 (corresponding to  $> 50\%$  of the day spent in bed). These traits are typical of hospice cancer patients nationwide.<sup>1,2</sup> Of the 326 patients in the current study cohort, 313 (96%) had known dates of death. For these patients, the median survival was 26 days and the mean survival was 55 days.

The physicians had a median duration of medical practice of 17 years and 80.2% were male. Their specialty distribution was internal medicine (29.9%), hematology-oncology (23.2%), nononcologic internal medicine subspecialties (18.1%), family practice or general practice (13.8%), and geriatrics (7.1%), and 82% were board certified in their specialty.

**Factors Associated with Patient Survival**

Bivariate analyses of patient survival and patient attributes using analysis of variance and single-term simple linear regression models revealed important differences with respect to marital status, disease duration, ECOG performance status, physician specialty, physician prognostic estimate, and physician prognostic accuracy. We found that unmarried patients (single, divorced, or widowed) lived 26.4 days longer in hospice compared with married patients (95% CI, 8.9, 43.9); each additional year the patient had been sick with cancer was associated with a 4.3-day longer survival in hospice (95% CI, 1.2, 7.4) and with each incremental increase in the ECOG performance status (representing a decline in function), the survival decreased by 26.8 days (95% CI,  $-35.0$ ,  $-18.7$ ).

Bivariate analyses of patient survival and referring physician attributes demonstrated important differences with respect to physician specialty and prognostic ability. As shown in Table 2, patients referred by oncologists survived the shortest in hospice care (36.8 days) and those referred by a group of physicians comprised primarily of surgeons lived the longest (82 days); the survival of patients referred by other medicine subspecialists, general internists or gerontologists, surgeons, and family practitioners fell between these two values ( $P < 0.01$ ). The physician's prediction of patient survival was found to be correlated positively with the actual survival of the patients after

**TABLE 1**  
**Characteristics of 326 Terminally Ill Cancer Patients and Their Physicians**

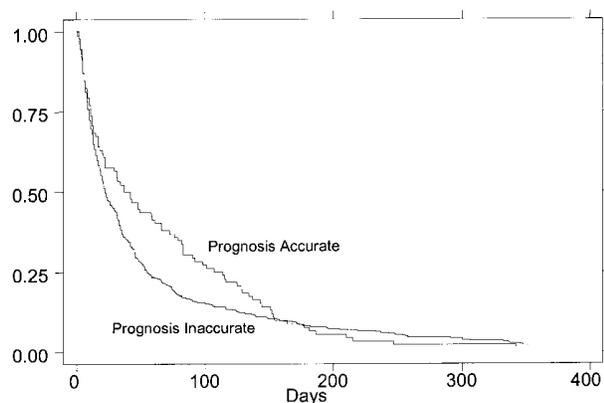
<i>Patient characteristics (n = 326)</i>	
Mean age (yrs) (SD)	69.2 $\pm$ 14.1
Male gender	39.6%
Race/ethnicity	
White	51.8%
African-American	19.6%
Asian	2.2%
Hispanic	4.3%
Unknown	22.1%
Marital status	
Married	43.4%
Single	16.7%
Divorced	10.3%
Widowed	29.6%
Cancer diagnosis	
Head and Neck	2.45%
Upper GI	4.60%
Colorectal	10.74%
Hepatobiliary	4.60%
Pancreas	8.0%
Lung	28.53%
Skin	0.92%
Breast	9.51%
Female genitourinary tract	6.13%
Prostate	5.83%
Urinary tract	4.60%
Central nervous system	2.76%
Lymphoma	2.45%
Leukemia	2.76%
Other	6.13%
Median disease duration (wks)	32
Median performance status (ECOG)	3
Patient accepting of hospice referral	87.2%
<i>Physician characteristics (n = 258)</i>	
Male gender	80.2%
Median yrs in practice	17
Board certification	82.2%
Specialty	
General internal medicine	29.9%
Hematology-oncology	23.2%
Cardiology	2.8%
Pulmonary/critical care	4.3%
Geriatrics	7.1%
Gastroenterology	3.2%
Other internal medicine subspecialties	7.9%
General surgery	1.6%
Gynecology or gynecologic oncology	2.0%
Other surgical specialities	1.6%
Family practice	13.8%
Other specialities	2.8%
Median similar patients in last 12 mos	3
Median hospice referrals in last 12 mos	8
Agrees with the statement "I am an Optimist"	72.2%
Median confidence in prediction	70.0%
<i>Patient-Physician relationship characteristics (n = 326)</i>	
Median duration of relationship (wks)	43
Median no. of contacts in last 3 mos	8 contacts

SD: standard deviation; GI: gastrointestinal; ECOG: Eastern Cooperative Oncology Group.

**TABLE 2**  
Bivariate Associations between Physician Specialty and Patient Survival in Hospice

Physician specialty	Mean survival (days)	No.
Oncology	36.8	102
Other internal medicine subspecialties	41.4	48
General medicine/geriatrics	67.4	102
Family practice/general practice	67.8	36
Surgery and other	82.0	21
Total		309

$P < 0.01$



**FIGURE 1.** Kaplan-Meier survival estimates based on physician prognostic accuracy

hospice referral (for example, with each 30-day increment in the physician's predicted survival, the patient lived an additional 7 days [95% CI, 5.1, 9.0]). However, more pertinent, patients of physicians whose prognostic estimates later were found to be "correct", lived on average 24 days longer after hospice referral compared with patients of physicians whose prognoses later were found to be "incorrect" (95% CI, 5.6, 42.8). Figure 1 shows a Kaplan-Meier survival curve describing the differences in survival between patients referred to hospice by physicians whose prognostic predictions were later found to be accurate and those whose predictions were later found to be inaccurate. Bivariate analyses of patient survival and the physician-patient relationship variables demonstrated no apparently significant differences.

Using a multivariate regression model, we combined significant variables from the bivariate analyses at the 5% level, standard patient and physician demographic variables, and variables in which we had substantive interest. The model, reported in Table 3, revealed that patient ECOG performance status, referring physician specialty, prior experience with

**TABLE 3**  
Multivariate Analysis of Patient, Physician, Patient-Physician Variables and Patient Survival after Hospice Referral

Variable	Days	95% CI
Patient performance status (ECOG)	-18.1	-25.1, -11.2
Physicians' predicted patient survival	0.20	0.1, 0.2
Physician specialty		
Hematology-oncology	-18.1	-35.9, -0.2
Other IM Subspecialty	-24.0	-45.3, -2.7
Surgery and other	3.0	-26.3, 32.4
FP/GP	-21.0	-44.1, 2.2
Referred $\geq 2$ patients to hospice in last 3 mos	17.0	2.5, 31.5
Accurate prediction	20.5	4.0, 36.9

95% CI: 95% confidence interval; ECOG: Eastern Cooperative Oncology Group; IM: internal medicine; FP/GP: family practice/general practice.

Table 3 presents the relative survival differences for patients referred to hospice palliative care with respect to specified patient and physician factors. In addition, the model controls for patient age, gender, race, marital status, and duration of illness and physician gender and experience. The omitted (reference) category for physician specialty is geriatrics/general internal medicine. Performance status is measured on the Eastern Cooperative Oncology Group continuous 0-4 scale with 0 = normal activity and 4 = completely bed-bound.

hospice patients, predicted survival, and prognostic accuracy all were important and significant predictors of cancer patient survival in hospice. Controlling for patient attributes, patients referred by oncologists survived 18.1 fewer days in hospice compared with patients referred by general internists or gerontologists (95% CI, -35.9, -0.2). Patients referred by physicians who estimated their survival accurately<sup>3</sup> lived 20.5 days longer in hospice compared with patients referred by physicians who made inaccurate survival estimates (95% CI, 4.0, 36.9). Patients referred by physicians who had referred  $\geq 2$  patients to hospice in the prior 3 months lived 17.0 days longer in hospice compared with patients whose physicians had referred fewer patients during that period (95% CI, 2.5, 31.5).

## DISCUSSION

We found that among terminally ill cancer patients who had been referred for hospice palliative care, attributes of the referring physician were important and significant predictors of their hospice length of stay. In particular, the prognostic accuracy of their referring physician was very important. The mean hospice survival for patients referred by physicians who estimated their survival accurately was over 3 weeks (24 days) longer than the mean survival of those patients whose physicians were inaccurate with regard to their survival estimate ( $P = 0.01$ ). This difference remained significant in the multivariate model. This finding suggests that, on average, the patients referred by physicians who are able to foresee their survival accurately are more likely to survive the ide-

alized 3 months in hospice palliative care than patients referred by physicians who are not able to predict their survival accurately. This finding provides further evidence in support of the hypothesis that shorter-than-idealized survival in hospice palliative care is, at least in part, due to physician prognostic inaccuracy.<sup>1-3</sup>

In addition, we found that patients referred to hospice care by internal medicine subspecialists (medical oncologists and other types) spent fewer days in hospice before death than patients referred by general internists and geriatricians. This finding is in keeping with prior survey work of a national random sample of internists that demonstrated that general internists had a longer lead-time preference for hospice referral.<sup>17</sup> Given that hospices discourage the first-line use of costly approaches to palliation (e.g., chemotherapy, radiation therapy, invasive procedures) and that general internists are unable provide such procedures, it is not surprising that general internists might refer patients to hospice care earlier than medical oncologists because hospice care will pose fewer therapeutic constraints for them compared with physicians who can provide such procedures. Supporting the hypothesis that the survival differences may be related to hospice reimbursement policies in the U.S. is recent literature from Italy (where the practice of medicine is less cost-sensitive) that demonstrates that cancer patients referred by oncologists and generalists have statistically similar survivals.<sup>13</sup>

There are limitations to the current study. First, our definition of "accurate" and "inaccurate" survival predictions may appear arbitrary. We chose this accuracy metric because of its precedent in the literature describing survival predictions by physicians referring patients to hospice programs.<sup>3,18</sup> Second, the requirement that patients referred to hospices live until the time of survey administration may present a possible left truncation bias, suggesting caution in generalizing our results to those patients who die within the first 1-2 days after hospice referral. Third, given the response rate of < 100%, there is the possibility of recruitment bias. However, our response rate (77.4%) significantly exceeded that of other reported surveys requiring physician completion and there was minimal difference between respondents and nonrespondents with regard to several measurable attributes.<sup>19</sup>

The findings of the current study demonstrate that patient and referring physician factors are associated with cancer patient survival after referral to hospice care. Physician prognostic accuracy, specialty, and previous experience with hospice patients each

are associated with longer patient survival in hospice, and thus most likely earlier referral.

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