original contributions

Different Associations Between Inpatient or Outpatient Palliative Care and End-of-Life Outcomes for Hospitalized Patients With Cancer

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QUESTION ASKED For decedents with cancer who experience hospitalizations toward end of life (EOL), how many receive inpatient and outpatient palliative care (PC), and how are EOL outcomes associated with PC in these two settings?

SUMMARY ANSWER: Half of decedents with cancer had any (outpatient or inpatient) exposure to PC, but only 21% were seen by outpatient PC. Any PC exposure was associated with improvements in EOL care quality, but only outpatient PC was associated with shorter hospital length-of-stay (LOS) and longer hospice LOS.

WHAT WE DID: We examined all patients admitted to one cancer center's inpatient oncology unit in a single year (October 2017 through September 2018) and were deceased by October 2020, using chart abstraction to describe EOL care processes.

WHAT WE FOUND: Five hundred twenty-two decedents were identified; 50% had any PC exposure, but only 21% were seen by outpatient PC. Any PC exposure was associated with hospice enrollment, do-not-resuscitate status, completion of advance care planning documents, and death at home or inpatient hospice instead of in hospital. Only outpatient PC was associated with shorter hospital LOS and longer hospice LOS.

BIAS, CONFOUNDING FACTOR(S), REAL-LIFE IMPLICATIONS: This was an observational study using existing data, not controlling for confounders including performance status, illness severity, prior cancer treatment, patient and family care preferences, and other factors. With these limitations in mind, our findings suggest PC is associated with better EOL care quality, but inpatient and outpatient PC have different effects. Patients with advanced cancer should receive outpatient PC early, concurrently with cancer treatment. Expansion and robust support of outpatient PC should be a priority for hospitals.

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ASSOCIATED CONTENT

Appendix

See accompanying editorial on page 255

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CARE DELIVERY

original contributions

Different Associations Between Inpatient or Outpatient Palliative Care and End-of-Life Outcomes for Hospitalized Patients With Cancer

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abstract

PURPOSE Palliative care (PC) improves outcomes in advanced cancer, and guidelines recommend early outpatient referral. However, many PC teams see more inpatient than outpatient consults. We conducted a retrospective study of hospitalized patients with cancer to quantify exposure to inpatient and outpatient PC and describe associations between PC and end-of-life (EOL) quality measures.

METHODS We identified all decedents admitted to an inpatient oncology unit in 1 year (October 1, 2017-September 30, 2018) and abstracted hospitalization statistics, inpatient and outpatient PC visits, and EOL outcomes. Descriptive statistics, univariate tests, and multivariate analysis evaluated associations between PC and patient outcomes.

RESULTS In total, 522 decedents were identified. 50% saw PC; only 21% had an outpatient PC visit. Decedents seen by PC were more likely to enroll in hospice (78% *v* 44%; $P < .001$), have do-not-resuscitate status (87% *v* 55%; $P < .001$), have advance care planning documents (53% *v* 31%; $P < .001$), and die at home or inpatient hospice instead of in hospital (67% *v* 40%; $P < .01$). Decedents seen by PC had longer hospital length-of-stay (LOS; 8.4 *v* 7.0 days; $P = .03$), but this association reversed for decedents seen by outpatient PC (6.3 *v* 8.3 days; $P < .001$), who also had longer hospice LOS (46.5 *v* 27.1 days; $P < .01$) and less EOL intensive care (6% *v* 15%; $P < .05$).

CONCLUSION PC was associated with significantly more hospice utilization and advance care planning. Patients seen specifically by outpatient PC had shorter hospital LOS and longer hospice LOS. These findings suggest different effects of inpatient and outpatient PC, underscoring the importance of robust outpatient PC.

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INTRODUCTION

Over the past decade, randomized controlled trials have shown that early delivery of specialized palliative care (PC) improves outcomes for patients with advanced cancer, including improved quality of life (QOL), reduced symptom burden, less patient and caregiver distress, and longer survival.[1-5] ASCO recommends that patients with advanced cancer, whether inpatient or outpatient, should receive dedicated PC services, early in the disease course, concurrent with active treatment.[6] However, despite the growth of PC across the United States, early, robust, and longitudinal integration of PC into cancer care remains aspiration rather than reality at many hospitals. National Cancer Institute–designated cancer centers have expanded outpatient PC since 2009, but inpatient consultation volumes remain significantly larger than outpatient volumes as of 2018.[7] As such, it is critical to understand the delivery process and clinical impact of PC consultation in the inpatient oncology setting, which differs from the interventions supported by earlier trials in the outpatient setting.

A number of studies have examined the effects of inpatient PC consultation on patients with cancer. These suggest a variety of benefits from inpatient PC, including reduced symptom severity,[8-11] increased disease awareness and election of do-not-resuscitate (DNR) status,[12-14] and decreased health care costs.[15,16] Unfortunately, this body of evidence is heterogeneous in terms of study design and quality, being largely composed of nonrandomized and uncontrolled studies[17]; two notable exceptions are recent randomized trials showing that inpatient PC, compared with usual care alone, improves QOL in patients with hematologic

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malignancies.[18,19] On the basis of these studies, individual centers have begun to implement new models of care with the goal of better integrating PC into the inpatient oncology setting. These include clinical triggers to facilitate or encourage PC consultation[20,21] and a corounding (as opposed to consultative) role for PC clinicians.[22]

Despite these innovations, gaps in the literature remain. Notably, although a variety of benefits have been attributed to inpatient and outpatient PC individually, the relative impact of inpatient *v* outpatient PC on outcomes is not as well described. This is important because the two settings are characterized by a marked difference in care delivery and process: outpatient PC visits often transpire as a result of referral earlier in the disease course, enabling longitudinal building of rapport, patient and family coping skills, and disease understanding; whereas inpatient PC teams are often involved later in the disease course, usually providing assistance with acute symptom management and decision making in the context of hospitalization or clinical crisis.[23] To address this gap in the evidence base, we conducted a retrospective cohort study of decedents with cancer who were hospitalized during 1 year in our center's inpatient oncology unit. Our goals were to describe which and how many patients were seen by inpatient and outpatient PC before death, to evaluate associations between PC exposure and end-of-life (EOL) quality measures, and to identify areas of differential impact of inpatient and outpatient PC on EOL outcomes and health care utilization.

METHODS

Study Design

This is a retrospective, observational study using preexisting data from the medical record to examine EOL outcomes in decedents with cancer who were hospitalized in the final 2 years of life, and explore associations between EOL outcomes and inpatient *v* outpatient PC exposure. Outcomes and analyses were post hoc and exploratory in nature. This study was reviewed and approved by the Beth Israel Deaconess Medical Center Institutional Review Board.

The subset of hospitalized decedents (as opposed to all decedents from the cancer center) was chosen for two specific reasons: (1) to describe a cohort with higher severity of illness and greater health care utilization, where EOL care processes would be abundantly documented, and (2) to describe a cohort that is less well described in the PC literature, which has often centered on the longitudinal experiences of patients in outpatient models of PC.

Data Collection

We identified all patients admitted to our cancer center's inpatient oncology unit during a single fiscal year (October 1, 2017, through September 30, 2018). Through targeted chart review, multiple study authors (J.C.Y., A.R.U., and R.J.B.) abstracted patient demographic information, hospitalization statistics, and number of inpatient and/or outpatient PC visits for each patient. Inpatient and outpatient PC exposure were treated as separate independent variables.

Decedents were identified through chart review and publicly available obituaries. For decedents, EOL outcomes, many of which correspond to quality measures published by ASCO's Quality Outcomes Practice Initiative, were captured in detail. These included hospice utilization, presence of advance care planning (ACP) documents in the electronic medical record, code status before death, pain and dyspnea management in the final two clinical encounters before death, and rates of systemic cancer therapy in the final 14 days of life and intensive care unit (ICU) utilization in the final 30 days of life. Hospital and hospice lengths-of-stay (LOS) were also documented. Health care utilization at other centers (including outside hospital admissions, ICU utilization, and PC utilization) was not able to be abstracted from the medical record.

PC Operations

At our center, during the study timeframe, oncology patients were referred to PC services at the discretion of a consulting physician (ie, an inpatient oncology service attending or longitudinal outpatient oncologist), as is routine in most centers across the United States. No automatic referral criteria or consult triggers were in use at this time. The inpatient and outpatient PC services were staffed by a hospital-based interdisciplinary team consisting of physicians (4.4 total clinical full-time equivalents or cFTE), nurse practitioners (1.3 cFTE), and social workers (1.3 cFTE), all of whom had specialty PC certification in their respective disciplines. PC consultations in both settings involved comprehensive symptom assessment and management; support of coping and prognostic understanding; exploration of patients' goals and values; and when warranted by the clinical situation, assistance with medical decision making and identification of EOL care preferences. Inpatient PC consults were seen on weekdays, with approximately 1,200 new patients seen over the year (average daily service census of 20-30 patients), and outpatient PC visits were seen two half-days per week, with approximately 800 total visits (250 new patients) over the year.

Statistical Analysis

Descriptive statistics and frequency distributions were used to summarize the results, and *t*-tests and chi-square tests were used to evaluate associations between PC exposure and continuous or categorical outcomes, respectively. We used generalized estimating equations to estimate means and standard deviations of continuous measures while accounting for multiple admissions per patient. Multivariate analysis of hospital LOS was done using generalized estimating equations to estimate change in LOS while accounting for age, sex, race and ethnicity, cancer type, and repeated measures among patients. To adjust for multiple

testing, we used a Bonferroni correction for all univariate analyses: the desired α of 0.05 was divided by 17 (the total number of outcome comparisons), yielding a statistical significance level of $< .003$ for two-sided P values. All analyses were performed using Stata version 13.0 (StataCorp, College Station, TX).

RESULTS

In 1 year, 899 unique patients were hospitalized; 57 were medical or surgical patients without an oncologic diagnosis and were excluded. Of the remaining 842 patients, 522 were deceased by the study cutoff date (October 1, 2020) and were included in the following analyses. Of the 522 decedents, 50% (n = 259) had some exposure to PC before death. Of these, most had only inpatient PC consultation; only 21% of all decedents (n = 111) had an outpatient PC visit before death. Thirteen percent of decedents (n = 68) were seen by both inpatient and outpatient PC. Patients seen by inpatient PC had a median of five inpatient visits (interquartile range [IQR]: 3-8 visits), with the first visit occurring a median of 45 days before death (IQR: 16-121 days). Patients seen by outpatient PC had a median of two clinic visits (IQR: 1-4 visits), with their first visit occurring a median of 223 days before death (IQR: 96-458 days).

In terms of patient demographics across the cohort (Table 1), the median age at death was 69 years (range: 22-93 years), 47% were women, 25% were from self-identified racial or ethnic minority groups, and 82% had advanced or metastatic solid tumors. Compared with patients without PC exposure, decedents seen by PC were younger at time of death (66 *v* 71 years; $P < .001$), more likely to be female (52% *v* 42%; $P = .03$), and more likely to have advanced or metastatic solid disease (90% *v* 74%; $P < .001$) as opposed to localized disease, leukemias, or lymphomas. There was no difference in distribution of self-reported race or ethnicity between the PC and non-PC groups.

In terms of hospitalization statistics (Table 2), the most common reasons for admission were cancer- or treatment-related complications (including infections, uncontrolled symptoms, and other problems related to disease progression). This was especially true for patients seen by PC, who had significantly fewer admissions for other reasons (non–cancer-related issues, planned chemotherapy, or expedited medical workup without complication) than their non-PC counterparts (14% *v* 29%; $P < .001$). Patients seen by PC had longer average hospital LOS (8.4 *v* 7.2 days; $P = .03$), but on subgroup analysis, this difference was because of longer LOS among patients seen only by inpatient PC. Patients with outpatient PC exposure had the reverse association (hospital LOS 6.3 days *v* 8.2 days; $P < .001$), as well as fewer mean hospitalized days over the entire year (16.0 *v* 21.2 days; $P = .003$) compared with patients never seen by outpatient PC. This association remained significant in a multivariate analysis of factors associated with LOS (Appendix Table A1, online only); controlling for patient demographics and cancer type, any exposure to outpatient PC conferred an adjusted change of –1.18 days in mean LOS per hospital admission. Between groups, there was no difference in the rate of 30-day readmissions, which was high across the entire cohort (37% of admissions).

TABLE 1. Patient Demographics

Characteristic	Entire Cohort (N = 522)	No PC (n = 263)	Any PC (n = 259)	Inpatient PC (n = 216)	Outpatient PC (n = 111)	*P*[a] (any PC *v* no PC)
Age at death, years	68 ± 12	71 ± 12	66 ± 12	66 ± 12	66 ± 11	< .001[a]
Sex						.03
Male	277 (53)	152 (58)	125 (48)	104 (40)	56 (50)	
Female	245 (47)	111 (42)	134 (52)	112 (60)	55 (50)	
Race or ethnicity						.86
White	394 (75)	202 (77)	192 (74)	159 (74)	84 (76)	
Black/African American	68 (13)	32 (12)	36 (14)	33 (15)	10 (9)	
Hispanic	21 (4)	11 (4)	10 (4)	8 (4)	6 (5)	
Asian and other	39 (8)	18 (7)	21 (8)	16 (7)	11 (10)	
Cancer type						< .001
Solid, localized	13 (2)	8 (3)	5 (2)	2 (1)	5 (4)	
Solid, advanced or metastatic	426 (82)	194 (74)	232 (90)	195 (90)	103 (93)	
Leukemia or lymphoma	83 (16)	61 (23)	22 (8)	19 (9)	3 (3)	

NOTE. Unless otherwise indicated, continuous variables are reported as mean ± standard deviation, and categorical variables are reported as raw numbers with percentage distribution in each column.

Abbreviation: PC, palliative care.

[a]Comparing Any PC to No PC by *t*-test for continuous variables and chi-square test for categorical variables.

TABLE 2. Hospitalization Statistics

Outcome	Entire Cohort (N = 522 patients, 1,343 admissions)	No PC (n = 263 patients, 683 admissions)	Any PC (n = 259 patients, 660 admissions)	Inpatient PC (n = 216 patients, 564 admissions)	Outpatient PC (n = 111 patients, 280 admissions)	P^a (any PC *v* no PC)	P^b (outpatient PC *v* all others)
Admission reason						< .001	< .001
Planned chemotherapy	127 (9)	95 (14)	32 (5)	15 (3)	18 (6)		
Expedited workup or noncancer complication	158 (12)	100 (15)	58 (9)	47 (8)	24 (9)		
Cancer-related or treatment-related	1,058 (79)	488 (71)	570 (86)	502 (89)	238 (85)		
Discharge location						< .001	< .001
Home, ALF, or community	929 (69)	521 (76)	408 (62)	324 (57)	204 (73)		
SNF, LTC, or inpatient rehabilitation	205 (15)	106 (16)	99 (15)	93 (16)	35 (13)		
Home hospice	81 (6)	20 (3)	61 (9)	58 (10)	19 (7)		
Facility-based hospice	54 (4)	8 (1)	46 (7)	43 (8)	13 (5)		
Deceased in hospital	74 (6)	28 (4)	46 (7)	46 (8)	9 (3)		
30-day readmissions	502 (37)	253 (37)	249 (38)	218 (39)	104 (37)	.75	.93
Hospital LOS, days	7.8 ± 9.87	7.2 ± 9.0	8.4 ± 10.7	9.0 ± 11.1	6.3 ± 6.5	.03	< .001[c]
Admissions (per patient)	2.6 ± 1.7	2.6 ± 1.8	2.5 ± 1.5	2.6 ± 1.5	2.5 ± 1.6	.74	.54
Hospital days (per patient in 1 year)	20.0 ± 20.0	18.8 ± 19.7	21.4 ± 20.2	23.4 ± 20.8	16.0 ± 14.5	.14	.003

NOTE. Unless otherwise indicated, continuous variables are reported as mean ± standard deviation, and categorical variables are reported as raw numbers with percentage distribution in each column. *P* values < .003 were considered statistically significant after Bonferroni correction for multiple testing.

Abbreviations: ALF, assisted living facility; LOS, length-of-stay; LTC, long-term care; PC, palliative care; SNF, skilled nursing facility.

[a]Comparing Any PC to No PC using generalized estimating equations to account for repeated admissions.

[b]Comparing Outpatient PC to all others using generalized estimating equations to account for repeated admissions.

[c]In contrast to patients seen only by inpatient PC, patients seen by outpatient PC had shorter LOS compared with all others.

In terms of EOL outcomes (Table 3), there was a high rate of hospice utilization across the entire cohort (61%). Despite this, patients who had any PC exposure before death were significantly more likely to enroll with hospice compared with those who had no PC exposure (78% *v* 44%; $P < .001$). Mean hospice LOS did not differ between any PC exposure *v* none, but again, subgroup analysis showed that patients seen by outpatient PC had significantly longer hospice LOS compared with all others (46.5 *v* 27.1 days; $P = .002$). PC exposure was also significantly associated with greater availability of ACP forms in the electronic medical record (53% *v* 31%; $P < .001$) and greater frequency of DNR code status at time of death (87% *v* 55%; $P < .001$). Patients seen by PC were more likely to die at home or in inpatient hospice, rather than on a hospital floor or ICU without hospice enrollment, although interpretation of this outcome is limited by missing or unknown locations of death in 20% of the cohort. Finally, PC exposure was associated with more frequent assessment and/or treatment of dyspnea in the last two documented clinical encounters before death (93% *v* 83%; $P < .001$). There was no difference in frequency of systemic cancer therapy in the final 14 days or life. Patients seen by outpatient PC were less likely to use the ICU in the final 30 days of life compared with all others, though this difference was not statistically significant (6% *v* 15%; $P = .046$).

DISCUSSION

In this observational study of decedents who were hospitalized on an inpatient oncology unit in the last 2 years of life, PC exposure was associated with several improvements in EOL care quality, including increased hospice utilization, increased documentation of ACP, more consistent symptom assessment, and fewer in-hospital deaths. Although concordance of care with patient and family goals and values is difficult to quantify in retrospect, the fact that PC exposure was strongly associated with multiple changes in EOL care processes (more hospice enrollment, more ACP and DNR code statuses, and different locations of death) suggests that PC involvement may have led to improved identification of patient and family care preferences. These findings are especially relevant because of the high illness severity within this cohort, as evidenced by the predominance of advanced or metastatic disease, the

TABLE 3. End-of Life Outcomes

Outcome	Entire Cohort (N = 522)	No PC (n = 263)	Any PC (n = 259)	Inpatient PC (n = 216)	Outpatient PC (n = 111)	P^a (any PC *v* no PC)	P^b (outpatient PC *v* all others)
Hospice utilization							
Number referred (%)	319 (61)	116 (44)	203 (78)	168 (78)	93 (84)	< .001	< .001
Hospice LOS, days	32.8 ± 51.2	32.2 ± 53.1	33.1 ± 50.1	26.6 ± 37.0	46.5 ± 63.3	.88	.002
Hospice LOS ≤ 7 days (% of those referred)	106 (33)	47 (41)	59 (29)	54 (32)	17 (15)	.16	.003
ACP							
HCP identified	502 (96)	250 (95)	252 (97)	210 (97)	110 (99)	.18	.07
ACP documents present	219 (42)	82 (31)	137 (53)	116 (54)	62 (56)	< .001	< .001
DNR code status	370 (71)	145 (55)	225 (87)	189 (88)	95 (86)	< .001	< .001
Location of death						< .001	<.001
Home, ALF, or community	199 (38)	79 (30)	120 (46)	92 (43)	68 (61)		
SNF, LTC, or inpatient rehabilitation	41 (8)	20 (8)	21 (8)	20 (9)	5 (5)		
Inpatient hospice	78 (15)	25 (10)	53 (21)	48 (22)	16 (14)		
Hospital floor without hospice	68 (13)	41 (16)	27 (10)	24 (11)	10 (9)		
Hospital ICU without hospice	33 (6)	19 (7)	14 (5)	14 (6)	1 (1)		
Unknown	103 (20)	79 (30)	24 (9)	18 (8)	11 (10)		
EOL quality outcomes							
Pain assessed and/or treated in last 2 visits	504 (97)	251 (95)	253 (98)	212 (98)	109 (98)	.11	.28
Dyspnea assessed and/or treated in last 2 visits	459 (88)	219 (83)	240 (93)	200 (93)	103 (93)	< .001	.07
Systemic cancer therapy in last 14 days of life	27 (5)	16 (6)	11 (4)	9 (4)	5 (5)	.34	.72
ICU utilization in last 30 days of life	69 (13)	34 (13)	35 (14)	35 (16)	7 (6)	.84	.04

NOTE. Unless otherwise indicated, continuous variables are reported as mean ± standard deviation, and categorical variables are reported as raw numbers with percentage distribution in each column. *P* values < .003 were considered statistically significant after Bonferroni correction for multiple testing.

Abbreviations: ACP, advance care planning; ALF, assisted living facility; DNR, do not resuscitate; EOL, end of life; HCP, health care proxy; ICU, intensive care unit; LOS, length of stay; LTC, long-term care; PC, palliative care; SNF, skilled nursing facility

[a]Comparing Any PC to No PC by *t*-test for continuous variables and chi-square test for categorical variables.

[b]Comparing Outpatient PC to all others by *t*-test for continuous variables and chi-square test for categorical variables.

frequency of admissions for disease-related complications, the high rate of 30-day readmissions across all groups, and the high rate of mortality within 2 years of the study timeframe (n = 522 of 842; 62%). These indicators affirm that the inpatient oncology population is one with significant PC needs.

Furthermore, in this study, we uniquely described differences in care outcomes associated with inpatient PC, outpatient PC, and no PC at all. The subgroup of patients who encountered the outpatient PC team had shorter hospital LOS, fewer hospitalized days over the study timeframe, longer hospice LOS, and less ICU utilization at EOL; these outcomes were not associated with inpatient PC alone. These differences speak to the complexity and challenge of providing high-quality PC: to successfully affect patient outcomes, PC teams must develop rapport and familiarity with patients and families; tend to an array of physical and nonphysical causes of suffering; and build disease understanding and coping skills so that patients and families are empowered to make informed decisions as illnesses progress. These tasks cannot be accomplished in a single consultation. In fact, the content of PC clinic visits has been shown to evolve over the course of illness,[23] which is difficult to replicate in the time-limited, emotionally fraught space of an acute hospitalization. As such, in line with previous research on early PC,[1-4] our findings suggest that outpatient PC involvement may be associated with an even greater impact on EOL care quality and health care utilization than inpatient PC alone, reaffirming ASCO's clinical practice guidelines stating that referral to specialized PC should occur within 8 weeks of an advanced cancer diagnosis.[6]

Unfortunately, patients seen by outpatient PC represented less than one quarter of all decedents in this sample (n = 111

of 522; 21%), most of whom died nearly a decade after the publication of Temel et al's[1] landmark trial of early PC for metastatic non–small-cell lung cancer, and at least 1-2 years after the publication of the aforementioned ASCO guidelines. What is needed to make early, integrated PC a reality for all patients diagnosed with advanced cancer? This problem requires a multifaceted solution, including education and outreach to referring clinicians, growth of the specialized PC workforce, and the development of automatic referral criteria or triggers for PC involvement, which have been studied at a few centers.[20,21] Most importantly, hospitals and cancer centers must prioritize support for PC at an institutional level, recognizing that despite recent advances in telemedicine, robust outpatient PC may require a greater investment of administrative support and clinic space than an inpatient consultation service. Our study and others suggest that this investment is worthwhile—that access to outpatient PC is associated with better care quality in the hospital.

This is not to suggest that inpatient PC is not beneficial; indeed, in this severely ill cohort, inpatient PC was associated with significant differences in EOL quality outcomes, including more frequent dyspnea management, increased hospice utilization and ACP, and reduced in-hospital deaths. Importantly, the association between inpatient PC and hospital LOS should not be interpreted as a causal relationship, as PC was consulted by physician discretion, and we could not control for confounding by indication. Rather, our findings argue that one critical function of the inpatient PC team (in addition to managing acute symptoms and providing expert communication during crises) may be to facilitate more frequent referrals to outpatient PC for a patient population that would benefit from those services.

There are important limitations to this study. First, its findings represent the experiences and outcomes of decedents at a single tertiary cancer center. As such, they may not readily generalize to other centers, especially nonacademic, nonmetropolitan cancer centers and hospitals, which may have different institutional cultures around PC referral, practice patterns surrounding EOL care, and availability of PC resources. As a result, however, our data highlight that even at a cancer center with a robust rate of hospice referral (compared with data from a nationwide cohort of Medicare beneficiaries across 54 cancer centers),[24] PC exposure is still associated with significant improvements in care quality. We theorize that PC services may be more impactful at cancer centers with lower baseline adherence to EOL quality measures.

A second important limitation is the retrospective, observational design of this study, such that we cannot infer causality, only association. In the absence of randomized exposure to PC, or a matched control group, we could not control for confounders mediating the observed associations between PC exposure and the outcomes described above. Some potential confounders that could not be reliably abstracted from the medical record include performance status at the time of hospitalization, the natural history of disease and status of cancer-directed therapy, and patient and family goals and care preferences. The associations we report should be interpreted with these limitations in mind.

The retrospective, observational nature of the study also introduced other limitations. We could not determine all decedents' location of death by reviewing medical records and obituaries. In addition, we chose to study a cohort of hospitalized decedents, for the reasons stated earlier. Although we believe this is an important patient group whose experiences have been underdescribed in the literature, our findings may not generalize to all decedents with cancer; for example, decedents who were never hospitalized toward EOL may have had different exposure to outpatient PC (and presumably less exposure to inpatient PC, or none at all).

In summary, in a population of decedents with cancer hospitalized toward EOL, PC exposure in any setting was associated with several important EOL quality outcomes, whereas PC exposure specifically in the outpatient setting was linked to shorter hospital LOS and longer hospice LOS. These findings underscore the importance of outpatient PC involvement. Inpatient PC teams are effective and valuable on their own, but one of their important functions may be to facilitate more connections between seriously ill patients and a robust, well-resourced outpatient PC team. Further work is needed to clarify how PC teams can best deliver this care in a way that is impactful, sustainable, and replicable across all cancer centers.

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DISCLAIMER

The content is solely the responsibility of the authors and does not necessarily represent the official views of Harvard Catalyst, Harvard University and its affiliated academic health care centers, or the National Institutes of Health.

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AUTHORS' DISCLOSURES OF POTENTIAL CONFLICTS OF INTEREST

Different Associations Between Inpatient or Outpatient Palliative Care and End-of-Life Outcomes for Hospitalized Patients With Cancer

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APPENDIX

TABLE A1. Multivariate Analysis of Factors Associated With Hospital LOS

Factor	Adjusted Change in LOS, Days (95% CI)	*P*
Age at death (65 years or older)	–0.50 (–1.47 to 0.47)	.31
Sex (male)	–0.31 (–1.27 to 0.66)	.53
Race or ethnicity		
White	0.00 (reference)	
Black	–0.19 (–1.84 to 1.46)	.82
Hispanic	–0.99 (–2.48 to 0.50)	.19
Asian and other	–0.79 (–1.96 to 0.38)	.19
Cancer type		
Solid, localized	0.00 (reference)	
Solid, advanced or metastatic	0.07 (–1.51 to 1.65)	.93
Leukemia or lymphoma	3.76 (1.74 to 5.79)	< .001
PC exposure		
None	0.00 (reference)	
Inpatient only	3.3 (1.96 to 4.63)	< .001
Outpatient only	–1.18 (–2.23 to –0.14)	.03
Both inpatient and outpatient	1.07 (–0.08 to 2.23)	.07

Abbreviations: LOS, length-of-stay; PC, palliative care.