

# Factors Associated with In-Hospital Death by Site of Consultation among Elderly Inpatients Receiving Pain and Palliative Care Consultations

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## Abstract

**Background:** Despite palliative care implementation, most deaths still occur in hospitals.

**Objectives:** To identify factors associated with in-hospital death among elderly patients receiving palliative care, by site of consultation.

**Design:** Prospective observational study.

**Setting/Subjects:** All inpatients aged 65 years and older receiving pain and palliative care consultations in a 533-bed acute tertiary care hospital in Honolulu, Hawaii, from January 2005 through December 2009.

**Measurements:** During consultation, demographics, diagnoses, consultation site (intensive care unit [ICU], non-ICU medical, non-ICU surgical, and rehabilitation floors), consultation indication (assistance with establishing goals of care versus pain and/or symptom management), Karnofsky scores, length of stay (LOS), discharge disposition, and in-hospital death were collected. Multiple logistic regression analyses examined factors associated with in-hospital death.

**Results:** Of 1630 elderly inpatients receiving palliative care, 305 (19%) died in-hospital. In-hospital death among non-ICU medical patients was associated with needing consultation to assist with plan of care (odds ratio [OR] = 1.89, 95% confidence interval [CI] = 1.27–2.80). Likelihood of in-hospital death increased 2% for each additional hospital day before consultation (OR = 1.02, 95% CI = 1.01–1.03). Among elderly ICU patients, likelihood of in-hospital death increased 8% for each additional hospital day before consultation (OR = 1.08, 95% CI = 1.01–1.16).

**Conclusion:** Among elderly non-ICU medical patients receiving palliative care consultations, the need for a consultation to assist with plan of care was associated with in-hospital death, while length of stay prior to consultation was important among both elderly ICU and non-ICU medical patients. Elderly hospitalized patients may benefit from earlier identification and palliative care consultation for assistance with plan of care to avoid in-hospital death.

## Introduction

HOSPITALS ARE GENERALLY not the preferred place of death for terminally ill patients.<sup>1</sup> With increased availability of hospital-based palliative care services, in-hospital death rates have declined.<sup>2</sup> Nevertheless, most deaths still occur in hospitals,<sup>3</sup> especially for older Asian American patients.<sup>4</sup> Among palliative care consult services

in diverse populations, little is known about factors associated with in-hospital death, an issue that may be influenced by culture.

We studied a predominantly Asian American and Pacific Islander cohort to identify characteristics of elderly patients who received palliative care consultation, yet died in the hospital. We hypothesized that characteristics associated with in-hospital death would differ by site of palliative care consultation.

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## Methods

### Study design, population, and setting

This observational cohort study examined all elderly hospitalized patients who received pain and palliative care consultations at a 533-bed Pacific Basin major tertiary care referral and teaching hospital in Honolulu, Hawaii, between January 2005 and January 2010. The hospital Institutional Review Board approved this study. The hospital multidisciplinary Pain and Palliative Care Department was established in 2004 from an existing nurse-run Pain Management Service and receives over 1200 referrals annually for symptom management, pain control, and/or assistance with plan of care related to progressive or life-limiting illness. One clinician usually provides less intensive consultations for pain or symptom management without assistance with plan of care, while consultations for assistance with plan of care require team consultation and intensive discussions with patients, families, medical and interdisciplinary teams to clarify and coordinate goals and plans of care.

### Data collection

The team collected the following data during consultation: site of consultation, patient demographic characteristics, primary diagnosis, Karnofsky score<sup>5</sup> at the time of palliative consultation, and preconsultation hospital length of stay in days at the time of consultation. Site of consultation was categorized as intensive care unit (ICU; including medical, surgical, neurosurgical, and postcardiac surgery ICUs), non-ICU medical floor, non-ICU surgical floor, and rehabilitation setting. The primary diagnosis at initial consultation was categorized as cancer, cardiac disease, pulmonary disease, surgical conditions, and other diagnoses. Although reason(s) for consultation (pain, symptom management and/or assistance with plan of care) were not mutually exclusive and consultations occurred for one, two, or all three reasons; for analyses, consultation indication was dichotomized into pain/symptom management versus assistance with plan of care.

### Outcomes

The main outcome of interest was in-hospital death versus survival to hospital discharge. In-hospital death included all patients who died in the hospital during that admission, including six patients who enrolled in hospice and received hospice staff services prior to dying in the hospital. Data on survival beyond hospital discharge were not available.

### Statistical analysis

The baseline characteristics of patients were compared by consultation site using  $\chi^2$  and *t* test analyses. Multiple logistic regression models analyzed factors associated with in-hospital death, with additional subgroup analyses for ICU and non-ICU medical floor consultation sites. All analyses were performed using SAS 9.2 (SAS Institute, Inc., Cary, NC).

### Results

During the 5-year study period, 1889 patients aged 65 years and older received pain and palliative care consultations. We excluded consultations in emergency room

(*n* = 29), outpatient settings (*n* = 23), patients the team did not follow until discharge (i.e., patient's limited problem was resolved, *n* = 204), and patients who left the hospital against medical advice (*n* = 3). Thus, our overall analytical sample was 1630 hospitalized patients aged 65 years or older who received palliative care consultations.

Table 1 displays baseline characteristics of elderly patients receiving pain and palliative care consultations stratified by site of consultation. Of 1630 older patients who received palliative care consultations, 305 (18.7%) died in the hospital and the ICU had the highest percentage of in-hospital deaths (38.2%). More patients receiving consultations in the ICU were aged 65–74 years, male, of Asian or Pacific Islander ethnicity, and with longer preconsult length of stays and consultations for assistance with plan of care.

Table 2 displays factors associated with in-hospital death for the overall sample and stratified by site of consultation (ICU and non-ICU medical floor). In the overall sample, being in the ICU, having a consultation for assistance with plan of care, and being over 75 years old or male were associated with increased likelihood of in-hospital death. The likelihood of in-hospital death increased 2% for each additional hospital day prior to consultation.

For ICU patients, the likelihood of in-hospital death increased eight percent for each additional hospital day prior to consultation. Age, gender, primary diagnosis, and consultation indication (for assistance with plan of care) were not significantly associated with in-hospital death among the ICU patients.

For non-ICU medical floor patients, consultation indication for assistance with plan of care and preconsult length of stay were strongly associated with in-hospital death. Age, gender, and primary diagnosis were not associated with in-hospital death after controlling for consultation indication.

### Discussion

Previous studies have described some of the factors associated with mortality in hospitalized patients receiving palliative care consultation,<sup>6–8</sup> however, no study examined factors by site of consultation. We found that factors associated with in-hospital death varied by site of consultation for elderly patients receiving palliative care consultation. In the overall cohort and non-ICU medical subgroup, having a consultation for assistance with plan of care was associated with an 80% increased likelihood of in-hospital death. For ICU patients, preconsultation length of stay was strongly associated with in-hospital death, as each additional hospital day delaying consultation increased the likelihood of in-hospital death 8%.

Previous studies have demonstrated that symptom management is a major reason for pain and palliative care consultation in non-ICU medical floor settings,<sup>7,9,10</sup> however, few studies examined assistance with plan of care as a consultation indication.<sup>11,12</sup> In our team's experience, many elderly patients in the hospital have an unstated plan of care that seeks cure and life prolongation. As a patient with serious or complex illness worsens, it may become clear to the health care team that the curative, life-prolonging plan of care is no longer achievable. Without provider continuity and ongoing communication about the "big picture," for example, because subspecialists are focused on a particular organ or

TABLE 1. BASELINE CHARACTERISTICS OF PATIENTS RECEIVING PAIN AND PALLIATIVE CARE CONSULTATIONS BY SITE OF CONSULTATION

	Overall n = 1630 <sup>a</sup> (%)	ICU subgroup n = 157(9.6%)	Non-ICU medical subgroup n = 937 (57.5%)	Other sites <sup>b</sup> n = 536 (32.9%)	p value <sup>c</sup>
Age group					
65–74 years	780 (47.9)	87 (55.4)	434 (46.4)	259 (48.3)	0.107
≥75 years	849 (52.1)	70 (44.6)	502 (53.6)	277 (51.7)	
Gender					
Male	722 (44.3)	82 (52.2)	459 (49.0)	181 (33.8)	<0.001
Female	907 (55.7)	75 (47.8)	478 (51.0)	354 (66.2)	
Ethnicity					
White	635 (39.0)	40 (25.5)	352 (37.6)	243 (45.3)	<0.001
Asian	778 (47.7)	87 (55.4)	460 (49.1)	231 (43.1)	
Pacific Islander	160 (9.8)	23 (14.7)	96 (10.3)	41 (7.7)	
Other	57 (3.5)	7 (4.5)	29 (3.1)	21 (3.9)	
Consultation Indication					
Plan of care	380 (23.3)	63 (40.1)	295 (31.5)	22 (4.1)	<0.001
Pain/symptoms <sup>d</sup>	1250 (76.7)	94 (59.9)	642 (68.5)	514 (95.9)	
Primary diagnosis					
Cardiac	96 (5.9)	7 (4.5)	83 (8.9)	6 (1.1)	<0.001
Pulmonary	76 (4.7)	23 (14.7)	44 (4.7)	9 (1.7)	
Cancer	470 (28.8)	48 (30.6)	388 (41.4)	34 (6.3)	
Surgical	699 (42.9)	57 (36.3)	197 (21.0)	445 (83.0)	
Others	289 (17.7)	22 (14.0)	225 (24.0)	42 (7.8)	
LOS (days)					
Total LOS	15.6±22.5	21.2±31.4	18.4±24.9	9.2±10.2	<0.001
Preconsult LOS	6.4±15.5	9.9±20.1	8.2±17.9	2.1±5.1	<0.001
Karnofsky score	52.9±25.5	46.0±30.0	45.9±23.8	67.2±20.7	<0.001
Disposition at hospital discharge					
Died in hospital	305 (18.7)	60 (38.2)	223 (23.8)	22 (4.1)	<0.001
Survived	1325 (81.3)	97 (61.8)	714 (76.2)	514 (95.9)	

<sup>a</sup>Numbers may not add up to total due to missing data or rounding. Column percentages shown in parentheses. Means±standard deviations shown for continuous variables.

<sup>b</sup>Other consultation sites included Non-ICU Surgical n=397 (24.4%) and rehabilitation floor n=139 (8.5%).

<sup>c</sup>P value comparing differences by site of consultation (ICU, non-ICU medical, and other).

<sup>d</sup>Pain/Symptom consultation indications: did not need assistance with plan of care and needed pain control (95.1%) and/or non-pain symptom control (11.1%: nausea, constipation, dyspnea, anxiety, confusion, depression).

ICU, intensive care unit; LOS, length of stay.

disease state, nursing staff change every shift and hospitalists change every week, a separation can occur between the health care team's and the patient/family unit's understanding of the appropriateness of a curative, life-prolonging plan of care. In this situation, the patient/family unit's understanding may still be that the curative goal is achievable even though the medical team clearly has evidence that cure is not realistic. Among patient populations with higher rates of late stages of presentation of illness, inadequate access to health care, or trust issues with the Western medical system due to historical experiences of their cohort, the separation between health care team's and the patient/family unit's understanding of achievable plans of care may be particularly wide. In addition, this separation often widens suddenly and dramatically with increased acuity of care (i.e., a transition to the ICU). The consultations for assistance with plan of care were requested for patients with these wide and often dramatic separations in understanding of achievable plans of care between the health care team and the patient/family units. Our ICU had the highest percentage of patients with consultations for assistance with plan of care (40%) compared to other sites, yet assistance with plan of care was not significantly

associated with in-hospital death for elderly ICU patients. The lack of correlation between consultation indication and in-hospital death among these elderly ICU patients may reflect the lower sample size of the ICU group. Alternatively, the team's threshold for designating an ICU consultation as needing assistance with plan of care (as the indication for consultation) may have been too stringent, and the lack of association may reflect that most of these elderly ICU patients were highly likely to die with increasing length of stay, and that most of them likely needed a consultation to assist with plan of care.

Hospital length of stay prior to consultation was three times longer among elderly patients who died in the hospital, and the ICU patients had the longest length of stay in our cohort. Previous studies report that earlier palliative care consultation may decrease the likelihood of in-hospital death for terminally ill patients who prefer home death.<sup>13,14</sup> Hospital length of stay of 10 days or more is a proposed indicator for palliative care consultation in the ICU, but intensivists in a previous study referred fewer patients meeting length of stay criteria than other criteria, such as dementia or ventilator withdrawal.<sup>15</sup>

TABLE 2. FACTORS ASSOCIATED WITH IN-HOSPITAL DEATH FOR OVERALL SAMPLE (n=1630); AND THE ICU (n=157) AND NON-ICU MEDICAL FLOOR (n=937) SUBGROUPS (MULTIPLE LOGISTIC REGRESSION)

	Overall sample (n=1630) <sup>a</sup>		ICU subgroup (n=157)		Non-ICU medical subgroup (n=937)	
	aOR (95% CI)	p value	aOR (95% CI)	p value	aOR (95% CI)	p value
Age ≥75 years (vs. 65–74)	1.41 (1.01–1.94)	0.036	2.53 (0.48–13.27)	0.27	1.41 (0.99–2.01)	0.056
Male gender (vs. female)	1.48 (1.08–2.02)	0.014	4.92 (1.00–24.23)	0.05	1.33 (0.95–1.88)	0.10
Assist with plan of care <sup>b</sup>	1.87 (1.29–2.69)	<0.001	1.37 (0.19–9.85)	0.76	1.89 (1.27–2.80)	0.002
Primary diagnosis						
Surgical	Reference		Reference		Reference	
Cardiac	2.67 (1.29–5.52)	0.008	21.01 (0.75–585.61)	0.073	1.93 (0.89–4.18)	0.096
Pulmonary	2.73 (1.26–5.91)	0.011	2.87 (0.26–31.39)	0.39	1.98 (0.81–4.84)	0.14
Cancer	2.37 (1.38–4.07)	0.002	6.05 (0.70–52.44)	0.10	1.58 (0.87–2.89)	0.14
Other	2.56 (1.45–4.52)	0.001	7.14 (0.60–85.36)	0.12	1.42 (0.75–2.69)	0.28
Preconsult length of stay <sup>c</sup>	1.02 (1.01–1.03)	<0.001	1.08 (1.01–1.16)	0.026	1.02 (1.01–1.03)	0.006
Karnofsky score <sup>d</sup>	0.66 (0.59–0.73)	<0.001	0.31 (0.16–0.59)	<0.001	0.73 (0.65–0.81)	<0.001
Site of consultation						
Non-ICU surgical/rehab	Reference		—		—	
ICU	3.82 (1.94–7.52)	<0.001	—		—	
Non-ICU medical	1.53 (0.88–2.64)	0.13	—		—	

<sup>a</sup>Multiple logistic regression model controlling for age, gender, indication for consultation, primary diagnosis, site of consultation, preconsult length of stay. Overall sample = all hospital patients aged 65+ receiving pain and palliative care consultation.

<sup>b</sup>Consultation indication for assistance with plan of care vs. other reasons (i.e., pain and/or symptom management without assistance with plan of care).

<sup>c</sup>Hospital length of stay in days before pain and palliative care consultation

<sup>d</sup>Karnofsky score OR reflects change in odds of in-hospital death for every 10% increase in Karnofsky score.

ICU, intensive care unit; aOR, adjusted odds ratio; CI, confidence interval.

### Clinical implications

Underrecognition of palliative care needs, particularly in frail elderly patients<sup>16</sup> and in ICU settings,<sup>17</sup> often results in late referrals to palliative care that are insufficient to improve the quality of patients' end-of-life care.<sup>18</sup> Identifying factors associated with in-hospital death among the elderly may enhance early recognition of unmet palliative care needs, increase patient-centered care and reduce medical expenditures.<sup>19</sup> Our findings suggest that all elderly adults with increasing hospital length of stay and non-ICU medical patients needing assistance with plan of care (because of a separation from the health care team in understanding of achievable goals of care) should be considered for palliative care consultation to reduce in-hospital death. Palliative care consultations for assistance with plan of care are associated with increased hospice referral, which could help avoid in-hospital death.<sup>11</sup> Palliative care referral criteria in hospital and ICU settings have been proposed to enhance proactive palliative care consultations,<sup>20,21</sup> including physicians' prognosis (the "surprise question"), symptom severity, ICU length of stay, and lack of clarity regarding goals of care.<sup>22</sup> Our findings support these criteria as prognostic factors for in-hospital death, especially unclear goals of care, and suggest adding length of stay in the non-ICU medical setting as an important consideration. In addition, efforts to move palliative care consultations "upstream" from prognosis-based referrals to needs-based referrals would provide continuity in communication with the patient/family unit that might keep the patient/family unit from lagging so far behind the medical team in their understanding of medically achievable goals.

### Limitations and strengths

This observational study has several limitations. Causal relationships cannot be determined from our findings and generalizability may be limited. Small ICU subgroup numbers (n=157) may limit power to detect factors associated with in-hospital death. Not all variables of interest were available (social support, patient preferences, and socioeconomic status). Karnofsky scores were recorded at the time of palliative consult, likely reflecting disease severity, hence correlating closely with in-hospital death. Data were not available on triage criteria or care plan discussions prior to acceptance to ICU, which may confound in-hospital deaths, although previous literature has noted that care plan discussions rarely occur prior to most ICU admissions.<sup>23</sup>

Strengths include the relatively large sample of elderly patients, with approximately 1600 consultations over a 5-year period and meticulously collected prospective data. The sample included cancer and noncancer patients, increasing generalizability, and a large percentage of Asian American and Pacific Islander patients. These are important populations to examine, as higher rates of in-hospital death for Asian-Americans or Asian immigrants<sup>4,24,25</sup> and lower rates of hospice use have been reported.<sup>26</sup> Examining cultural reasons for separation between the health care team's and the patient/family unit's understanding of achievable goals of care is an important area of future research.

### Conclusion

In-hospital death was associated with longer preconsult length of stay in all elderly patients, especially elderly ICU

patients. Consultations for assistance with plan of care were strongly associated with in-hospital death in non-ICU medical patients. A better understanding of characteristics associated with in-hospital death by site of consultation may allow clinicians to enhance earlier recognition of elderly patients' unmet palliative care needs and allow patients to avoid in-hospital death if they prefer to die at home.

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