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Frequency and Risk Factors for Live Discharge from Hospice

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Risk Factors for Live Discharge from Hospice

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Frequency and Risk Factors for Live Discharge from Hospice

Abstract

Objective: To report frequencies and associated risk factors for four distinct causes of live discharge from hospice.

Design: Retrospective cohort study using electronic medical records of hospice patients who received care from a large urban not-for-profit hospice agency in New York City during a three-year period between 2013 and 2015 (N=9,190).

Results: Roughly one in five hospice patients were discharged alive (21%; n=1911). Acute hospitalization was the most frequent reason for live discharge (42% of all live discharges; n=802). Additional reasons included elective revocation to resume disease-directed treatments (18%; n=343), disqualification (14%; n=271), and service transfers or moves (26%; n=495). Multinomial logistic regression analyses revealed that risk for acute hospitalization was higher among younger patients (age AOR=0.98 [95% CI=0.98-0.99] $p<.01$), racial/ethnic minorities (Hispanic AOR=2.23 [CI=1.82-2.73] $p<.001$; African American OR=2.46 [CI=2.00-3.03] $p<.001$; Asian/other OR=1.63 [CI=1.25-2.11] $p<.001$), and patients without advance directives (AOR=1.41 [95% CI=0.98-0.99] $p<.001$). Disqualification occurred much more frequently among patients with non-cancer diagnoses, including dementia (AOR=13.14 [95% CI=7.96-21.61] $p<.001$) and pulmonary disease (AOR=11.68 [95% CI=6.58-20.74] $p<.001$). Transfers and service moves were more common among Hispanics (AOR=1.56 [95% CI=1.45-2.34] $p<.001$), African Americans (AOR=1.35 [95% CI=1.03-1.79] $p<.05$), patients without a primary caregiver

41 (AOR=1.35 [95% CI=1.09-1.67] $p<.001$), and those without advance directives (AOR=1.30 [95%
42 CI=1.07-1.58] $p<.01$).

43 Conclusions: Further research into factors that underlie live discharge events, especially acute
44 hospitalization, is warranted given their cost and burden for patients/families. Hospices should
45 develop strategies to address acute medical crises and thoroughly evaluate patients' suitability,
46 unmet needs, and knowledge about end-of-life issues at the time of hospice enrollment,
47 especially for those with non-cancer diagnoses.

48 Frequency and Risk Factors for Live Discharge from Hospice

49 **Introduction**

50 Hospice encompasses palliative and supportive services targeted towards people nearing the
51 end of life. The Medicare hospice benefit, which covers most hospice care in the U.S., can be
52 elected by patients with an estimated life expectancy of six months or less. While hospice use
53 has increased, nearly one of every five patients is discharged before death (i.e. “live discharge”)

54 ¹. The live discharge rate increased over the past decade—from 13.7% in 2000 to 18.1% in 2012

55 ². Live discharge may presage burdensome transitions and aggressive end of life care ^{3, 4}.

56 Further, most patients discharged alive never re-enroll in hospice, even though more than a
57 third die within six months ⁵. The experience can also be stressful for patients and families—
58 who may lose support for functional assistance and symptom management ⁶.

59 Reasons for live discharge include revocation due to *acute hospitalization*, *elective revocation* to
60 resume disease-directed treatments with the goal of life prolongation, *disqualification* due to
61 loss of eligibility, and *transferring* to another hospice or moving out of the provider’s service
62 area. Few studies have examined the characteristics of hospice patients who are discharged
63 alive ^{5, 7-10}. Even less research has examined withdrawal from hospice as being driven by
64 conceptually distinct factors, or has examined predictors of different live discharge reasons ¹¹.

65 Theories of healthcare utilization and societal vulnerability provide a useful conceptual
66 framework for identifying relevant patient characteristics that are likely associated with live
67 discharge ^{12, 13}. Socio-demographic characteristics, including race/ethnicity and socioeconomic
68 status, have wide ranging consequences for health and healthcare access, and have been

shown to affect knowledge and attitudes about hospice care¹². Further, caregiver and spousal characteristics have also been shown to influence hospice use and end-of-life decision making¹⁴. Younger patients and those without advance directives may have preferences for life-sustaining treatments, and thus be more likely to electively revoke hospice benefits¹¹. Clinical characteristics, including functioning and diagnosis, have also been associated with live discharge¹¹. Prior research suggests that cancer patients are less likely than those with other diagnoses to be discharged alive⁷. Conversely, patients with heart failure and neurologic diseases tend to have a higher live discharge rate^{7, 15}.

This study aimed to identify the frequency and associated characteristics of four live discharge reasons among home hospice patients: revocation due to acute hospitalization, elective revocation to resume disease-directed treatments with the goal of life prolongation, disqualification due to loss of hospice eligibility, and transfers to other hospice/palliative settings or service moves. We hypothesized that patient characteristics associated with live discharge may vary by the reason for discharge itself. For instance, patients who lack social support in the home may have a higher odds of acute hospitalization due to limited symptom management, whereas patients with primary diagnoses of heart failure or pulmonary disease may have a higher risk of disqualification because of ineffective prognostic criteria^{16, 17}.

Methods

Study Setting and Data Sources

This retrospective cohort study included 9,190 adult patients served by an urban, nonprofit hospice organization in New York City (NYC) between 2013 and 2015. The agency has an

average daily census of approximately 1,000 patients across all five NYC boroughs. This study focused on home hospice patients because 1) they represented the majority of patients served by the agency; and 2) live discharge was more frequent among home hospice patients compared to those receiving care in institutional settings. The Institutional Review Board at the Visiting Nurse Service of New York approved all study procedures. Patient data were obtained by querying structured fields from the comprehensive admission assessment recorded in the agency's electronic medical record database. Additional data regarding patient care setting, date of death/discharge, and insurance were queried from administrative records stored in the database.

Measures

Hospice Discharge Reason

The primary outcome of interest, hospice discharge reason, was represented by a nominal variable with five categories. **Figure 1** displays the frequency of hospice discharge reason. The majority of patients died in hospice (79%; n=7,279; reference category). The remainder were discharged alive (21%; n=1,911). Reasons for live discharge were indicated by administrative codes. Four live discharge categories were distinguished: 1) revocations among patients who dialed 911 and were admitted to acute care hospitals (42% of all live discharges; n=802), 2) patients who revoked their hospice benefits to resume disease-directed treatments without acute hospitalization (18%; n=343), 3) patients who were disqualified due to loss of eligibility because the patient was no longer terminally ill or failed to recertify (14%; n=271), and 4) patients who moved out of the service area or transferred to another hospice or palliative-care

setting (26%; n=495). These categories were validated by manually reviewing narrative clinical notes for 50 randomly selected patients in each live discharge category. Clinical notes were reviewed independently by two authors [DR and ELD] and invariably reflected the correct categories. Separate analyses revealed no discernible trends in discharge reasons across the study period.

Patient Characteristics

Socio-demographic characteristics included sex, age, race/ethnicity (white non-Hispanic, Hispanic, African American, and Asian/other), marital status, and the presence of a primary caregiver. Advanced directives included documentation that a signed Do Not Resuscitate (DNR) order was scanned into the medical record. Insurance was grouped into five categories based on the primary payer: Medicare (i.e. federal insurance), Managed Medicare (i.e. private Medicare Advantage plans), Medicaid (i.e. state insurance for low income residents), Managed Medicaid (i.e. private managed care for Medicaid enrollees), and commercial/other (e.g. employer coverage). We also measured several clinical and functional characteristics of patients. Primary diagnosis was grouped into six categories based on ICD-9-CM/ICD-10 codes: cancer, dementia, heart failure, stroke, pulmonary disease, and all other non-cancer diagnoses. The Palliative Performance Scale (PPS), a tool for evaluating functional status in hospice and palliative care settings, was documented by a hospice clinician at the time of admission¹⁸⁻²⁰. The PPS score represents a discrete variable with values between 0 (death) and 100 (full health). Diagnosis codes were used to calculate Charlson comorbidity index scores²¹. Hospice

referral source distinguished patients who came to hospice from hospital versus non-hospital settings.

Data Analysis

Means and percentages were used to describe the study population. Variables were entered simultaneously into a multinomial logistic regression model that was used to examine associations of socio-demographic, clinical, and functional characteristics with live discharge reasons. Separate logistic regression models were used to examine residuals and goodness of fit. Residuals fell within a normal range. There was no evidence of lack of fit. Associations between study variables were examined to ensure that variables were not highly colinear. A p-value of 0.05 represented the threshold for determining statistical significance.

Results

Study Population

Patient characteristics are presented in **Table 1**. The average age was 78 years (SD=14.8). Most patients were female (58%), white (53%), not married (55%), and had a primary caregiver (77%). More than half of patients did not have a signed DNR order at the time of admission (53%). Medicare (56%) and Managed Medicare (23%) were the most common payers. Those with a primary diagnosis of cancer represented the largest share of patients (54%). Other primary diagnoses included dementia (12%), heart failure (7%), stroke (4%), and pulmonary disease (4%). Patients had an average PPS score of 36.2 (SD=12.6); indicating extensive disease/impairment. The average Charlson score was 3.2 (SD=2.2). Most patients were referred

to hospice from the hospital (54%). Additional analyses indicated that the median length of service and interquartile range were 17 and 50 days, respectively. Length of service was highly skewed toward shorter hospice stays—with 32% of patients enrolled for seven days or less.

Associations of Patient Characteristics with Hospice Discharge Outcomes

Table 2 presents regression results examining associations between patient characteristics and live discharge reasons. Marked differences were observed across live discharge reasons, leading us to summarize results separately.

Acute Hospitalization

While no relationship was observed with sex, increasing age was associated with a lower odds of hospitalization (AOR=0.98; CI=0.98-0.99). Hispanics (AOR=2.23; CI=1.82-2.73), African Americans (AOR=2.46; CI=2.00-3.03), and Asians/others (AOR=1.63; CI=1.25-2.11) had a greater odds of acute hospitalization compared to white non-Hispanics. The odds of acute hospitalization tended to be greater among the unmarried (AOR=1.31; CI=1.10-1.55), those without advance directives (AOR=1.41; CI=1.21-1.65), and for patients with Medicaid (AOR=1.53; CI=1.20-2.25) and Managed Medicaid (AOR=1.54; CI=1.06-2.25). Relative to patients with a primary diagnosis of cancer, the odds of acute hospitalization were significantly greater among those with primary diagnoses of dementia (AOR=1.48; CI=1.07-2.05), heart failure (AOR=2.42; CI=1.84-3.20), pulmonary disease (AOR=1.97; CI=1.34-2.90), or any other non-cancerous disease (AOR=1.45; CI=1.13-1.85). Higher PPS scores were associated with greater odds of hospitalization (AOR=1.06; CI=1.06-1.07).

Elective Revocation of Hospice Benefits to Resume Disease-Directed Treatments

Increasing age was associated with a lower odds of elective revocation (AOR=0.98; CI=0.97-0.99). Asians/others (AOR=1.43; CI=1.01-2.00), patients without a primary caregiver (AOR=1.39; CI=1.08-1.78), and those without advance directives (AOR=1.26; CI=1.01-1.58) also had greater odds of elective revocation. Compared to Medicare enrollees, patients with commercial/other insurances had a lower odds of elective revocation (AOR=0.41; CI=0.26-0.67). Relative to cancer patients, those with heart failure (AOR=2.29; CI=1.54-3.41) and other non-cancerous primary diagnoses (AOR=1.54; CI=1.10-2.18) had a greater odds of elective revocation. Higher PPS scores were associated with greater odds of revocation (AOR=1.05; CI=1.04-1.06).

Disqualification due to Loss of Hospice Eligibility

The odds of disqualification were higher among women compared to men (AOR=1.34; CI=1.03-1.87). Patients without advanced directives had significantly lower odds of disqualification (AOR=0.66; CI=0.51-0.85). Patients with non-cancerous primary diagnoses had greater odds of disqualification, including dementia (AOR=13.14; CI=7.96-21.61), pulmonary disease (AOR=11.68; CI=6.58-20.74), stroke (AOR=9.20; CI=4.62-18.35), heart failure (AOR=4.78; CI=2.62-8.71), and all other non-cancerous primary diagnoses (AOR=7.36; CI=4.49-12.07). Higher PPS scores were associated with greater odds of disqualification (AOR=1.06; CI=1.04-1.07). Patients with higher Charlson scores had lower odds of disqualification (AOR=0.83; CI=0.76-0.92). Patients referred to hospice from non-hospital settings had significantly greater odds of disqualification (AOR=1.44; CI=1.10-1.89).

Transfers to Other Hospice/Palliative Care Settings and Moves out of the Provider Service Area

The odds of transferring to another hospice setting or moving out of the area were greater among Hispanics compared to whites (AOR=1.56; CI=1.45-2.34), and among those without a primary caregiver (AOR=1.38; CI=1.14-1.67) or advance directives (AOR=1.35; CI=1.09-1.67). Unlike the other findings, dementia patients (AOR=0.52; CI=0.32-0.85) had lower odds of transferring compared to cancer patients. Patients with higher PPS scores had greater odds of transferring (AOR=1.06; CI=1.05-1.07).

Discussion

This study examined the frequencies and correlates of live discharge reasons among hospice patients, including acute hospitalization, revocation to resume disease-directed treatments, disqualification, and transfers or moves. Analyses revealed several patient characteristics associated with live discharge; younger patients, race/ethnic minorities, and those without advance directives had greater odds of revocation. Acute hospitalization was the most frequent reason for live discharge and may be viewed by some hospice personnel as an unnecessary disruption of the natural dying process and a potential threat to patient safety²². Reasons for acute hospitalization that lead caregivers to call 911 include patients' or families' poor understanding of hospice, caregiver burden, and distressing signs and symptoms²³. The high frequency of acute hospitalization in our study suggests that some patients and family members may not feel secure or supported in their homes as symptoms emerge or worsen and as a patient's clinical status changes. While most adults view their homes as the ideal place to die, many also recognize that practical constraints such as increasing disability, symptom relief, and caregiver burden may lead them to institutional settings as illness progresses²⁴. Interviews

with caregivers of home hospice patients revealed that decisions to pursue hospitalization were influenced by acute medical events, uncontrolled symptoms, imminent death, or an inability to provide care safely at home ¹⁶. The increased odds of transferring observed among patients without a primary caregiver may also be a marker for patients who need additional services and supports. Interventions directed towards preparing patients and caregivers for end-of-life care at home and improving awareness of supportive services available through hospice may help to reduce live discharge and promote hospice enrollment ^{6, 25, 26}. This is particularly important given that only a minority of patients in our study who were discharged alive later reenrolled in hospice during the two-year study period (29%).

Racial/ethnic minority patients had significantly greater odds of live discharge due to acute hospitalization. These findings are consistent with prior research indicating that African Americans and other racial/ethnic minority groups are more likely than white patients to withdraw from hospice, even in the context of enrolling in hospice later in the course of their disease ^{10, 27, 28}. These trends are particularly notable in light of evidence that African Americans are less likely than other patients to return to hospice after discharge ²⁹. Prior research indicates that minority patients' and caregivers' views towards end of life care may influence their use of hospice services ²⁵. Views among patients and caregivers that hospice only has a role in the care of the imminently dying may contribute to decisions that lead patients out of hospice prematurely to pursue treatment ^{6, 25}. Patients and caregivers harboring these views tend to have mixed feelings about being discharged alive ²⁹. For instance, an earlier study of African American patients with advanced illness uncovered views that stopping disease-directed treatment in favor of hospice care was seen as "giving up" ³⁰. Other recent research

suggests that terminally ill patients who receive high levels of spiritual support from their communities, especially racial/ethnic minorities, are less likely to access hospice and more likely to receive aggressive medical care near the time of death ³¹. Efforts by hospice organizations to provide greater spiritual care to highly religious patients may help to reduce live discharge. Our observation that Hispanics were more likely than white non-Hispanic patients to transfer out of hospice prior to death is consistent with the “salmon bias” documented by demographers ³². This research suggests that older, sicker foreign-born Hispanics are more likely than other race/ethnic groups to emigrate from the U.S. to be with family in their native countries ^{32, 33}. The study findings highlight the need to evaluate patients’ readiness and suitability for hospice at the time of referral. Findings that patients were more likely to be discharged alive if they had higher functioning at admission or lacked advance directives suggest the need to educate patients about their treatment options and hospice goals ³⁴. The higher odds of disqualification observed among patients with dementia, pulmonary disease, stroke, and heart failure is sobering, considering that these patients are among the fastest growing group of hospice users ³⁵. Prognostication is especially challenging for dementia patients, where there is often a long period between diagnosis and death, and a trend towards aggressive treatments in the last six months of life, often at the expense of palliative care ³⁶. Making advance determinations about which patients with advanced pulmonary or heart disease are likely to die within six months is often unrealistic due to unpredictable terminal trajectories ¹⁷. This may also be true for patients with debility or adult failure to thrive, conditions that represented an increasing number of hospice admissions over the past decade, but which were no longer allowable as primary diagnoses under 2014 Medicare guidelines ². Likely because of this new rule, a limited number

of patients in our analytic sample had this primary diagnosis (n=180). Hospice disqualification may be a function of eligibility requirements in and of themselves. Revision of Medicare hospice eligibility criteria to allow patients to receive disease-directed treatments alongside hospice may reduce the frequency of disqualification ³⁷.

There are several limitations. First, the study examined patients at a single hospice agency, limiting generalizability. Further research is needed to replicate the study findings in other hospice agencies. Secondly, this study analyzed data that were collected retrospectively. This design does not allow for attributing causal relationships between patient characteristics and live discharge reasons. Third, our study lacked measures of patients' and caregivers' knowledge of hospice and preferences for hospice care. This may be an important omission considering recent research showing that racial/ethnic minorities are less likely to have heard of hospice and score significantly lower on tests of hospice knowledge ³⁸. Also, it is possible that live discharge events reflect issues related to quality of care, including the extent to which patients felt adequately supported by hospice personnel and that the care they received honored their preferences; these dimensions of care were not captured in our study. Similarly, there may be clinical circumstances when hospitalization is the best course of action to alleviate symptoms (e.g. hip fracture). Additionally, there may some patients for whom even a temporary enrollment in hospice facilitates psychosocial support and pain management ^{39, 40}. Further, many patients classified in this study as transferring or moving out of the service area may have enrolled in another hospice or palliative care program following discharge.

While preliminary, study findings help to elucidate the frequencies and associated risk factors for distinct live discharge reasons. Findings may be used to develop tools that hospices can use

279 to identify patients with high revocation risk. Further research is needed to explore hospice
280 patients' needs and preferences, especially among racial/ethnic minorities and
281 socioeconomically disadvantaged groups, with the aim of reducing unwanted hospitalizations
282 and aggressive treatments for patients who wish to remain at home ⁴¹.

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Conflict of Interest

The authors have no financial, personal, or any other potential conflicts of interest to report.

Author's Contributions

David Russell and Eli L. Diamond were responsible for the conception and design of the study, acquisition and analysis of study data, interpretation of statistical analyses, and drafting and revising earlier versions of the manuscript. Bonnie Lauder, Ritchell Dignam, Dawn Dowding, Timothy Peng, Holly Prigerson, and Kathryn Bowles assisted with the interpretation of study data and revised earlier versions of the manuscript for important intellectual content versions of the manuscript. The authors would like to acknowledge the efforts of Natalie Ehret and Malaika Borni, students at the University of Pennsylvania School of Nursing, for their help collecting relevant literature. We are also grateful to John Taylor for his helpful comments on an earlier version of this paper.

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References

- [1] Medicare Payment Advisory Commission. Report to the Congress: Medicare Payment Policy. Washington, DC, 2016 [on-line]. Available at <http://www.medpac.gov/docs/default-source/reports/march-2016-report-to-the-congress-medicare-payment-policy.pdf?sfvrsn=0> Accessed January 3, 2017.
- [2] Prsic E, Plotzke M, Christian TJ et al. A national study of live hospice discharges between 2000 and 2012. *J Palliat Med.* 2016;19:987-990.
- [3] Teno JM, Bowman J, Plotzke M et al. Characteristics of hospice programs with problematic live discharges. *J Pain Symptom Manage.* 2015;50:548-552.
- [4] Institute of Medicine (US). *Dying in America: Improving Quality and Honoring Individual Preferences Near the End of Life.* Washington, DC: The National Academies Press, 2015.
- [5] Kutner JS, Meyer SA, Beaty BL et al. Outcomes and characteristics of patients discharged alive from hospice. *J Am Geriatr Soc.* 2004;52:1337-1342.
- [6] Watson Campbell R. Being discharged from hospice alive: The lived experience of patients and families. *J Palliat Med.* 2015;18:495-499.
- [7] Kutner JS, Blake M, Meyer SA. Predictors of live hospice discharge: data from the National Home and Hospice Care Survey (NHHCS). *Am J Hosp Palliat Me.* 2002;19:331-337.
- [8] Teno JM, Plotzke M, Gozalo P et al. A national study of live discharges from hospice. *J Palliat Med.* 2014;17:1121-1127.
- [9] Taylor DH, Steinhauer K, Tulsy JA et al. Characterizing hospice discharge patterns in a nationally representative sample of the elderly, 1993-2000. *Am J Hosp Palliat Me.* 2008.
- [10] Johnson KS, Elbert-Avila K, Kuchibhatla M et al. Characteristics and outcomes of hospice enrollees with dementia discharged alive. *J Am Geriatr Soc.* 2012;60:1638-1644.
- [11] Casarett DJ, Marenberg ME, Karlawish JH. Predictors of withdrawal from hospice. *J Palliat Med.* 2001;4:491-497.
- [12] Mechanic D, Tanner J. Vulnerable people, groups, and populations: societal view. *Health Aff (Millwood).* 2007;26:1220-1230.
- [13] Andersen R, Newman JF. Societal and individual determinants of medical care utilization in the United States. *Milbank Q.* 2005;83:Online-only.
- [14] Ornstein KA, Aldridge MD, Mair CA et al. Spousal characteristics and older adults' hospice use: Understanding disparities in end-of-life care. *J Palliat Med.* 2016;19:509-515.
- [15] Bain KT, Maxwell TL, Strassels SA et al. Hospice use among patients with heart failure. *Am Heart J.* 2009;158:118-125.
- [16] Evans WG, Cutson TM, Steinhauer KE et al. Is there no place like home? Caregivers recall reasons for and experience upon transfer from home hospice to inpatient facilities. *J Palliat Med.* 2006;9:100-110.
- [17] Fox E, Landrum-McNiff K, Zhong Z et al. Evaluation of prognostic criteria for determining hospice eligibility in patients with advanced lung, heart, or liver disease. *JAMA.* 1999;282:1638-1645.
- [18] Anderson F, Downing GM, Hill J et al. Palliative performance scale (PPS): a new tool. *J Palliat Care.* 1995;12:5-11.
- [19] Harrold J, Rickerson E, Carroll JT et al. Is the palliative performance scale a useful predictor of mortality in a heterogeneous hospice population? *J Palliat Med.* 2005;8:503-509.
- [20] Head B, Ritchie CS, Smoot TM. Prognostication in hospice care: can the palliative performance scale help? *J Palliat Med.* 2005;8:492-502.
- [21] Quan H, Sundararajan V, Halfon P et al. Coding algorithms for defining comorbidities in ICD-9-CM and ICD-10 administrative data. *Med Care.* 2005;43:1130-1139.

- [22] Smucker DR, Regan S, Elder NC et al. Patient safety incidents in home hospice care: the experiences of hospice interdisciplinary team members. *J Palliat Med.* 2014;17: 540-544.
- [23] Phongtankuel V, Scherban BA, Reid MC et al. Why do home hospice patients return to the hospital? A study of hospice provider perspectives. *J Palliat Med.* 2016;19:51-56.
- [24] Gott M, Seymour J, Bellamy G et al. Older people's views about home as a place of care at the end of life. *Palliat Med.* 2004;18:460-467.
- [25] Chung K, Essex EL, Samson L. Does caregiver knowledge matter for hospice enrollment and beyond? Pilot study of minority hospice patients. *Am J Hosp Palliat Me.* 2009;26:165-171.
- [26] Wennman-Larsen A, Tishelman C. Advanced home care for cancer patients at the end of life: A qualitative study of hopes and expectations of family caregivers. *Scand J Caring Sci.* 2002;16:240-247.
- [27] Johnson KS, Kuchibhatla M, Tanis D et al. Racial differences in hospice revocation to pursue aggressive care. *Arch Intern Med.* 2008;168:218-224.
- [28] Unroe KT, Greiner MA, Johnson KS et al. Racial differences in hospice use and patterns of care after enrollment in hospice among Medicare beneficiaries with heart failure. *Am Heart J.* 2012;163:987-993.
- [29] Kapo J, Macmoran H, Casarett D. "Lost to follow-up": Ethnic disparities in continuity of hospice care at the end of life. *J Palliat Med.* 2005;8:603-608.
- [30] Torke AM, Garas NS, Sexson W et al. Medical care at the end of life: Views of African American patients in an urban hospital. *J Palliat Med.* 2005;8:593-602.
- [31] Balboni TA, Balboni M, Enzinger AC et al. Provision of spiritual support to patients with advanced cancer by religious communities and associations with medical care at the end of life. *JAMA Intern Med.* 2013;173:1109-1117.
- [32] Turra CM, Goldman N. Socioeconomic differences in mortality among US adults: insights into the Hispanic paradox. *J Gerontol B Psychol Sci Soc Sci.* 2007;62:S184-S192.
- [33] Turra CM, Elo IT. The impact of salmon bias on the Hispanic mortality advantage: New evidence from social security data. *Popul Res Policy Rev.* 2008;27:515-530.
- [34] Garrido MM, Balboni TA, Maciejewski PK et al. Quality of life and cost of care at the end of life: the role of advance directives. *J Pain Symptom Manage.* 2015;49:828-835.
- [35] Aldridge MD, Canavan M, Cherlin E et al. Has hospice use changed? 2000-2010 utilization patterns. *Med Care.* 2015;53: 95.
- [36] Birch D, Draper J. A critical literature review exploring the challenges of delivering effective palliative care to older people with dementia. *J Clin Nurs.* 2008;17:1144-1163.
- [37] Casarett DJ. Rethinking hospice eligibility criteria. *JAMA.* 2011;305:1031-1032.
- [38] Cagle JG, Van Dussen DJ, Culler KL et al. Knowledge about hospice exploring misconceptions, attitudes, and preferences for care. *Am J Hosp Palliat Me.* 2016;33:27-33.
- [39] Miller SC, Mor V, Wu N et al. Does receipt of hospice care in nursing homes improve the management of pain at the end of life? *J Am Geriatr Soc.* 2002;50:507-515.
- [40] Kelley AS, Deb P, Du Q et al. Hospice enrollment saves money for Medicare and improves care quality across a number of different lengths-of-stay. *Health Aff (Millwood).* 2013;32:552-561.
- [41] Cintron A, Hamel MB, Davis RB et al. Hospitalization of hospice patients with cancer. *J Palliat Med.* 2003;6:757-768.

Risk Factors for Live Discharge from Hospice

TABLE 1. Characteristics of Home Hospice Patient Population (N=9,190)

Independent Variables	% (N) or M (SD)
Sex	
Male	42.0% (3858)
Female	58.0% (5332)
Age	77.7 (14.8)
18 to 64 Years	20.0% (1836)
65 to 74 Years	17.9% (1647)
75 to 84 Years	23.9% (2200)
85 Years or Older	38.2% (3507)
Race/Ethnicity	
White Non-Hispanic	52.5% (4829)
Hispanic	20.2% (1853)
African American	16.1% (1481)
Asian or Other	11.2% (1027)
Marital Status	
Married	45.5% (4181)
Not Currently Married	54.5% (5009)
Primary Caregiver	
Has Primary Caregiver	77.3% (7108)
No Primary Caregiver	22.7% (2082)
Advanced Directives	
Yes	46.8% (4298)
No	53.2% (4892)
Primary Payer Source	
Medicare	56.2% (5161)
Managed Medicare	22.6% (2081)
Medicaid	4.5% (409)
Managed Medicaid	3.7% (337)
Commercial/Other	13.1% (1202)
Primary Diagnosis	
Cancer	54.4% (5000)
Dementia	11.6% (1066)
Heart Failure	7.2% (663)
Stroke	3.9% (359)
Pulmonary Disease	3.6% (334)
All Other Dx	19.2% (1768)
Palliative Performance Scale	36.2 (12.6)
Charlson Comorbidity Score	3.2 (2.2)
Referral Source	
Hospital	54.3% (4992)
Other	45.7% (4198)

TABLE 2. Multinomial Logistic Regression Model Predicting Hospice Discharge Outcome (N=9,190) †

Variable	Discharged Alive from Hospice			
	Hospitalized <i>AOR (95% CI)</i>	Revocation <i>AOR (95% CI)</i>	Disqualified <i>AOR (95% CI)</i>	Transferred <i>AOR (95% CI)</i>
Female	0.88 (0.75-1.04)	1.20 (0.95-1.52)	1.34 (1.03-1.87) *	1.21 (0.99-1.48)
Age	0.98 (0.98-0.99) **	0.98 (0.97-0.99) ***	1.01 (0.99-1.02)	0.99 (0.98-1.00)
Race/Ethnicity				
White Non-Hispanic	--	--	--	--
Hispanic	2.23 (1.82-2.73) ***	1.32 (0.96-1.64)	1.87 (1.35-2.58) ***	1.56 (1.45-2.34) ***
African American	2.46 (2.00-3.03) ***	0.78 (0.54-1.11)	1.45 (0.98-2.14)	1.35 (1.03-1.76) *
Asian or Other	1.63 (1.25-2.11) ***	1.43 (1.01-2.00) *	1.40 (0.85-2.16)	0.99 (0.70-1.38)
Marital Status				
Married	--	--	--	--
Not Currently Married	1.31 (1.10-1.55) **	1.15 (0.90-1.46)	1.26 (0.93-1.70)	0.90 (0.73-1.10)
Primary Caregiver				
Has Primary Caregiver	--	--	--	--
No Primary Caregiver	0.97 (0.80-1.17)	1.39 (1.08-1.78) **	1.03 (0.75-1.42)	1.35 (1.09-1.67) **
Advance Directives				
Yes	--	--	--	--
No	1.41 (1.21-1.65) ***	1.26 (1.01-1.58) *	0.66 (0.51-0.85) ***	1.30 (1.07-1.58) **
Primary Payer Source				
Medicare	--	--	--	--
Managed Medicare	1.10 (0.91-1.34)	1.28 (0.99-1.67)	1.25 (0.93-1.67)	1.16 (0.92-1.47)
Medicaid	1.53 (1.20-2.25) *	0.78 (0.44-1.38)	1.86 (0.91-3.81)	0.75 (0.46-1.24)
Managed Medicaid	1.54 (1.06-2.25) *	0.98 (0.56-1.73)	1.82 (0.68-4.81)	0.75 (0.44-1.29)
Commercial/Other	1.32 (1.01-1.72) *	0.41 (0.26-0.67) ***	1.55 (0.82-2.91)	1.01 (0.74-1.38)
Primary Diagnosis				
Cancer	--	--	--	--
Dementia	1.48 (1.07-2.05) *	1.38 (0.88-2.17)	13.14 (7.96-21.61) ***	0.52 (0.32-0.85) **
Heart Failure	2.42 (1.84-3.20) ***	2.29 (1.54-3.41) ***	4.78 (2.62-8.71) ***	1.08 (0.73-1.60)
Stroke	1.66 (0.99-2.80)	1.65 (0.84-3.27)	9.20 (4.62-18.35) ***	0.57 (0.24-1.32)
Pulmonary Disease	1.97 (1.34-2.90) ***	1.47 (0.81-2.60)	11.68 (6.58-20.74) ***	0.61 (0.31-1.17)
All Other Dx	1.45 (1.13-1.85) **	1.54 (1.10-2.18) **	7.36 (4.49-12.07) ***	0.96 (0.71-1.32)
Palliative Performance	1.06 (1.06-1.07) ***	1.05 (1.04-1.06) ***	1.06 (1.04-1.07) ***	1.06 (1.05-1.07) ***
Charlson Comorbidity	0.98 (0.94-1.02)	0.96 (0.90-1.02)	0.83 (0.76-0.92) ***	0.99 (0.95-1.04)
Referral Source				
Hospital	--	--	--	--
Other	1.04 (0.89-1.22)	0.90 (0.72-1.14)	1.44 (1.10-1.89) **	0.99 (0.82-1.21)

† Reference category includes patients who died while under hospice care; * $p < .05$, ** $p < .01$, *** $p < .001$

Risk Factors for Live Discharge from Hospice

FIGURE 1. Distribution of Hospice Discharge Reason (N=9,190)

NOTE: Data Legend

Hospice Discharge Reason	Percent of Patients
Died in Hospice	79%
Acute Hospitalization	9%
Transfer or Service Move	5%
Elective Revocation	4%
Disqualification	3%