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The High Burden of Palliative Care Needs in Older Patients Prior to Emergent Major Abdominal Surgery

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Abstract

Background/Objectives—Prior research suggests that high illness burden (HIB) is a proxy for palliative care needs in older adults. Increasing numbers of older adults are undergoing emergent major abdominal surgery (EMAS); however, illness burden in this population is unexamined. Our objectives were to 1) quantify preoperative illness burden among older EMAS patients; 2) examine the association between illness burden and postoperative outcomes; and 3) describe end-of-life care among decedents in the year after discharge.

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Conflict of Interest

The authors have no conflicts of interest to declare.

Author Contributions

ZC, EJJ, SLM, CSR, and ASK conceptualized and designed the study. ASK managed the data acquisition. EJJ, EBL, SRL, and ASK performed the data analysis. ZC, EJJ, SLM, CSR, and ASK undertook the data interpretation. All authors contributed significantly to the preparation of the manuscript.

Design—Retrospective study using data from Health and Retirement Study interviews linked to Medicare claims (2000-2012).

Setting—National population-based dataset.

Participants—Medicare beneficiaries who underwent EMAS.

Exposure—HIB, defined as 2 of the following vulnerabilities: functional dependence, dementia, use of helpers, multimorbidity, poor prognosis, high healthcare utilization.

Measurements—In-hospital outcomes were complications and mortality. Post-discharge outcomes included emergency department (ED) visits, hospitalization, intensive care unit (ICU) stay, and 365-day mortality. Among patients discharged alive who died within 365 days of surgery, outcomes included hospice utilization, hospitalization, ICU and ED use in the last 30 days of life. Multivariable regression was used to determine the association between illness burden and outcomes.

Results—Among 411 patients, 57% had HIB. More HIB patients had complications (45% vs. 28% $P < 0.01$) and in-hospital death (20% vs. 9%, $P < 0.01$). Post-discharge ($n=349$), HIB patients experienced more ED visits (57% vs. 46%, $P=0.04$) and higher mortality (35% vs. 13%, $p < 0.01$). Among post-discharge decedents ($n=86$), 75% had HIB, median survival was 67 (range 21-141) days, 48% enrolled in hospice, 32% died in-hospital, and ICU and ED utilization in the last 30 days of life were 23% and 37%, respectively.

Conclusion—Most older patients undergoing EMAS have pre-existing HIB, and experience high mortality rates and healthcare utilization in the year after surgery, particularly near the end-of-life. Concurrent surgical and palliative care may improve quality of life and end-of-life care in these patients.

Keywords

Emergency general surgery; older adults; palliative surgery; palliative care; geriatric surgery

INTRODUCTION

Meeting the needs of clinically complex older patients is an increasingly important challenge for policymakers, healthcare systems, and clinicians. This is particularly difficult in life-threatening surgical emergencies where outcomes are quite poor and high-intensity treatment may ultimately not benefit the patient. Among emergent procedures, major abdominal operations are the most morbid and costly.¹ Older patients undergoing these procedures experience complication rates exceeding 30%, over 50% are discharged to facilities, and almost a quarter die within a year of surgery.² The goal of surgery is to rid the patient of an immediately life-threatening condition (e.g., bleeding, obstruction, infection, or ischemia). However, return to prior health is frequently not possible, or even desirable, for some very frail or seriously ill older patients.^{3,4}

Surgeons are increasingly attuned to frailty among older patients, and are working to reduce surgical risk.⁵⁻¹³ However there is inadequate understanding of the prevalence of serious illness among older surgical patients, and therefore, limited recognition of who may benefit

from palliative care concurrent to surgery. Serious illness is defined as “a health condition that carries a high risk of mortality and either negatively impacts a person’s daily function or quality of life, or excessively strains their caregivers”¹⁴ As a group, seriously ill patients have rates of hospitalization, mortality and healthcare costs far exceeding other patients, and have high risk of low satisfaction with healthcare and receiving treatments discordant with their preferences.^{15–20} Palliative care delivered throughout the course of serious illness is associated with greater satisfaction with care, better quality of life, improved quality of end-of-life care, and lower hospital costs, and is thus increasingly recognized an approach to improving value in healthcare.^{21,22} Previous studies have used an accumulation of two or more vulnerabilities, or “High Illness Burden,” to identify seriously ill patients at the population level.^{23,24} Quantifying the prevalence of serious illness among older patients having emergent major abdominal surgery, is crucial to improving outcomes and the patient and family experience for survivors and decedents alike.

Presently, few studies quantify the need for palliative care among older patients undergoing emergency major abdominal surgery, or describe the end-of-life care received.^{25–27} We hypothesized that a significant portion of older patients who undergo these procedures have a high illness burden antecedent to surgery, and that these patients would have high rates of postoperative morbidity, mortality and healthcare utilization, as well as high intensity end-of-life care. We sought to 1) quantify preoperative illness burden among older patients who had emergent major abdominal surgery; 2) examine the impact of high preoperative illness burden on short and long-term outcomes, and 3) measure indicators of quality in end-of-life care among older patients who die in the year after hospital discharge.

METHODS

Data sources

This study used data from Health and Retirement Study (HRS) linked with Medicare claims.²⁸ The HRS is a nationally-representative longitudinal study of adults, ages 50 years. Participants are selected using probabilities based on geography, clustering and oversampling of minority participants, and are supplemented every six years to maintain population representativeness.²⁹ HRS participants, or their proxies, are interviewed biennially and provide measures of functional status, cognitive status, living situation, and self-reported health. Linkage of these data with Medicare claims provides information on longitudinal healthcare utilization. This study received approval from the Icahn School of Medicine at Mount Sinai Institutional Review Board.

Study population

Subjects had an inpatient Medicare Claim between 2000-2012, for an urgent or emergent hospital admission associated with ICD-9 procedure codes for open appendectomy, open cholecystectomy, colectomy, laparotomy, abdominal hernia repair, intestinal resection, adhesiolysis, and pancreatic or gastric procedures.² Inclusion criteria were: 1) age 65.5 years at surgery, 2) at least one core HRS interview within 3 years before surgery, and 3) fee-for-service Medicare Parts A and B enrollment for a minimum of 6 months before surgery to ensure completeness of claims data.

Variables

Patient Characteristics—Patient characteristics from the HRS included age (stratified as 65.5-74; 75-84; 85 years), sex, race (White, Black, Other), and ethnicity (Hispanic).

Illness burden—Using existing methodology,^{23,24} illness burden prior to surgery was determined from HRS and Medicare Claims by presence of the following vulnerabilities: functional dependence, dementia, use of helpers, multimorbidity, poor prognosis, and high healthcare utilization. Functional dependence included dependence in 1 activities of daily living (ADL). Dementia was determined by ICD-9 diagnosis codes. Use of helpers was defined as report of caregivers assisting with any ADL or Instrumental ADL (IADL) for 1 hours per week. Multimorbidity was Charlson Comorbidity Score (CCS) >2, based on ICD-9 diagnosis codes during the 6-months before surgery. CCS is based on diagnosis codes for 17 disease conditions from the Deyo adaptation for administrative data, with higher scores representing more comorbidity.³⁰ High healthcare utilization, was based on inpatient and outpatient Medicare claims, and defined as 2 emergency department (ED) visits or hospitalizations or 10 outpatient visits during the 12 months before surgery. Poor prognosis was a score of 14 on the Lee index.³¹ The Lee Index is a prognostic measure, including function and self-reported comorbidity to predict 4-year mortality among community dwelling elders (range, 0-41, higher is worse). A score of 14 predicts 64% mortality risk in four years. A summative score for illness burden was calculated for each patient as the number of functional and medical vulnerabilities before surgery. Patients were categorized as *high illness burden* if they had 2 vulnerabilities, and *low illness burden* if they had 1 vulnerabilities. The latter were the comparison group in analyses.⁷

Outcomes

In-hospital, post-discharge, and end-of-life care outcomes, were identified from Medicare claims. In-hospital outcomes were complications, postoperative length of stay, and in-hospital mortality. Complications, identified based on ICD-9 diagnosis codes, included urinary tract infection, pulmonary embolus, pneumonia, surgical site infection, respiratory failure, acute kidney failure, and acute myocardial infarction.^{2,32} Post-operative length of stay was the number of days from the date of surgery until hospital discharge. Mortality was determined using date of death from HRS-linked National Death Index and Medicare enrollment data.

Post-discharge outcomes included the percentage of patients who had an ED visit, hospitalization for any indication, intensive care unit (ICU) admission, and death within 365 days of surgery. Subjects were considered alive at 365 days if they did not have a date of death or if they had a follow up interview or Medicare Claims more than 365 days after surgery.

Adapted from previously established measures for intensity³³⁻³⁵ of end-of-life care in other populations,³⁶ the following outcomes were measured among live discharges who died within 365 days after surgery: days in hospital per 100 days alive; ICU stay in the last 30 days of life; ED visit in the last 30 days of life; death in a hospital (determined from HRS

after-death interviews with caregivers); hospice enrollment; days in hospice per 100 days alive; and hospice duration in days from first hospice claim until death.³⁴

Analyses

The unit of analysis was the most recent admission for a qualifying procedure from Medicare Claims. If subjects had more than one qualifying admission during the study period, the most recent admission was included in the analysis.

Preoperative illness burden was determined by the number of vulnerabilities for each patient. Characteristics (age, sex, race) and vulnerabilities (ADLs, Helpers, Dementia, Charlson Index > 2, high healthcare utilization, and Lee Index ≥ 14) were compared between patients with high vs. low illness burden using bivariate analyses (chi-square for categorical variables and t-test for continuous variables, since these were not skewed). A p value of ≤ 0.05 was used to indicate statistical significance.

In-hospital outcomes, (complications, length of stay, and mortality) were compared between patients with high illness burden and low illness burden using bivariate analysis. Multivariable logistic regression, adjusting for age, sex, and race examined associations (adjusted odds ratios (AOR), 95% confidence interval (CI)) between illness burden, in-hospital mortality and complications.

Kaplan-Meier analysis was used to compare 365-day survival after surgery for patients with high and low illness burden.

Post-discharge outcomes within 365 days of surgery (number of ED visits, hospitalization, and ICU stays, percent of patients who died) were compared between patients with high illness burden and low illness burden using bivariate analysis. Multivariable Cox regression, adjusting for age, sex, and race was used to examine the associations (Hazard ratio (HR), 95% CI) of illness burden with 365-day postoperative mortality. Multivariable competing-risk regression was used to examine the associations between illness burden and post-discharge healthcare utilization using time after discharge until the first post-discharge healthcare utilization event, adjusting for age, sex, and race.

Previous studies have shown that functional dependence is a strong predictor of postoperative mortality.⁷ Therefore, additional sensitivity analyses were conducted to tease out the influence of functional disability in the high illness burden group. Univariate and multivariable competing-risk regression analyses were repeated comparing, in-hospital and post-discharge outcomes between patients with high illness burden, high illness burden without functional dependence functional dependence (dependence ≥ 1 ADLs) alone, and low illness burden. Additional tests were performed to test the relative differences in outcomes between patients with high illness burden with, and without, functional dependence. Kaplan-Meier analysis was used to compare 365-day survival after surgery stratified by illness burden and vulnerability.

Due to the small number of decedents, and data use restrictions on reporting small cell size, it was not possible to compare end-of-life outcomes between high and low burden patients. Therefore, end-of-life outcomes are reported for all decedents. These outcomes were

described using frequencies, medians and interquartile ranges, as appropriate. Days in hospital per 100-person-days-alive were calculated as the number of days alive after discharge as a percentage of total days alive.

Analyses were performed using Stata 13 (StataCorp. 2013. *Stata Statistical Software: Release 13*. College Station, TX: StataCorp LP).

RESULTS

Study population

Among 411 patients, preoperative vulnerabilities were as follows: 18% had functional dependence, 15% had dementia, 26% required helpers, 72% had multimorbidity, 48% had high healthcare utilization, and 16% had poor prognosis. High illness burden was identified in 57% of patients (n=235). Characteristics of patients with high versus low illness burden are in Table 1.

In-hospital outcomes

Overall, 38% experienced postoperative complications. Compared with low illness burden patients, patients with high illness burden had more complications (46% vs. 28%, $p < 0.01$). Among the entire cohort, 15% died in-hospital. In-hospital mortality was higher among those with high illness burden (20% vs. 9%, $p < 0.01$) (Table 2). High illness burden was associated with a higher likelihood of complications (adjusted odds ratios (AOR) 1.98, 95% CI 1.29-3.03) and in-hospital mortality (AOR 2.47, 95% CI 1.32-4.58).

Post-discharge

Among 349 patients discharged alive, 52% had an ED visit, 23% were hospitalized, and 17% had an ICU admission in the year after surgery. Patients with high illness burden were more likely to experience an ED visit (58% vs. 45%, $p = 0.02$) or an ICU admission (20% vs. 12.2%, $p = 0.05$), but were not significantly more likely to be hospitalized (49% vs. 43%, $p = 0.22$). In adjusted analysis, high illness burden was associated with increased risk of ED visits, and 365-day mortality (adj. HR 2.78, 95% CI 1.69-4.58), but not increased risk of ICU admission. (Table 3).

Sensitivity Analysis

Results of the sensitivity analyses are in the appendix. Among patients with high illness burden (n=231), approximately one-third (n=79) had functional dependence. Overall 365-day mortality was similar for patients with high illness burden without functional dependence and patients with functional independence alone (Supplementary Figure S1). In bivariate analysis, in hospital outcomes and 365-day mortality were significantly worse in patients with high illness burden without functional dependence and those with functional dependence alone, as compared to patients with low illness burden (Supplementary Table S1, S2). Functional dependence was associated with slightly higher risk of death (2.90, 1.55-5.46) than high illness burden without functional dependence (2.72, 1.60-4.62), or high illness burden (2.78, 1.69-4.58) (Supplementary Table 2). However, functional dependence was not associated with higher risk of ED visits, hospitalizations, or ICU stay in the year

after surgery. Differences between patients with high illness burden with, and without, functional dependence were not significant.

End-of-Life-Outcomes

Overall 365-day mortality was 36%; 48% for patients with high illness burden and 21% for low illness burden (Figure 1). Overall median survival for decedents was 23.5 days (IQR 8.5-95.5days). Of patients discharged alive, but who died in the year after surgery (n = 86), median survival was 67 days, 48% enrolled in hospice and 32% died in hospital (Table 4).

DISCUSSION

This study used a nationally-representative sample to demonstrate that most older adults who undergo emergent major abdominal surgery have antecedent serious illness and may benefit from palliative care alongside surgical care. This study also found that older patients who undergo emergent major abdominal surgery experience high rates of postoperative complications, healthcare utilization and mortality in the year after surgery, and are at risk of experiencing poor quality end-of-life care. Patients with high illness burden experience an almost 2-fold increased risk for in-hospital death - nearly half will die in the year after surgery. Among patients who died in the year after discharge, median survival was less than 10 weeks, yet 62% were readmitted prior to death, 14% of decedents' remaining days were spent in hospital, and fewer than half were enrolled in hospice, suggesting opportunities to improve end-of-life care for these patients.

Others have shown that functional disability predicts mortality after surgery. Our study used a broader conceptual model of illness burden, which includes functional disability, and other markers of poor health status including symptom burden and healthcare utilization. This approach helps to identify a similarly vulnerable group of older patients without functional dependence, who may also benefit from palliative care. Our findings imply that treatment directed solely towards these patients' acute surgical and rehabilitative needs are inadequate, and build upon results from a single center study at a tertiary care center showing that 63% of older patients evaluated by an acute care surgery service had one or more palliative care needs.³⁷ These findings are also comparable to a study by Ritchie et al., using the HRS to measure pre-injury illness burden among older patients with hip fracture. In that cohort, 60% had high illness burden before their fracture.³⁸ Our study shows that, like hip fracture, emergent major abdominal surgery is frequently followed by high rates of health care utilization and death in the year after the event.^{39,40} From a contextual standpoint, recognizing similarities between older emergent major abdominal surgery patients, and older patients with hip fracture, can help patients, families and clinicians understand the prognostic significance of the former. This also suggests that, like patients with hip fracture, older emergent major abdominal surgery patients, particularly those with high illness burden, may benefit from integrated multidisciplinary care intended to assess needs, address symptoms, and restore function.^{41,42} Furthermore, palliative care in this setting can help establish prognosis, facilitate goal-concordant treatment decisions, manage symptoms, and assist with complex transitions of care which may include permanent nursing home placement. Introducing palliative care early in the hospital course may help patients more

fully understand the surgical and non-surgical treatment options and risks and benefits of each choice, thus prompting some patients to forego surgery altogether. A study in a Veterans Affairs hospital showed that palliative care consultation for frail elders before elective surgery reduced postoperative mortality, presumably by improving patient selection.^{10,11} With respect to outcomes examined in this study, in-hospital palliative care including symptom management, prognostication, and establishing goals of care could prevent avoidable hospital or ICU stays, and increase hospice use for patients expected to die within months of discharge.

Integrating palliative processes of care for seriously ill patients is a priority for professional organizations, healthcare systems and policymakers.^{43,44} The Institute of Medicine recommends that all seriously ill patients and their families have access to comprehensive care addressing physical, social, psychological, and spiritual needs near the end of life.¹⁵ Given that nearly half of patients with high illness burden will die in the year after emergent major abdominal surgery, and most of those will die in the first months after discharge, admission should prompt patients, families and clinicians, to engage in advance care planning, complete physician orders for life sustaining treatments, and consider hospice enrollment when appropriate. Tools to help surgeons better identify patients near the end of life, clinical processes to elicit goals of care and increase advance care planning during surgical admissions, and quality measures holding surgeons accountable for the type of palliative and end-of-life care patients receive, are necessary to improve quality of care, decrease undesired or burdensome postoperative healthcare utilization, and increase value for this vulnerable and high need patient population. These objectives are closely aligned with performance metrics, set forth by CMS, to make health care more patient-centered, and which are increasingly tied to payments to surgeons and health systems.

This study has several limitations. First, we used administrative claims which may contain coding errors and lack granular clinical information required for accurate risk adjustment. Second, using the HRS, rather than Medicare Claims alone, limited the size of our cohort. However, the HRS is a nationally-representative study containing information about function and caregiving necessary to draw an accurate composite of serious illness in older adults. Third, HRS interviews are conducted biennially, so we were unable to capture illness burden at the time of surgery. This time lag likely underestimates the true illness burden among these patients, as patients tend to experience declining health over time. Fourth, this study does not account for patients with indications for emergent major abdominal surgery who forewent surgery. Understanding their trajectories is necessary to fully describe the illness burden and outcomes among patients under surgical care and fully inform clinical decision making. Finally, these findings are not generalizable to patients who do not have fee-for-service Medicare.

In conclusion, this study showed high preoperative illness burden, high rates of postoperative healthcare utilization, mortality and poor quality end-of-life care, among older patients who underwent emergent major abdominal surgery. This information can guide clinicians in their communication with patients and families about prognosis. As many as two-thirds of these patients could benefit from palliative care in the perioperative period and in the months after surgery to improve quality-of-life, end-of-life care, and reduce undesired

or burdensome healthcare utilization. Findings from this study should press surgeons, hospital administrators and policy makers to routinely provide palliative care as an added layer of support for this vulnerable population.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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Impact Statement

We certify that this work is novel in that it quantifies the prevalence of high illness burden and preoperative palliative care needs among older adults who experience emergent major abdominal surgery. These findings suggest that most of these patients should receive palliative care concurrent to surgery.

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Figure 1.

One-year survival of older adults after emergency laparotomy stratified by illness burden.

High Illness Burden defined as 2 of the following vulnerabilities; functional dependence (> 1 activity of daily living), dementia (by ICD-9 code), use of helpers (assistance with any ADL for > 1 hours per week), multimorbidity (Charlson Score > 2), poor prognosis (Lee Index > 14), high healthcare utilization (two or more emergency department (ED) visits or hospitalizations or > 10 outpatient visits during the 12 months prior to the index admission).

Low Illness Burden defined as 0-1 of the vulnerabilities described above.

Table 1

Preoperative characteristics of older patients who underwent emergency laparotomy comparing those with high versus low illness burden

		High illness burden ^a n = 231 %	Low illness burden ^a n = 180 %	p-value
Age	65-74	29.4	43.9	<0.01
	75-84	45.0	35.0	
	85 +	25.5	21.1	
Sex	Female	63.4	55.0	0.08
Race	White	76.6	81.1	0.83
	Black	15.2	18.9	
	Hispanic/Other	7.2		
ADL ^b	Any dependence	32.6	-	<0.01
Helpers	Any helpers	45.9	-	<0.01
Dementia		24.7	-	<0.01
Charlson > 2		90.9	48.3	<0.01
High healthcare utilization		81.0	10.6	< 0.01
Lee index ≥ 14		19.1	-	<0.01

^a *High Illness Burden* defined as ≥ 2 of the following vulnerabilities; functional dependence (≤ 1 activity of daily living), dementia (by ICD-9 code), use of helpers (assistance with any ADL for ≥ 1 hours per week), multimorbidity (Charlson Score ≥ 2), poor prognosis (Lee Index > 14), high healthcare utilization (two or more emergency department (ED) visits or hospitalizations or ≥ 10 outpatient visits during the 12 months prior to the index admission). *Low Illness Burden* defined as 0-1 of the vulnerabilities described above.

^b Activities of Daily Living

^c Cells values representing fewer than 11 patients were suppressed, as per agreement with the Health and Retirement Study.

Table 2

In-Hospital and one-year post-discharge outcomes among a cohort of older patients undergoing emergent laparotomy

	High Illness Burden ^a %	Low Illness Burden ^a %	P value
In-hospital Outcomes^b	n = 231	n = 180	
Complications	45.5	28.3	<0.01
Postoperative length of stay, mean (SD)	9.9 (7.9)	8.2 (6.7)	0.02
Mortality	19.9	8.9	<0.01
Post-discharge Outcomes^c	n = 185	n = 164	
Emergency department visit	57.8	45.1	0.02
Hospitalization	49.2	42.7	0.22
ICU Stay	20.0	12.2	0.05
Mortality	35.1	12.8	<0.01

^a *High Illness Burden* defined as ≥ 2 of the following vulnerabilities; functional dependence (≥ 1 activity of daily living), dementia (by ICD-9 code), use of helpers (assistance with any ADL for ≥ 1 hours per week), multimorbidity (Charlson Score ≥ 2), poor prognosis (Lee Index > 14), high healthcare utilization (two or more emergency department (ED) visits or hospitalizations or ≥ 10 outpatient visits during the 12 months prior to the index admission). *Low Illness Burden* defined as 0-1 of the vulnerabilities described above.

^b In-hospital outcomes are reported for the entire cohort (N = 411)

^c Post discharge outcomes are reported among 349 patients discharged alive from the emergent major abdominal surgery admission. Does not account for competing risk of death over one year.

Table 3

Association of post-operative mortality and healthcare utilization in the year after discharge from emergency laparotomy (N = 349)

	Hazard ratio [95% confidence interval] ^a			
	Mortality	ED visits	Hospitalization	ICU admission
High Illness burden ^b	2.78[1.69-4.58]	1.46[1.08-1.98]	1.17[0.85-1.61]	1.51[0.88-2.60]

^aReference group is patients with low illness burden. Model adjusted for age, sex, race, and complications. Complications include urinary tract infection, pulmonary embolus, pneumonia, surgical site infection, respiratory failure, acute kidney failure, and acute myocardial infarction. Boldface indicates statistically significant differences ($p < 0.05$)

^b*High Illness Burden* defined as 2 of the following vulnerabilities; functional dependence (< 1 activity of daily living), dementia (by ICD-9 code), use of helpers (assistance with any ADL for < 1 hours per week), multimorbidity (Charlson Score ≥ 2), poor prognosis (Lee Index > 14), high healthcare utilization (two or more emergency department (ED) visits or hospitalizations or ≥ 10 outpatient visits during the 12 months prior to the index admission). *Low Illness Burden* defined as 0-1 of the vulnerabilities described above.

Table 4 End-of-life outcomes among patients who died after hospital discharge (N = 86)^a

Outcome	
Survival after discharge, days, median (IQR)	66.5 (21-141)
<i>Hospice utilization</i>	
Enrolled in hospice %	48
Hospice duration ^b , days, median (IQR)	13 (6-33)
Days enrolled in hospice per 100 days alive ^b , mean (SD)	14.4 (36.1)
<i>Hospital Utilization</i>	
Hospital readmission after index admission %	61.6%
Total days in hospital after index admission, median (IQR)	8 (0-11)
Days admitted to hospital per 100 days alive, mean (SD)	13.5 (17.8)
<i>Care in the last 30 days of life</i>	
Died in hospital %	32.0%
Intensive care unit stay in last 30 days of life	23.3%
Emergency department visit in last 30 days of life	37.2%

^aIncludes patients with high and low illness burden. Comparison between high and low illness burden was not possible due to small cell sizes.^bAmong 41 patients enrolled in hospice.