Understanding Factors Contributing to Area-Level Variation in End-of-Life Expenditures

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Abstract

Health care spending in the months before death varies across geographic areas but is not associated with improved outcomes. Using data from the prospective multiregional Cancer Care Outcomes Research and Surveillance Consortium (CanCORS) study, we assessed the extent to which such variation is explained by differences in patients' sociodemographic factors, clinical factors, and beliefs; physicians' beliefs; and the availability of services. Among 1,132 patients ages sixty-five and older who were diagnosed with advanced-stage lung and colorectal cancer in 2003–05, died before 2013, and were enrolled in fee-for-service Medicare, mean expenditures in the last month of life were $13,663. Physicians in higher-spending areas reported less knowledge about and comfort with treating dying patients and less positive attitudes about hospice, compared to physicians in lower-spending areas. Higher-spending areas also had more physicians and fewer primary care providers and hospices in proportion to their total population than lower-spending areas did. Availability of services and physicians' beliefs, but not patients' beliefs, were important factors in explaining geographic variations in end-of-life spending. Enhanced training to better equip physicians to care for patients at the end of life and strategic resource allocation may have potential for decreasing unwarranted variation in care.

Keywords

Substantial variations in health care spending at the end of life exist across geographic areas for patients with chronic illnesses, including cancer, but higher spending levels are not associated with improved outcomes.[1–4] Regions with high levels of end-of-life spending use more inpatient care, specialty visits, and diagnostic tests than regions with low levels, even

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for patients not at the end of life—and these differences are not explained by differences in underlying illness severity.[1,5,6]

Previous research has sought to identify the extent to which variations in intensity of care are explained by differences in patients' characteristics or beliefs, physicians' beliefs and practice styles, or the availability of services to support care at the end of life. Prior studies have found that patients in high- versus low-spending areas do not differ in their preferences for end-of-life care,[7] and that patients' preferences for seeking primary and specialty medical care have a minimal role in explaining regional variation in health care use.[8] However, these studies relied on patients responding to hypothetical situations using clinical vignettes. A more recent study found that patients' preferences explained about 5 percent of the variation in total Medicare spending across hospital referral regions (HRRs)—substantially less than the 23 percent of the variation explained by supply factors, such as the numbers of physicians, specialists, and hospital beds.[9] None of these studies included information about physicians' beliefs and practice styles, which have been associated with area-level differences in care intensity.[10–12]

We used data from a prospective multiregional study to understand the factors contributing to area-level variations in intensity of medical care at the end of life. Specifically, we examined the extent to which area-level differences in patients' sociodemographic and clinical factors, patients' and physicians' beliefs, and the availability of services explained area-level variation in Medicare spending in the last thirty days of life for patients with advanced-stage lung or colorectal cancer.

Study Data And Methods

Overview

Full details about our methods are in online appendix 1.[13] Briefly, we linked rich clinical data with patient survey, physician survey, and administrative data for a cohort of older patients with advanced lung or colorectal cancer who had died. The patients had lived in twenty-six HRRs across the United States. We characterized patients' health care spending in the last thirty days of life and used multilevel models to assess variation in end-of-life spending attributed to geographic area and the contribution of patients' sociodemographic and clinical variables, patients' beliefs, availability of services, and physicians' beliefs in explaining these area-level variations.

Data

We used data from the Cancer Care Outcomes Research and Surveillance Consortium (CanCORS) study, a multiregional prospective study of care delivered to patients diagnosed with lung or colorectal cancer in the period 2003–05.[14] Patients (or their proxies if they were deceased or too ill) were surveyed by telephone approximately three to six months after diagnosis, and those alive at baseline were surveyed up to two additional times. We linked the CanCORS patient survey data with Medicare data for 2003–12.[15]

Patient Cohort

We identified patients diagnosed in 2003–05 with stage 3b or 4 lung cancer or stage 4 colorectal cancer, or patients who were diagnosed with earlier-stage disease who recurred with metastatic disease by 2012. We linked Medicare claims data for 2,588 such patients (see appendix 2 for a cohort flow diagram)[13] and then identified the 1,177 patients who had died by the end of 2012, had been at least age sixty-five at diagnosis, had been continuously enrolled in Parts A and B fee-for-service Medicare during the three months before death, and survived for at least a month after diagnosis. Patients were assigned to an HRR based on their residential ZIP code at diagnosis, and we excluded 45 patients in HRRs with fewer than ten patients and ten physicians responding to key survey items. The final cohort comprised 1,132 decedents.

Key Variables

Medicare Spending In The Last Thirty Days Of Life—Following previously described methods,[16–19] we summed Medicare expenditures (including patient cost sharing) for the thirty-day period before death from claims irrespective of whether they were directly related to the cancer diagnosis. We included expenditures for inpatient care, postacute skilled nursing facility care, outpatient care, physician/supplier fees, durable medical equipment, home health care, and hospice care.

Patients' Demographic And Clinical Characteristics—Demographic variables included age at death, year of death, and urban/rural residence as well as self-reported sex, race/ethnicity, marital status, education, and income. Clinical variables included cancer type; stage at diagnosis; comorbidity at diagnosis (using the medical record–based Adult Comorbidity Evaluation-27);[20] smoking status at diagnosis; and visits within six months of diagnosis with a surgeon, radiation oncologist, or medical oncologist.

Availability Of Services—We characterized area-level availability of services in 2005 for the HRRs based on 2005 Area Health Resources Files.[21] The relevant data included total population, population age sixty-five and older, proportion of the population that was nonwhite, number of physicians, proportion of physicians who were primary care physicians, and number of hospital beds. We characterized the number of hospices in 2005 based on the Medicare Provider of Services file.[22]

Physicians' Beliefs—In 2005–07 the CanCORS study surveyed physicians who had been reported by CanCORS patients as playing key roles in their care about their beliefs and practices regarding end-of-life care for patients with cancer.[23,24] We characterized a variety of physician beliefs pertaining to experience with and comfort in caring for patients at the end of life, personal preferences for hospice care, reported timing of discussions with terminally ill patients about end-of-life issues, and likelihood to recommend chemotherapy for patients with advanced-stage lung cancer with poor performance status. The survey items are described in detail in appendix 1.[13]

Patients' Beliefs And Supports—We summarized patients' beliefs about cancer's curability and the side effects of cancer treatments; preferences for treatments that extend

life or minimize symptoms or financial burden; prognosis; preferred roles for themselves and family in decisions; and fatalism, vitality, and social supports at the HRR level because many of these items were not included in the proxy survey for patients who had died at the time of the baseline survey. These items are described in detail in appendix 1.[13]

Analyses

For the HRR-level variables, we categorized our twenty-six HRRs into quintiles of spending in the last six months of life using publicly available data on spending at the HRR level at the end of life for patients with serious chronic illness from the *Dartmouth Atlas of Health Care*.[25] The quintiles contained approximately equal numbers of patients. We calculated mean values for each variable by quintile of HRR-level spending and used the Armitage test for trend to assess for differences by quintile. The HRR-level measures of availability of services, physicians' beliefs, and patients' beliefs and supports were often highly correlated. Therefore, we used principal components analysis to summarize these into subsets of related variables (see appendix 3 for full details).[13]

We next constructed a series of mixed-effects linear regression models with random HRR effects, with the patient as the unit of analysis, to understand the HRR-level variance in spending in the last thirty days of life and the proportion of that variance that was explained with sequentially adding groups of explanatory variables. The first model included no covariates. Model 2 included patient demographic variables. Model 3 included patient demographic and clinical variables. In three versions of model 4, we added variables for HRR-level availability of health care services, physicians' beliefs, or patients' beliefs. Model 5 included all variables. For each model, we report the fraction of variation (intraclass correlation, or ICC) in spending attributed to the HRR, and we calculated the percentage change in estimated HRR-level variance in the sequential models. For the final model, which included all groups of variables, we also assessed associations of each variable with differences in end-of-life expenditures.

The study was approved by the Harvard Medical School Office of Research Subject Protection.

Limitations

Our study had several limitations. First, although we had rich clinical data, including survey data from patients and physicians, we were unable to analyze beliefs at the patient level because of the lack of information about patients' beliefs among patients who were deceased at the time of the baseline patient survey and because physician survey responses were not available for all patients. This necessitated summarizing these variables at the HRR level. Nevertheless, these data allowed us to capture patients' and physicians' beliefs where other studies have not.

Second, the cohort was limited to patients with two types of cancer, and many patients died in the mid-2000s. However, our ability to follow patients through 2012 allowed us to include cancer patients who died soon after diagnosis as well as those who survived for many years before recurrence and death.

Third, we studied care for people who were ages sixty-five and older and enrolled in fee-for-service Medicare at the time of death. Some evidence suggests that variation in expenditures differs for commercially insured populations.[4]

Fourth, because Medicare payments for hospital care are determined based on prospective payment, there could be variations in intensity of hospital-based care that were not captured by our end-of-life spending measure.

Study Results

Exhibits 1 and 2 present characteristics of the 1,132 decedents in our sample. The mean age at death was 75.6 (standard deviation: 6.7). Nearly 80 percent of the patients were white, 43 percent were women, and most had household incomes of less than $40,000 (exhibit 1). Three-quarters of the patients had lung cancer (exhibit 2). Mean expenditures in the last thirty days of life were $13,663 overall, ranging from $10,131 for patients in the lowest-spending quintile of HRRs to $19,318 for those in the highest quintile (exhibit 3). HRRs with higher levels of end-of-life spending were more populous, had larger shares of nonwhite residents, more physicians per 10,000 people, lower proportions of physicians who were primary care providers, and fewer hospital beds and hospices per 10,000 people, compared to HRRs with lower levels of end-of-life spending.

Compared to physicians in lower-spending areas, those in higher-spending areas were less likely to strongly agree that they were well prepared to treat end-of-life symptoms, were comfortable discussing "do not resuscitate" (DNR) status, or were knowledgeable enough to discuss end-of-life care options with patients. They were substantially less likely to strongly agree that they would enroll in hospice themselves if they were terminally ill or that they would discuss DNR status "now" with a terminally ill patient who they estimated had four to six months to live (exhibit 3). Physicians in higher-spending areas were also considerably more likely to recommend chemotherapy for a patient with stage 4 lung cancer who had poor performance status and pain from their cancer.

Patients' beliefs and supports were not consistently associated with area-level spending (exhibit 3 and appendix 4[13]). We observed no difference in beliefs about curability of cancer or the belief that cancer treatment can cause serious side effects. Patients in higher-spending areas were somewhat less likely to prefer treatment that will extend their life even if it causes more pain. Patients did not differ in their ability to report about prognosis, vitality, or fatalism. Patients in higher-spending areas had somewhat lower levels of instrumental and affective social supports and were slightly more likely to prefer making treatment decisions without input from family.

Exhibit 4 displays the fraction of the variance (ICC) in spending in the last thirty days of life attributed to the HRR. The ICC was 0.026 when no patient, area, or physician covariates were considered (model 1). (While this is a relatively small proportion of the total variance, there was still meaningful variation across areas: The estimated SD in spending across areas was $2,833.) Adding demographic variables (model 2) had a negligible effect (SD: $2,646), as did adding clinical variables to demographic variables (model 3) (SD: $2,461. Adding

variables that reflected HRR-level availability of services to the patients' demographic and clinical variables (model 4a) explained an additional 39 percent (SD: $1,509). Alternatively, adding HRR-level measures of physicians' beliefs (model 4b) explained 26 percent (SD: $1,830), while adding HRR-level patients' beliefs instead of HRR-level availability of services or physicians' beliefs (model 4c) did not reduce the variance attributed to the HRR (SD: $2,496). The fully adjusted model with all covariates (model 5) had an SD of $1,020— a reduction of 59 percent compared with model 3 (exhibit 4), and a reduction of 64 percent compared with model 1 (not shown).

Detailed results of the fully adjusted model (model 5) are in appendix 5.[13] When we assessed the association of all variables with expenditures in the last thirty days of life in this model, expenditures were greater for younger than for older patients ($5,576 more for people ages 65–69 years and $5,171 more for people ages 70–74 years, compared to those ages 85 and older, both P = 0.01). Expenditures tended to be higher for white versus Hispanic patients (a difference of $3,916; *p* = 0.053) and for people who were married and living with others at the time of diagnosis versus those who were married and living with a spouse only (a difference of $4,915; *p* = 0.06), although these differences were not significant. Expenditures were also greater (by $3,702) for people who had seen a surgeon within six months of diagnosis versus those who had not (P = 0.004). Patients in areas with greater availability of health care services had expenditures that were $1,705 higher for each standard-deviation increase (P = 0.02). Those in areas where physicians reported more comfort discussing and knowledge about end-of-life issues had expenditures that were $2,508 lower for each standard-deviation increase (P = 0.03). Other characteristics were not associated with expenditures in the last thirty days of life.

Discussion

We examined geographic variation in Medicare spending in the last thirty days of life for people with advanced-stage lung and colorectal cancer at the level of the hospital referral region and found that the most important contributors to variation were physicians' beliefs and the availability of health care services. Patients' beliefs, preferences, and supports did not contribute meaningfully to geographic variation in spending intensity.

The recent Institute of Medicine report titled *Dying in America: Improving Quality and Honoring Individual Preferences Near the End of Life*[26] emphasized the importance of patient- and family-centered care that is consistent with people's values, goals, and informed preferences. Although patients' preferences for more or less intensive care at the end of life may vary, we found no evidence that such differences explain area-level variation in expenditures at the end of life. Our study extends other work that found no association between anticipated preferences for intense care among people who were not seriously ill and spending at the end of life[7] by collecting data on patients with cancer. One prior study that used data from a population-based survey of elderly Medicare beneficiaries found evidence that patients' preferences explain a small but significant share of regional variation in Medicare spending.[9] However, that study measured preferences for physician visits and testing, which may be shaped by the availability of such care. Moreover, the preferences measured were not specific to patients' health conditions.

We found that physicians' beliefs and practice styles and area-level availability of services were the primary drivers of variations in intensity of care. We demonstrated strong associations of physician-reported beliefs, end-of-life care skills, and practice patterns with area-level spending. Physicians practicing in higher-spending areas were much less likely than those in lower-spending areas to report that they were well prepared to treat symptoms, comfortable discussing DNR status, and knowledgeable enough to discuss end-of-life options with terminally ill patients. They were also substantially less likely than other physicians to report that they would enroll in hospice if terminally ill, and they were more likely to recommend chemotherapy for patients with stage 4 lung cancer who had poor performance status and pain.

These findings suggest that interventions targeted at providers hold potential to decrease the use of high-intensity care at the end of life that is not driven by patients' preferences. Specifically, training to increase physicians' comfort in caring for patients with serious illness is crucial and should include training in symptom management as well as communication skills anchored in end-of-life issues.[26] Evidence suggests that communication skills training can improve observable communication behaviors among oncologists and trainees.[27,28] Nevertheless, more research is needed to better characterize communication quality and assess the durability and scalability of clinician communication training interventions.[29]

In addition to the lower levels of enthusiasm for early hospice discussions and lower personal interest in hospice among physicians in higher-spending areas, we observed fewer hospices per 10,000 people in higher- versus lower-spending areas. Hospice care is considered to be high-value care: It can improve the quality of care for dying patients[30] and the experiences of bereaved caregivers,[31,32] and it is associated with savings for Medicare.[33] Other research has found that areas with high levels of care intensity have higher rates of very short hospice stays.[34] Although we did not examine hospice use directly, physicians' attitudes and a limited supply of hospice care may contribute to a relative underuse of hospice in higher-spending areas. Of interest, we also observed fewer social supports for patients in higher-spending areas, which may affect their eligibility for hospice. The relative contribution and interrelationship of these factors require further study.

It is of note that the fraction of variation in end-of-life expenditures attributed to the HRR was relatively small (0.026). However, spending in the highest quintile was almost twice that in the lowest quintile ($19,318 versus $10,131). This is similar to variation seen in previous studies,[35,36] despite our more homogeneous population of patients with advanced-stage lung or colorectal cancer in 26 of 306 HRRs.

Relatively few factors at the patient, HRR, or physician levels were associated with higher expenditures in our fully adjusted model. Spending was greater for younger patients, but it did not differ by patients' race/ethnicity or socioeconomic status. However, our analysis may have been underpowered to detect modest differences in spending by these characteristics. The availability of services factor was associated with higher spending. In addition, regions where physicians reported greater comfort with and knowledge about addressing end-of-life issues with patients had lower spending. Although our analyses cannot demonstrate

causality, this result suggests that empowering physicians with the skills necessary for communicating with patients and families at the end of life might not only decrease variation but also help lower end-of-life spending.

Conclusion

Physicians' beliefs and HRR-level availability of health care services were important contributors to geographic variations in end-of-life spending for patients with advanced-stage lung and colorectal cancer, while patients' beliefs, preferences, and supports did not contribute to this variation. Attention to the allocation of health care resources necessary to support patients and families at the end of life as well as resources and training to equip physicians to care for patients at that time appear more likely to reduce unwarranted variation in care than interventions that target patients' beliefs.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

Acknowledgments

Biographies

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13. To access the appendix, click on the Details tab of the article online.

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Exhibit 1

Demographic characteristics of patients with advanced-stage lung or colorectal cancer in twenty-six hospital referral regions, 2003–12

Demographic characteristic	No.	%
Age range at death (years)		
65–69	240	21
70–74	303	27
75–79	266	23
80–84	203	18
85 and older	120	11
Sex		
Male	637	57
Female	495	43
Self-reported race/ethnicity		
White	899	79
Black	60	5
Hispanic	93	8
Asian	43	4
Other	37	3
Self-reported marital and household status		
Unmarried, living alone	329	29
Unmarried, living with others	47	4
Married, living with spouse	534	47
Married, living with others	49	4
Unknown	173	15
Self-reported educational attainment		
Less than high school	303	27
High school graduate or GED	604	53
College graduate	208	18
Unknown	17	2
Self-reported household income		
Less than $20,000	334	29
$20,000– less than $40,000	289	26
$40,000– less than $60,000	134	12
$60,000 or more	127	11
Unknown	248	22
Urban/rural residence		
Metropolitan area	800	71
Micropolitan area	148	13
Small town	90	8

Demographic characteristic	No.	%
Rural	94	8
Year of death		
2003	67	6
2004	351	31
2005	321	28
2006	138	12
2007–08	140	12
2009–12	115	10

SOURCE Authors' analysis of data from patient surveys and medical records, physician surveys, and the Area Health Resources Files. NOTES $N =$ 1,132. Percentages might not sum to 100 because of rounding. The mean expenditure in the last thirty days of life was $13,663 (standard deviation: $17,563).

Exhibit 2

Clinical characteristics of patients with advanced-stage lung or colorectal cancer in twenty-six hospital referral regions, 2003–12

Clinical characteristic	No.	%
Cancer type		
Lung	846	75
Colorectal	286	25
Stage at diagnosis		
1	107	9
2	73	6
3	319	28
4	617	55
Unknown	16	1
Comorbidity at diagnosis based on medical record review		
None	149	13
Mild	393	35
Moderate	229	20
Severe	225	20
Unknown	136	12
Smoking status		
Current smoker	58	5
Former smoker	737	65
Never smoked	172	15
Unknown	165	15
Within six months of diagnosis, saw:		
Surgeon		
Yes	634	56
No	498	44
Radiation oncologist		
Yes	523	46
No	609	54
Medical oncologist		
Yes	795	70
No	337	30

SOURCE Authors' analysis of data from patient surveys and medical records, physician surveys, and the Area Health Resources Files. NOTE *N* = 1,132. Percentages might not sum to 100 because of rounding.

[a] Using the Adult Comorbidity Evaluation-27; see note 20 in text.

Exhibit 3

Area, physician and patient hospital referral region (HRR)-level characteristics overall and by quintile of Dartmouth Atlas of Health Care HRR-level spending in last six months of life, 2003–12

	Overall		By Quintile of Area Level Spending					p value[a]
	Mean	SD	Lowest	2	3	4	Highest	
Mean patient spending in last 30 days of life	$13,663	$17,562	$10,131	$10,686	$12,733	$15,070	$19,318	<0.001
Population in 2005	2,856,783	3,683,860	789,574	428,662	1,396,191	1,395,049	9,991,548	<0.001
Population in 2005 65 and older	306,470	362,382	109,992	59,587	174,096	158,070	1,003,309	<0.001
Nonwhite population	36.5%	23.5%	9.1%	17.3%	31.0%	51.8%	70.4%	<0.001
Physicians per 10,000 people	24.2	11.1	23.8	17.7	21.9	30.4	27.1	<0.001
Physicians who are primary care physicians	41.7%	13.0%	48.3%	53.3%	40.9%	35.6%	31.2%	<0.001
Hospital beds per 10,000 people	33.0	99.0	39.5	38.9	39.2	21.7	26.4	<0.001
Hospices per 10,000 people	0.14	0.07	0.22	0.17	0.19	0.05	0.05	<0.001
Physicians who:[b]								
Strongly agree that they:								
Are well prepared to treat symptoms at the end of life	39.7%	8.4%	40.7%	39.3%	35.8%	33.9%	33.4%	<0.001
Are comfortable discussing DNR status	66.6%	8.4%	67.3%	70.5%	67.2%	60.1%	61.3%	0.003
Are knowledgeable enough to discuss end-of-life care options	56.5%	8.6%	57.8%	58.1%	52.9%	50.8%	49.5%	<0.001
Would enroll in hospice themselves if terminally ill	65.2%	8.4%	71.4%	68.2%	64.4%	62.7%	54.4%	<0.001
Would discuss "now" with a terminally ill patient with 4–6 months to live:								
Prognosis	62.4%	5.0	65.3	59.2	63.5	66.5	59.5	0.31
Hospice	43.7%	6.9	45.9	40.9	46.1	46.7	38.9	0.11
DNR status	26.3%	7.0	30.3	27.4	25.4	23.8	19.3	<0.001
Preferred site of death	19.6%	5.1	18.5	18.7	19.8	20.9	18.7	0.73
Would be very or somewhat likely to recommend chemotherapy for a stage 4 lung cancer patient with poor performance status and pain	42.7%	15.9	29.4	38.3	41.4	43.7	47.8	<0.001
Patients who:[c]								
Strongly agree that cancer can be cured	12.4%	8.2%	9.2%	9.2%	12.3%	10.8%	12.2%	0.38
Strongly agree that cancer treatment can cause serious side effects	12.3%	7.7%	18.4%	9.0%	11.2%	15.5%	17.0%	0.85
Prefer treatment that will extend their life even if it causes more pain	37.0%	9.2%	50.1%	42.1%	41.9%	31.5%	40.6%	0.03

	Overall		By Quintile of Area Level Spending					
	Mean	SD	Lowest	2	3	4	Highest	p value[a]
Prefer treatment that will extend life even if it uses all of their finances	42.6%	12.1%	39.9%	47.1%	54.1%	45.2%	53.3%	0.05
Are unable to report about prognosis	45.2%	13.7%	37.7%	53.7%	57.5%	52.9%	45.7%	0.22
Report they defer treatment decisions without input from family	45.6%	11.5%	35.2%	37.8%	45.9%	54.4%	52.1%	<0.001
Report that they prefer to defer most treatment decisions to their doctor	7.1%	4.1%	5.7%	6.3%	6.1%	4.6%	6.6%	0.92

SOURCE Authors' analysis of data from patient surveys and medical records, physician surveys, and the Area Health Resources Files. NOTES NOTE $N = 1,132$. The five quintiles of mean HRR spending in the last six months of life (based on data from the *Dartmouth Atlas of Health Care*; see note 25 in text) were as follows: lowest, $38,823; 2, $41,926; 3, $48,429; 4, $60,645; and highest, $89,945. In our cohort, quintile 1 had 207 patients in two HRRs, quintile 2 had 231 patients in eight HRRs, quintile 3 had 234 patients in seven HRRs, quintile 4 had 227 patients in seven HRRS, and quintile 5 hade 233 patients in one HRR. SD is standard deviation. DNR is do not resuscitate.

[a] For trend across quintiles.

[b] Based on responses from 3,139 physicians, adjusted for sex, race, year of graduation from medical school, specialty, base payment, practice type, proportion of patients in managed care, patient volume, teaching, and board certification.

[c] Based on responses from patients with advanced-stage cancer, adjusted for age, sex, race/ethnicity, education, income, and marital and household status.

Data for four additional patient variables are included in appendix 4.

Exhibit 4

Influence on hospital referral region (HRR)–level variance of factors at the patient, physician, and HRR levels

Model	Model description	Fraction of variance in spending in the last 30 days of life attributed to HRR[a]	SD in spending across HRRs	Change in SD from prior model
1	No covariates	0.026	$2,833	—[b]
2	Demographic variables	0.023	2,646	−7%
3	Model 2 with patient clinical variables	0.020	2,461	−7
4a	Model 3 with HRR-level availability of services	0.008	1,509	−39
4b	Model 3 with physician beliefs	0.011	1,830	−26
4c	Model 3 with patient beliefs	0.021	2,496	1
5	All variables	0.004	1,020	−59[c]

SOURCE Authors' analysis of data from patient surveys, medical records, physician surveys, and the Area Heath Resources Files. NOTE SD is standard deviation.

[a]Intraclass correlation (ICC).

[b]Not applicable.

[c]Change from model 3.