

Inpatient Hospitalization of Oncology Patients: Are We Missing an Opportunity for End-of-Life Care?

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Abstract

Introduction: Despite advances in the care of patients with cancer over the last 10 years, cancer remains the second leading cause of death in the United States. Many patients receive aggressive, in-hospital end-of-life care at high cost. There are few data on outcomes after unplanned hospitalization of patients with metastatic cancer.

Methods: In 2000 and 2010, data were collected on admissions, interventions, and survival for patients admitted to an academic inpatient medical oncology service.

Results: The 2000 survey included 191 admissions of 151 unique patients. The 2010 survey assessed 149 admissions of 119 patients. Lung, GI, and breast cancers were the most com-

mon cancer diagnoses. In the 2010 assessment, pain was the most common chief complaint, accounting for 28%. Although symptoms were the dominant reason for admission in 2010, procedures and imaging were common in both surveys. The median survival of patients after discharge was 4.7 months in 2000 and 3.4 months in 2010. Despite poor survival in this patient population, hospice was recommended in only 23% and 24% of patients in 2000 and 2010, respectively. Seventy percent of patients were discharged home without additional services.

Conclusion: On the basis of our data, an unscheduled hospitalization for a patient with advanced cancer strongly predicts a median survival of fewer than 6 months. We believe that hospital admission represents an opportunity to commence and/or consolidate appropriate palliative care services and end-of-life care.

Introduction

Over the past 10 years, there have been multiple advances in cancer care. Although chemotherapy options and supportive care for patients with advanced cancer have evolved, cancer remains the second leading cause of death in the United States.¹ It is estimated that 571,950 people will die this year as a result of cancer in the United States.² Patients with end-stage cancer have high rates of hospitalization, with over 60% being admitted in the last month of life.³ The use of aggressive end-of-life care is often discordant with the desires of the general population.⁴⁻⁶ The cost of cancer care is rising at a dramatic rate, with a high proportion of dollars being spent on end-of-life-care.⁷

In patients with cancer who receive inpatient palliative care consultation, the median survival after consultation ranges from 4 to 30 days.⁸⁻¹⁰ This population is heavily selected to have a poor prognosis. Few data exist on the estimated survival of patients with advanced cancer after unplanned hospitalization. As part of a quality improvement project in 2000, the inpatient oncology service at an academic medical center was evaluated for patient characteristics, interventions, and survival. In 2010, this assessment was repeated with additional emphasis on reason for admission, disposition, services at discharge, and hospice recommendations. We aimed to compare the outcomes and interventions over time as well as to provide recommendations for future improvement in services directed toward this population.

Methods

2000 Survey

Study population. All patients admitted to the University of Wisconsin (UW) Hospital inpatient oncology service from August 1, 2000, through December 31, 2000, were included. At that time, the inpatient oncology service admitted patients with solid tumors, non-Hodgkin lymphoma, and multiple myeloma.

Study design. Data were collected retrospectively on consecutive patients as part of a quality improvement project. Patient characteristics assessed included age, sex, site of primary cancer diagnosis, and stage (metastatic/advanced or local). During hospitalization, the number and type of imaging studies, procedures, and antitumor interventions as well as length of stay and whether the admission was a repeat admission were collected. Overall survival was assessed at 1 year using the Wisconsin death registry.

2010 Survey

Study population. All patients with an unplanned admission to the UW Hospital inpatient oncology service from August 31, 2010, through December 23, 2010, were included, regardless of disease stage. An admission was considered unplanned if patients were admitted for symptoms or additional work-up that could not be completed as an outpatient. Patients who had previously planned admissions for procedures or chemotherapy were excluded from this analysis, because they received care

through another nurse practitioner–run service. This population included only patients with solid tumors. Patients with hematologic malignancies were cared for through a separate service.

Study design. As part of a quality improvement project, data were collected prospectively, including age, site of primary cancer, reason for admission, whether the admission was a repeat admission, evidence of disease progression, procedures, consultations, and imaging performed, discharge diagnosis, disposition, hospice recommendation, length of stay, and disposition. The date of death was collected using hospital records and the UW Carbone Cancer Center tumor registry.

Results

The 2000 and 2010 surveys were similar in patient demographics, interventions, and outcomes (Table 1). The 2000 survey included 191 admissions of 151 unique patients. The mean age was 60 years (range, 27 to 88 years). Of these patients, 19 (13%) had localized disease, and 132 (87%) had metastatic disease. During the 2010 data collection, there were 149 admissions of 119 unique patients. In both 2000 and 2010, lung, GI, and breast cancers were the most common underlying cancer diagnoses. The median length of stay was similar in both surveys, at 3 days (range, 1 to 36 days) in 2000 and 4 days (range, 1 to 36 days) in 2010.

A majority of patients were admitted for uncontrolled symptoms in both 2000 and 2010 (70% and 66%). Although relatively few patients were admitted solely for procedures or chemotherapy in either analysis, the number of admissions for chemotherapy decreased from 11% in the 2000 assessment to 3% in 2010. In the 2010 survey, pain was the most common chief complaint at admission (28%; Fig 1). Although symptoms were the dominant reason for admission, procedures and imaging were common in both surveys. The number of procedures performed among inpatients decreased, with 186 procedures performed in 2000 and 82 in 2010. In contrast, the frequency of imaging increased, with 196 versus 415 studies. These imaging studies predominantly were x-rays, magnetic resonance imaging, computed tomography scans, and ultrasounds. In terms of cancer-directed therapy, 29 patients received chemotherapy in 2000 compared with five patients in 2010. The 2000 review did not include assessment of consultation, but in 2010, the most common reason for consultation was for radiation therapy. Despite the majority of patients being admitted for uncontrolled symptoms, palliative care consultation was only the fifth most common consult, behind the procedural-based specialties of radiation oncology, gastroenterology, interventional radiology, and general surgery (Appendix Fig A1, online only).

In 2010, when patients were assessed for progression, 85% had progression, 7% were unchanged, and 8% had improvement in disease burden. The median survival of patients after discharge in 2000 was 4.7 months. At 1 year, 73.5% of patients had died. In 2010, the median survival after discharge was 3.4 months, with 74.8% of patients deceased at 1 year. The short

Table 1. Baseline Demographics, Interventions, and Outcomes in 2000 and 2010 Surveys

Demographic/Intervention/Outcome	2000	2010
Patients, No.	151	149
Admissions, No.	191	119
Cancer type, No.		
GI	38	31
Lung	33	23
Breast	24	16
Genitourinary	25	13
Head and neck	5	9
Other	26	27
Length of stay, days		
Median	3	4
Range	1-36	1-36
Imaging studies, No.	196	415
Procedures, No.	186	82
Chemotherapy, No.	29	5
Hospice recommended, %	24	23

survival outcomes were consistent across disease types in both 2000 and 2010 (Fig 2).

Within this highly symptomatic population of patients from 2010, 70% were discharged home without additional services. Only 18% of patients were enrolled in hospice at discharge. Of these patients, 12% received outpatient hospice, and 6% received inpatient hospice care (Appendix Fig A2, online only). Despite the high rate of death within 6 months, the inpatient teams only recommended hospice during 24% (2000) and 23% (2010) of admissions.

Discussion

From the initial 2000 survey, we concluded that the inpatient oncology service predominantly cares for a population nearing the end of life; therefore, goals should include symptom control and end-of-life planning. We found that despite 10 years of time, this message remains accurate. Admission rates remain steady, and patient demographics are similar. The proportion of patients with the five most common disease sites (GI, lung, breast, genitourinary, and head and neck) was similar in the outpatient and inpatient settings. From 2000 to 2010, there were 4,915 unique patients with metastatic cancer seen for an initial visit at the UW Carbone Cancer Center in the five most common disease sites (GI, lung, breast, genitourinary, and head and neck). The number of new metastatic patients increased modestly, with 379 new patients in this group in 2000 compared with 424 patients in 2010.

Given the declining rates of procedures and chemotherapy administered, we postulate that in 2000, patients were more often receiving active workup and cancer therapies as inpatients. In 2010, we believe that a greater amount of workup, procedures, and chemotherapy were performed in the outpatient setting, and therefore, pain crisis was the most common

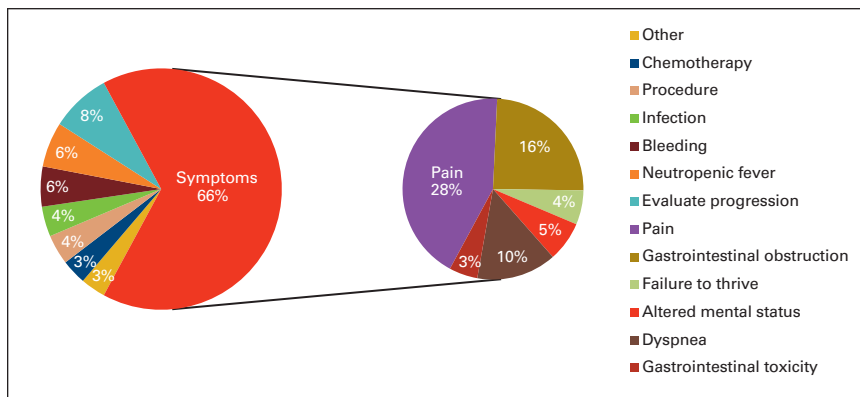


Figure 1. Chief reasons for admission to the inpatient oncology service.

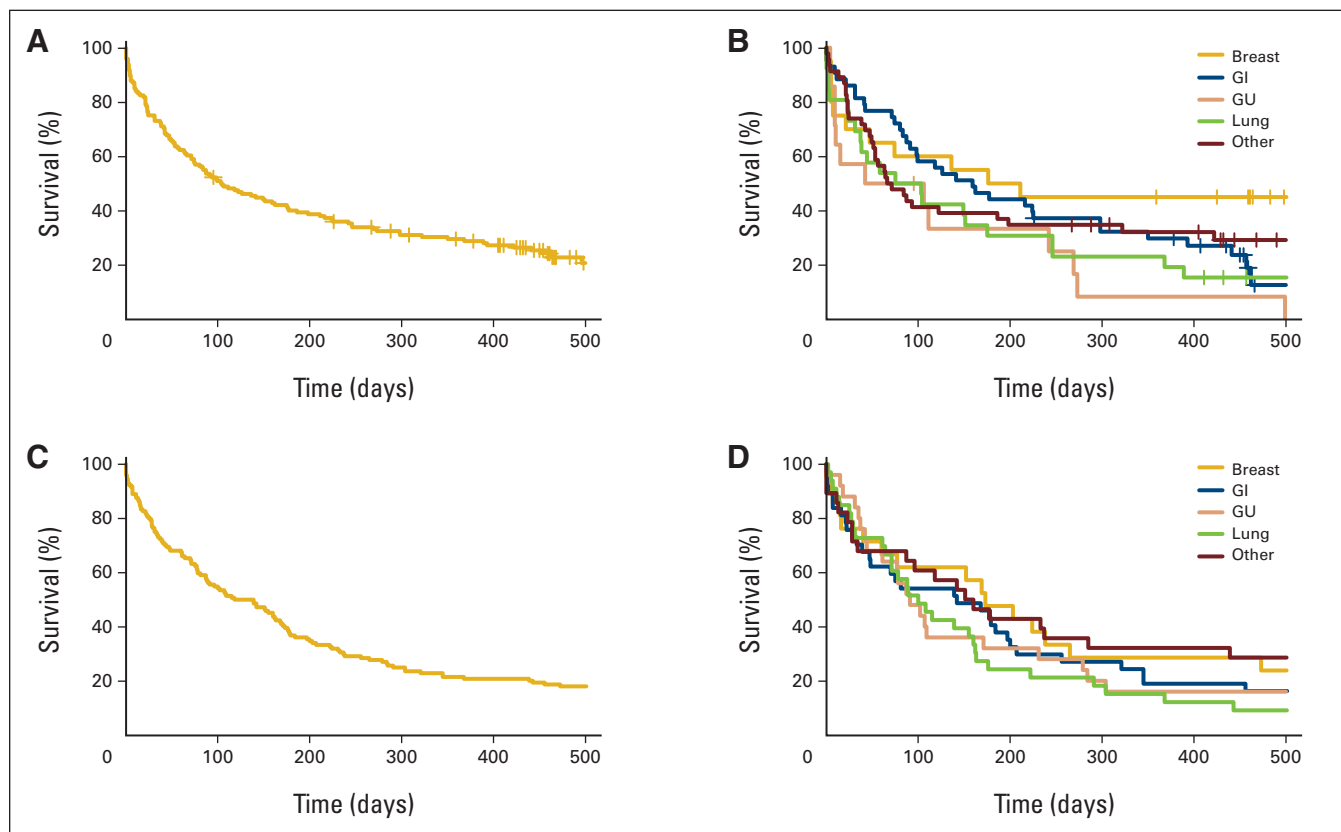


Figure 2. (A) Overall survival and (B) survival by disease type of patients in 2010 survey. (C) Overall survival and (D) survival by disease type in 2000. GU, genitourinary.

chief complaint. The high symptom burden of the 2010 population suggests a sicker population of patients.

On the basis of our data from 2000 and 2010, an unscheduled hospitalization for someone with advanced cancer strongly predicts survival of fewer than 6 months (median, 3.4 months in 2010 and 4.7 months in 2000). Although the prognosis for patients with metastatic cancer varies widely based on the primary site, patients who are hospitalized have a poor prognosis regardless of cancer type. Patients with good performance status who have changes in symptoms often can be managed as outpatients, whereas patients with global decline require admission. Therefore, hospital admission can be used as a marker for

death in the near term. Given the overall poor survival, any patient with metastatic cancer with an unscheduled hospitalization could be considered hospice eligible and appropriate for end-of-life planning, including discussion of advanced directives. Palliative care consultation would be a potential intervention to better address end-of-life care for these patients.

In this population, palliative care consultation was only performed during 6.8% of admissions in 2010. We suspect that this is in part the result of the assumption that end-of-life conversations can be performed well by the attending oncologist. However, despite this sentiment, hospice was only recommended during 23% and 24% of admissions in 2000 and 2010,

respectively. When reviewing these data with our inpatient oncologists, some noted that they were more comfortable with the decision to pursue hospice being made between the patient and primary outpatient oncologist, who should have a better relationship with the patient. We believe that this represents a missed opportunity to provide supportive palliative care services and end-of-life care. Recent data have emerged showing the benefit of early palliative care involvement. In non-small-cell lung cancer, Temel et al¹¹ demonstrated improvement in quality of life as well as a survival benefit with comanagement of oncology and palliative care physicians. American Society of Clinical Oncology guidelines recommend that palliative care be integrated into the management of all patients with metastatic cancer.¹² The best approach for palliative care involvement remains unclear. Although early integration into the clinic setting would be ideal, there exists a shortage of palliative care physicians and infrastructure.¹³ Providing inpatient palliative care consultation would allow for delivery of service to patients who are truly approaching the end of life and likely to have high need of supportive care.

UW established an inpatient palliative care consult team in 1996. This team now consists of a palliative care physician, nurse practitioner, social worker, chaplain, and pharmacist. They can provide multidisciplinary care for patients admitted to an inpatient palliative care unit as well as consultation at physician request. In response to this assessment, we have implemented automatic palliative care consultation for all inpatients in our solid tumor oncology service. We hope to extend

the involvement of palliative care into the outpatient setting in the near future. Although we hope for a future where all patients, inpatient and outpatient, will be able to benefit from palliative care services, we believe that inpatient palliative care consultation is an important component of quality cancer care.

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Authors' Disclosures of Potential Conflicts of Interest

The author(s) indicated no potential conflicts of interest.

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Appendix

Table A1. Treatment Recommendations for Stage III and IV Non–Small-Cell Lung Cancer Endorsed by the National Comprehensive Cancer Network Guidelines

Stage IIIA	T3 N1 M0	Surgery followed by chemotherapy with or without postoperative radiation (the latter only if positive margins)
	T1-T3 N2 M0	Neoadjuvant chemotherapy followed by surgery Neoadjuvant chemotherapy followed by surgery and postoperative radiation (if positive margins) Neoadjuvant chemoradiation followed by surgery Definitive concurrent chemoradiation Sequential chemotherapy followed by radiation (if borderline performance status)
Stage IIIB	T4 any N M0	Definitive concurrent chemoradiation Sequential chemotherapy followed by radiation (if borderline performance status)
	Any T N3 M0	Definitive concurrent chemoradiation Sequential chemotherapy followed by radiation (if borderline performance status)
Stage IV	Any T any N M1	Chemotherapy alone Chemotherapy and palliative radiation

Recommendations are based on the American Joint Committee on Cancer 6th Edition Staging System.

Table A2. Patient and Initial Physician Characteristics

Characteristic	No.	%
Patients (N = 28,977)		
Age, years		75.6
Mean		6.1
SD		
Sex		
Male	15,346	53.0
Female	13,631	47.0
Race/ethnicity		
White	24,161	83.4
Black	2,336	8.1
Hispanic	1,021	3.5
Asian	1,360	4.7
American Indian/Alaskan Native	67	0.2
Unknown	32	0.1
SEER registry area		
San Francisco-Oakland	974	3.4
Connecticut	2,151	7.4
Detroit	2,539	8.8
Hawaii	409	1.4
Iowa	2,064	7.1
New Mexico	497	1.7
Seattle/Puget Sound	1,666	5.8
Utah	401	1.4
Atlanta	777	2.7
San Jose	614	2.1
Los Angeles	1,867	6.4
Rural Georgia	91	0.3
Greater California	5,025	17.3
Kentucky	3,041	10.5
Louisiana	2,449	8.5
New Jersey	4,412	15.2

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Table A2. (Continued)

Characteristic	No.	%
2004	5,030	17.4
2005	4,982	17.2
Initial Physicians (N = 18,605)		
Median annual household income, \$*		
Lower tertile	≤ 36,600	
Medium tertile	36,601-52,700	
Higher tertile	52,701-200,000	
Charlson comorbidity score		
0	12,949	44.7
1-2	12,380	42.7
> 2	2,469	8.5
Unknown	1,179	4.1
Stage		
IIIA	4,371	15.1
IIIB	9,736	33.6
IV	14,870	51.3
Year of diagnosis		
2000	4,442	15.3
2001	4,610	15.9
2002	4,737	16.3
2003	5,176	17.9
Age, years		
Mean	49.4	
SD	9.9	
Sex		
Male	15,899	85.5
Female	2,706	14.5
Degree		
MD	17,258	92.8
DO	1,347	7.2
AMA Physician Recognition Award		
Yes	1,308	7.0
No	17,297	93.0
US medical school graduate		
Yes	13,856	74.5
No	4,749	25.5
Primary medical specialty		
Internal medicine	6,713	36.1
Family practice	3,543	19.0
Pulmonology	1,304	7.0
Emergency medicine	1,170	6.3
Cardiology	973	5.2
Hematology-oncology or oncology	652	3.5
General surgery	527	2.8
Thoracic surgery	244	1.4
Other/unknown	3,479	18.7

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Table A2. (Continued)

Characteristic	No.	%
Office geographic region		
West	7,183	38.6
Northeast	3,853	20.7
Midwest	2,708	14.6
South	3,830	20.6
Unknown	1,031	5.5
Years since graduation from medical school†		
0-9	2,074	11.1
10-14	2,599	14.0
≥ 15	13,932	74.9
Type of primary practice		
Direct patient care	16,822	90.4
Administrative	154	0.8
Medical teaching	164	0.9
Medical research	138	0.7
Not currently active	1,276	6.9
Unknown	51	0.3
Practice setting		
Self-employed/solo	4,755	25.6
Group‡	10,440	56.1
HMO	23	0.1
Teaching hospital	223	1.2
VA/non-VA government hospital	991	5.3
Nongovernment hospital	578	3.1
Other or unknown	1,595	8.6

Abbreviations: AMA, American Medical Association; DO, doctor of oncology; HMO, health maintenance organization; SD, standard deviation; VA, Veterans Affairs.

* Household income at the census tract or Zip code level.

† At the time of initiation of study period (January 1, 2000).

‡ Group practice includes two or more physicians working in the same clinic, excluding HMOs.

Table A3. Univariable and Multivariable Logistic Regression Analysis of Patient and Initial Physician Characteristics With Referrals to All Cancer Specialists (medical oncologists, radiation oncologists, and thoracic or general surgeons)

Characteristic	Referred*		Unadjusted P	Adjusted OR	95% CI	Adjusted P
	No.	%				
Patients (N = 28,977)						
Age, years†			< .001	0.94‡	0.94 to 0.95	< .001
Mean	74					
SD	5					
Race/ethnicity			< .001			
White	7,718	32		Reference		
Black	690	30		0.79	0.72 to 0.87	< .001
Hispanic	274	27		0.90	0.77 to 1.05	.169
Asian	344	25		0.97	0.85 to 1.12	.691
American Indian/Alaska Native	22	33		1.34	0.78 to 2.30	.292
Unknown	5	16		0.42	0.15 to 1.13	.087
Sex			< .001			
Male	4,945	32		Reference		
Female	4,108			0.95	0.90 to 0.99	.040
Stage		30	< .001			
IV	4,180	28		Reference		
IIIA	1,784	41		1.86	1.73 to 2.01	< .001
IIIB	3,089	32		1.27	1.20 to 1.35	< .001
Region			< .001			
West	2,923	26		Reference		
Northeast	2,201	34		1.53	1.42 to 1.64	< .001
Midwest	1,756	38		1.84	1.70 to 2.00	< .001
South	2,173	34		1.44	1.34 to 1.56	< .001
Household income§			.608			
Lower tertile	2,973	31				
Medium tertile	3,009	31				
Higher tertile	3,035	31				
Unknown	36	30				
Charlson index			< .001			
0	4,193	32		Reference		
1-2	3,841	31		0.92	0.87 to 0.98	.006
> 2	688	28		0.78	0.70 to 0.86	< .001
Unknown	331	28		0.72	0.63 to 0.83	< .001
Year of diagnosis			.188			
2000	1,417	32		Reference		
2001	1,433	31		1.00		.536
2002	1,488	31				
2003	1,634	32			0.99 to 1.02	
2004	1,572	31				
2005	1,509	30				
Initial Physicians (N = 18,605)						
Degree			.180			
MD	8,372	31				
DO	681	33				

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Table A3. (Continued)

Characteristic	Referred*		Unadjusted P	Adjusted OR	95% CI	Adjusted P
	No.	%				
AMA Physician Recognition Award			.473			
No	8,427	31				
Yes	626	32				
US medical school			.028			
Yes	2,422	32		Reference		
No	6,631	31		0.93	0.87 to 0.99	.026
Primary specialty			< .001			
Internal medicine	3,316	31		Reference		
Family practice	1,614	31		0.98	0.90 to 1.06	.549
Pulmonology	1,002	28		0.84	0.77 to 0.92	< .001
Emergency medicine	408	28		1.00	0.88 to 1.15	.962
Cardiology	405	31		1.01	0.88 to 1.15	.881
Oncology	358	34		1.17	1.01 to 1.36	.031
General surgery	317	48		2.15	1.81 to 2.55	< .001
Thoracic surgery	192	49		2.01	1.61 to 2.52	< .001
Other	1,441	32		1.08	1.00 to 1.18	.048
Sex			.002			
Male	8,021	32		Reference		
Female	1,032	29		0.92	0.84 to 0.99	.048
Years since graduation			.020			
0-9	776	29		Reference		
10-14	1,179	32		1.13	1.01 to 1.27	.040
≥ 15	7,098	31		1.10	1.00 to 1.21	.055
Type of practice			.697			
Direct patient care	8,248	31				
Administration	73	31				
Teaching	58	27				
Research	54	25				
Not active during study period	602	33				
Unknown	18	26				
Employment setting			.010			
Self-employed/solo	2,459	32		Reference		
Group practice¶	5,181	31		0.95	0.89 to 1.01	.094
Medical school	74	26		0.74	0.55 to 0.99	.039
Government hospital (VA/non-VA)	397	28		0.81	0.71 to 0.93	.003
Nongovernment hospital	282	31		0.91	0.77 to 1.07	.268
Other/unknown	660	30		0.89	0.80 to 1.00	.048
Pulmonology after initial physician			.281			
No	3,709	32				
Yes	5,344	31				
Initial physician random-effect coefficient				0.40	0.31 to 0.53	< .001
Total referred to all specialists	9,053	31				

* Percentages in parenthesis indicate row proportions of patients referred to all cancer specialists (as opposed to those not referred) for each category level.

† Among patients who saw all types of cancer specialists.

‡ Odds ratio shows the effect of 1-year increase in age on the odds of referral to all cancer specialists.

§ Median household income at the census tract or Zip code level.

¶ We assumed a fixed effect for each subsequent year on referral to all cancer specialists.

¶¶ Group practice refers to two or more physicians working in the same clinic other than health maintenance organizations.

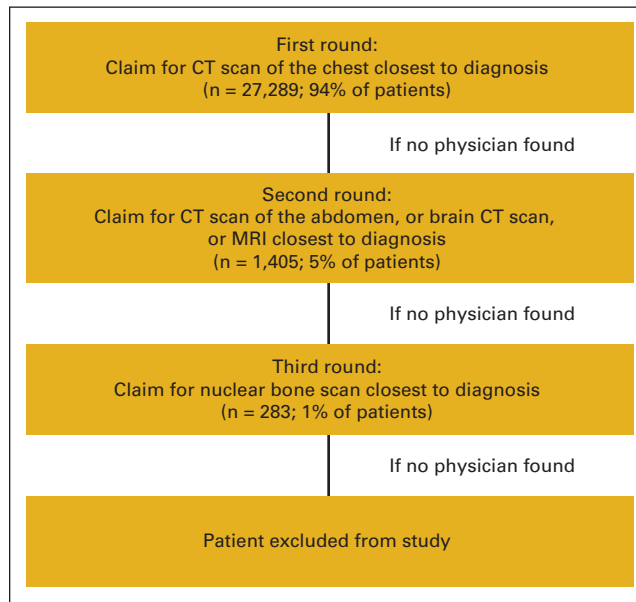


Figure A1. Algorithm to identify physicians initially involved in the management of non-small-cell lung cancer cases (initial physician). CT, computed tomography; MRI, magnetic resonance imaging.

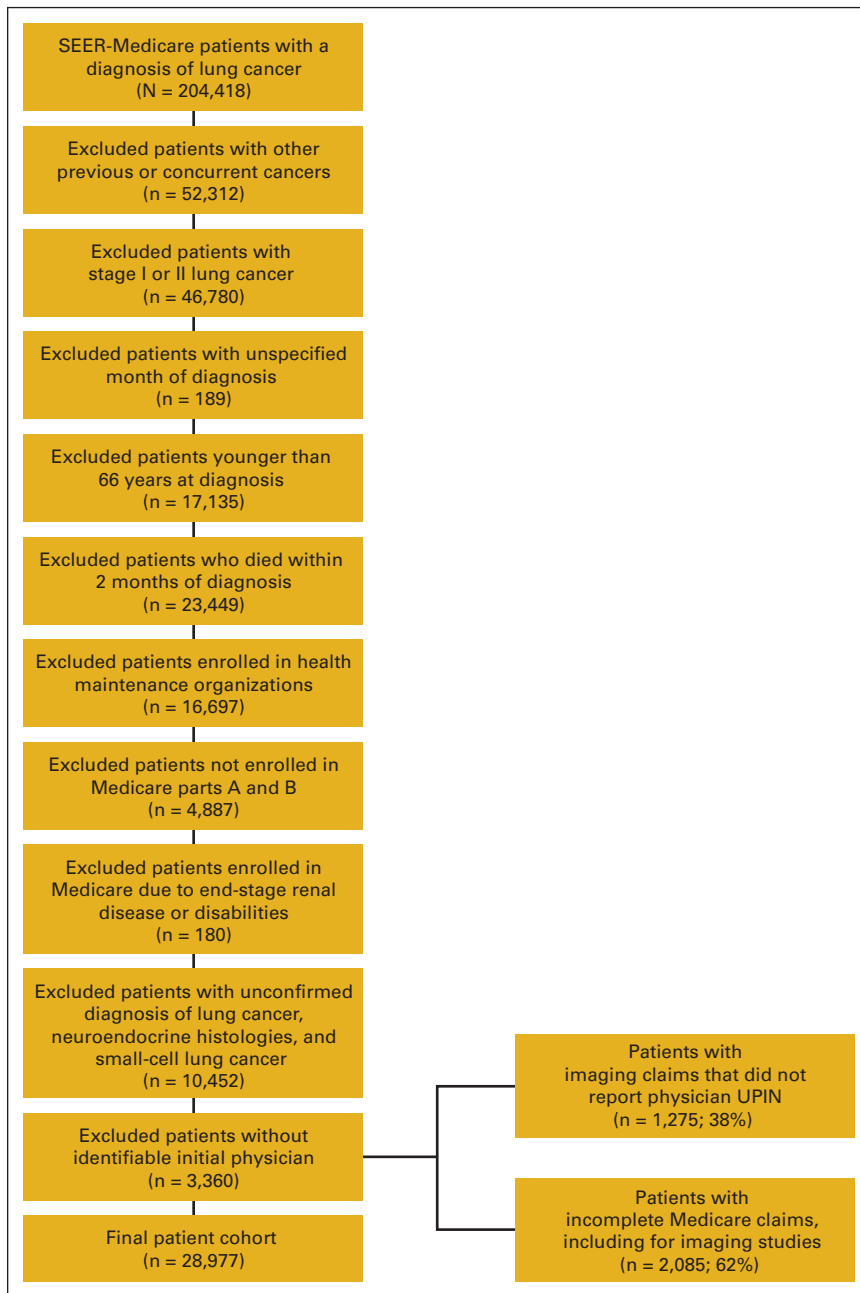


Figure A2. Flow chart of patient selection criteria. UPIN, universal physician identification number.

Appendix

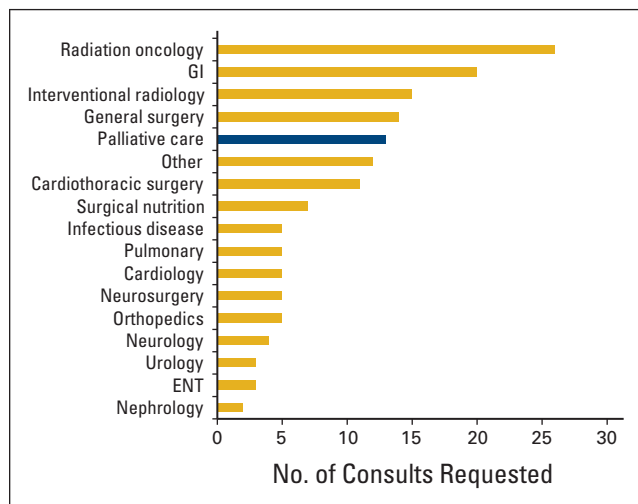


Figure A1. Consultations requested by primary team in 2010 survey. ENT, ear nose throat.

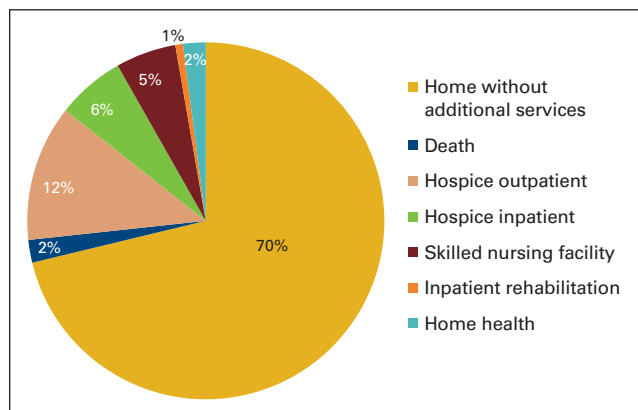


Figure A2. Percentages of patients who received supportive services at discharge.