Published in final edited form as:

J Cancer Educ. 2010 December ; 25(4): . doi:10.1007/s13187-010-0100-3.

Prevalence of Cancer Visits by Physician Specialty, 1997–2006

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Abstract

Introduction—Understanding the prevalence of cancer-related visits by physician specialty may help target educational and quality improvement initiatives.

Methods—Using the 1997–2006 National Ambulatory Medical Care Survey, adult ambulatory visits (N=161 278) were classified by cancer diagnosis and patients' characteristics and compared with physician specialty.

Results—The prevalence of cancer visits within each specialty varied from 0% to 62%. Aside from hematology/oncology specialties, 9 surgical specialties and 4 medical specialties had more than 1% cancer visits. Cancer patients with private insurance or Medicaid coverage were less likely to see hem/onc specialists compared to Medicare patients.

Conclusion—Whereas hem/onc specialists primarily see cancer patients, general surgeons and primary care physicians provide a large amount of cancer services, particularly to under-insured patients. Thus, when trying to contact cancer patients or their physicians, health administrators, researchers, and practitioners should consider targeting general surgeons and primary care physicians in addition to hem/onc specialists.

Who sees cancer patients? A recent publication by Pollock and colleagues recommends that researchers involved in initiatives in cancer policy, education, and quality improvements do not rely solely on Medicare claims to identify cancer specialists, particularly in cancer surgeons [1]. Similar to Pollock's study, which illuminates potential gaps in cancer policy and educational initiatives, the authors of the present study hypothesize that certain "non-cancer" specialists have a high prevalence of cancer patients and may be included in such initiatives. Few articles identify the physician specialties that routinely deliver ambulatory cancer services. Furthermore, the demographic characteristics and expected source of payment of cancer patients likely vary by physician specialty, yet only a small number of studies compare the characteristics of patient populations by specialty. Longstanding disparities in health outcomes, such as cancer-related mortality, may be attributable to access barriers to cancer specialists. For example, after adjusting for socioeconomic factors, Black men and women are more likely to have lower 5-year survival rates when compared to Non-Hispanic Whites [2]. Recent data suggest Blacks are more likely than Whites to undergo initial treatment that falls below national standards and are more likely to receive

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care at institutions with higher than average mortality rates [3]. There are substantial data to suggest that for many acute and chronic conditions, Blacks are less likely to have access to specialty care [4–7].

Access to specialty care is an important determinant of cancer treatment outcomes, according to Hilner, Smith, and Desch, who conducted a comprehensive literature review on this fundamental relationship [8]. Their findings indicate a volume-outcome relationship for complex surgical procedures, which implies specialty physicians who see large numbers of cancer patients are associated with improved patient outcomes. The relationship between high patient volume and better outcomes was previously noted by Luft and colleagues in 1979 [9]. More recent studies further suggest cancer patients receive more appropriate diagnostic and therapeutic interventions, or have better outcomes when care is delivered by a specialized hospital or clinician [10, 11]. As compared to generalists, specialists may have higher levels of cancer specific knowledge and provide more consistent patterns of care by following the most current guidelines for care by cancer type [12].

Differences in cancer prevention efforts have also been noted across specialties. Feldman demonstrated that skin cancer prevention communication to high-risk patients depends on physician specialty [13]. Bhosle and colleagues showed that breast cancer screening recommendations depend on specialty [14]. Moreover, differences between physician specialties in the practice of preventive medicine have been demonstrated outside the United States (US) [15, 16].

Although a multitude of personal and institutional factors likely impact access to specialty care, given its more expensive nature, financial considerations and type of insurance are likely part of the complex equation [17, 18]. Patients may either be unaware of the availability of specialist care for their diagnosis, or may be in a system such as managed care where choice and referral to specialty is not within their authority [19, 20]. Thus, during an assessment of practice patterns in relation to cancer care, researchers must consider that patient access to specialty services and knowledge of the availability of such services may be limited.

The purpose of this paper is to remind policy makers, clinicians, and researchers to look beyond hem/onc specialties when trying to contact cancer patients and/or physicians providing care to cancer patients. In order to begin to better understand who sees cancer patients, we examined the prevalence of visits with a primary diagnosis of cancer by physician specialty and compared patient characteristics across specialty. Specifically, using clinical response data from the 1997–2006 National Ambulatory Medical Care Survey (NAMCS), we identified patients who have a primary diagnosis of cancer in an effort to understand which physician specialties delivered a substantive proportion of cancer visits (ie, greater than 1%). Next, we compared the demographics, health, and expected source of payment of cancer patients by specialty in an effort to determine if patients seen by hematology/oncology (hem/onc) specialists had similar characteristics as patients seen by non-hem/onc specialists.

METHODS

National Ambulatory Medical Care Survey

NAMCS is a national survey, developed in 1973, and directed by the US Bureau of the Census to collect information on ambulatory medical care services in the US [21]. It consists of probability samples of patient visits to practices located within specific geographic areas in the US and the District of Columbia. Through a complex, multistage sampling process, data are collected via chart reviews from a systematic random sample of patient visits to

non-hospital based physician practices. Response rates are high, but vary by strata (ie, physician specialty). In 2002, the average response rate was 70.4, and ranged by strata from 57.2 (internal medicine) to 75.5 (general and family practice). Anesthesiologists, pathologists, and radiologists are not surveyed.

Study Sample

From the 254 716 patient visit records in the 1997 to 2006 NAMCS data, 76 998 were removed, because either the patient was aged 17 or younger, or the patient was seen by a pediatrician or pediatric specialist. Among the remaining records, 5218 were removed, because the patient did not see a physician during his/her visit. An additional 11 165 records describing psychiatric services were removed, because the purpose of this study focuses on the medical and surgical treatment of cancer. Lastly, 57 records were removed due to unknown physician specialty. The resulting sample contained 161 278 records on ambulatory care visits of US adult patients over a 10-year period. A subsample of only records containing patients with a principle diagnosis of malignant neoplasm was created (N = 5122) and served as the basis for the analyses presented in this manuscript. In order to study the utilization of services, the patient visit is analyzed, as opposed to the individual patient.

Measurement

Individual physicians or a designated representative from his or her practice are responsible for performing the random sampling of patient visits and completing NAMCS surveys for data submission. The Patient Record instrument includes items on patients' symptoms, diagnoses, planned or provided services, and medications prescribed or provided during an office visit. In addition, patients' demographic information and expected source of payment are recorded.

The principle diagnosis for each visit in this study was recorded using the 9th edition 3-digit version of the International Statistical Classification of Diseases and Related Health Problems (ICD-9) codes. To measure cancer diagnosis, an indicator variable for neoplasms (ICD-9: 140 to 239) was created. Non-melanoma skin cancer (ICD-9: 173), benign neoplasms (ICD-9: 210 to 229), carcinoma in situ (ICD-9: 230 to 243), and neoplasms of uncertain behavior (ICD-9: 235 to 239) were excluded. Each cancer diagnosis was then categorized by site using the following ICD-9 codes: 140–149 (lip, oral cavity, and pharynx), 150–159 (digestive organs and peritoneum), 160–165 (respiratory and intrathoracic organs), 172 (skin), 174 (breast), 179–189 (genitourinary organs), and 200–208 (lymphatic and hematopoietic tissue). The remaining codes were combined into a summary category (other site).

NAMCS race response was recoded into 3 indicator variables: White; Black; or other racial minority, a category combining Asian (N=117), American Indian/Alaskan Native/Native Hawaiian/Other Pacific Islander (N=12), and other (N=2). Potential responses for the expected source of payment included private insurance, Medicare, Medicaid, worker's compensation, self-pay, no charge, other, and unknown. Among the cancer cases, self-pay (N=68), other (N=160), and no charge (N=47) responses were combined to create a non-insurance indicator variable. The 1 case of worker's compensation was counted as private insurance, because this may have been a form of employer-funded insurance. However, respondents with unknown insurance status (N=85) were dropped from the analytical analysis in Tables 2 and 3.

Physician Specialties

NAMCS has 70 distinct physician specialties, excluding pediatric specialties [21]. Although the American Medical Association (AMA) categorizes physician specialties as primary care, surgical specialty, and medical specialty [22], health services researchers have published alternative categorizations of physician specialties. For example, Feldman and colleagues divided physician specialties into family and general practice, internal medicine, pediatrics, general surgery, dermatology, otolaryngology, and all other physicians [13]; Richardson and Tanka categorized specialties as primary care, general surgery, dermatology, oncology, urology, and other [23]; and Shepherd separated hem/onc categories into medical oncology, radiation oncology, surgery, hematology, and pediatric oncology [15]. Pollack and colleagues defined cancer specialists to be gynecologic oncologists, hematologists, hematologists/oncologists, medical oncologists, musculoskeletal oncologists, radiation oncologists, and surgical oncologists [1]. Instead of categorizing physician specialties into several classes, other researchers examined dichotomies, such as obstetrician/gynecologist versus non-obstetrician/gynecologist, or breast oncologists versus surgeons [14, 16].

For this study, we separated out the hematology/oncology (hem/onc) specialties and applied the AMA definitions, rendering 4 categories: (1) hem/onc, (2) primary care, (3) surgical specialty, and (4) medical specialty. The hem/onc categorization includes hematology/oncology, medical oncology, hematology, musculoskeletal oncology, surgical oncology, and gynecological oncology.

Statistical Analyses

Using a binomial probability test, we first examined which of the non-hem/onc physician specialties had a substantial portion of cancer patient visits (greater than 1%). Second, using a chi-square goodness of fit test, we tested whether the demographic characteristics and expected source of payment of cancer patients per patient visit to different categories of non-hem/onc specialists were significantly different from the demographic characteristics and expected source of payment of cancer patients per visit to hem/onc specialists (eg, primary care versus hem/onc). Third, we compared the characteristics of cancer patients per visit seen by non-hem/onc specialists to those seen by hem/onc specialists using logistic regression. Patient visits to hem/onc specialists served as the cases and patient visits to non-specialists were the controls in the logistic regression models. In addition, the logistic regression models allowed us to examine all cancer visits collectively and then stratify the data by cancer site.

Database management was conducted in SAS 9.1.3; however, the statistical analysis was conducted using STATA MP 9.0 [24, 25]. The analyses did not apply sampling weights, because NAMCS data did not contain sample weights across the 10-year period of data used in our study.

RESULTS

Aside from the 5 hem/onc specialties, NAMCS has 10 primary care specialties, 21 surgical specialties, and 34 medical specialties. The proportion of cancer visits within each specialty varied from 0% to 62%. The binomial probability test results identified no primary care specialties with >1% prevalence of cancer visits; however, 8 of the 21 surgical specialties and 4 of the 34 medical specialties were identified (See Figure 1). Urology had the highest proportion (16%) of cancer visits, followed by general surgery. We combined abdominal, cardiovascular, colorectal, cardiothoracic, thoracic, and vascular surgery as an “other specialty surgery” category. Each of these specialties had a substantial number of cancer visits, ranging from 2.4% to 15.4%, but had fewer observations (ranging from 4 to 22) than

the other 3 specialty surgeries: urology (N=1,931), otolaryngology (N=162), and plastic surgery (N=37).

Next, we examined the subsample of patients with a primary diagnosis of malignant neoplasm. Eighty-five visits were removed due to an unknown source of payment by the patient. Within the subsample (N=5037), we separated hem/onc specialties and non-hem/onc specialties. The non-hem/onc specialties were further separated by AMA categories: primary care, surgical specialties, and medical specialties. To better capture potential differences, we split surgical specialties by general surgery, urology, and other.

Descriptively, hem/onc specialists served White, mid-aged or older, non-Hispanic, female patients (Table 1). The typical source of payment was insurance; hem/onc specialists received an alternative source of payment, such as self-pay, for only 6% of visits. The most common cancer was breast cancer (31%) followed by disorders of lymphatic or hematopoietic tissues (20%). Melanoma and oral cancer were the least common (1% for both sites).

Demographics of cancer patients seen by primary care physicians and hem/onc specialists were similar when compared by patient visit. However, primary care physicians were more likely than hem/onc specialists to be visited by Black cancer patients, patients aged 80 or older, and patients whose primary source of payment was not insurance. Also, primary care physicians had less visits involving breast and blood cancers, and more involving genitourinary cancers compared to all other physician specialties.

Compared to hem/onc specialists, general surgeons saw less patients aged 80 and older and more patients below 50 years of age as well as female patients, perhaps due to the high proportion of breast cancers (51%). Cancer visits with general surgeons were more likely to be uninsured; however, visits to hem/onc specialists or general surgeon did not demonstrate racial or ethnic differences between patients.

Not surprisingly, urologists were mostly visited by males (93%) and patients with genitourinary cancers (98%). In comparison to hem/onc specialists, the patient population of a urologist by visits included a greater number of Hispanic patients and nearly twice the number of Black patients; a possible correlation to the higher incidence of prostate cancer in minority communities [26, 27]. Compared to hem/onc specialists, urologists also saw older patients who more often utilized Medicare over private insurance.

Cancer visits to the remaining surgical specialties, such as thoracic surgeons, plastic surgeons, and otolaryngologists, were for neoplasms in respiratory and intrathoracic organs (23%), or the lips, oral cavity and pharynx (22%). The remaining medical specialties (eg, dermatologists, pulmonologists, and gastroenterologists) saw patients for conditions such as malignant melanoma (23%), or neoplasms of digestive or respiratory organs (23%). In terms of demographic and expected source of payment, patients who saw these less common surgical and medical specialties were similar to patients seen by hem/onc specialists.

Results from the logistic regression models are presented in Table 2. Across all cancer sites, male visits to a hem/onc specialist were less likely than female visits (OR = 0.28, 95% CI 0.25, 0.32). Compared to visits by White cancer patients, visits by Black cancer patients were less likely to be to hem/onc specialists (OR = 0.68, 95% CI 0.53, 0.86), as were visits by cancer patients without private insurance (OR = 0.69, 95% CI 0.57, 0.83). Compared to visits by cancer patients aged 65 to 80, visits by those in younger age groups were more likely to be to a cancer specialist (OR = 1.48, 95% CI 1.17, 1.88 and OR = 1.47, 95% CI 1.21, 1.80, respectively).

When examined by cancer site, there were few statistically significant relationships between cancer patient characteristics and the odds of seeing a hem/onc specialist versus seeing a non-hem/onc specialist. The only significant difference among colorectal cancer visits was expected source of payment. Compared to visits by patients with Medicare coverage, visits by colorectal cancer patients with other payment sources (eg, private pay) were less likely to be received by a hem/onc specialist (OR = 0.43, 95% CI 0.19, 0.96). Among visits by male patients with genitourinary cancer, visits by younger cancer patients (age less than 50) were more likely to be to a hem/onc specialist (OR = 3.02, 95% CI 1.39, 6.55). Statistically significant age and payment source differences were also noted among female patients with breast cancer. Hem/onc specialists saw more female breast cancer patients below 65 years of age than those aged 65 to 80 (OR = 1.75, 95% CI 1.07, 2.84 and OR = 1.61, 95% CI 1.05, 2.45, respectively). However, compared to visits covered by Medicare, visits by female breast cancer patients with private insurance or other payment sources were less likely to be to hem/onc specialists (OR = 0.47, 95% CI 0.31, 0.72 and OR = 0.45, 95% CI 0.25, 0.82).

DISCUSSION

In this study, we use data from NAMCS to answer the question, “Who sees cancer patients?” Although oncologists and other hem/onc specialists seem to be the obvious answer to this question, our findings suggest otherwise. Within the population of adult patients in the US, no primary care specialties have >1% prevalence of cancer visits; however, 8 of the 21 surgical specialties, and 4 of the 34 The characteristics of cancer visits to non-hem/onc specialists medical specialties see a substantive proportion of cancer visits.

In the 2009 study by Pollock and colleagues, non-cancer specialists, such as general surgeons, were excluded, even if they saw a large portion of cancer patients [1]. Their study found a large effect of misclassification in surgical and gynecologic oncology is demonstrated with the use of Medicare claims. In complement to their study, this survey-based study extends the target population of educational interventions to non-cancer specialists (eg, general surgeons and urologists) based on evidence that these specialists see a large portion of cancer patients.

The characteristics of cancer visits to non-hem/onc specialists versus to hem/onc specialists are substantially different. Primary care physicians and general surgeons have more visits without an insured source of payment than hem/onc specialists. Urologists and primary care physicians saw more Black cancer patients than hem/onc specialists. Visits to urologists are largely by male patients, and visits to hem/onc specialists and general surgeons are mostly by female patients.

Controlling for cancer patient characteristics further identifies statistically significant relationships between physician specialty and patient sex, race, and expected source of payment. Hem/onc specialists saw fewer male cancer patients compared to female cancer patients. This pattern may be attributed to the fact that urologists receive a large proportion of cancer visits (16%) and most are by males (93%). Nevertheless, hem/onc specialist saw fewer male colorectal cancer patients than female colorectal cancer patients, although this result is not statistically significant.

In the US, the relationship between age and specialty care may be confounded by health insurance. The vast majority of adults (95%) over age 65 qualify for Medicare, but only 4% of adults under age 65 qualify, leaving many cancer patients under age 65 without health insurance [28–30]. Due to the coincidence of age 65 and insurance, these characteristics must be interpreted together. Based on the results, Medicare increases the likelihood of seeing a hem/onc specialist, but this effect is lessened among patients aged 80 and older.

Compared to adults aged 65 and older, younger cancer patients are more likely to visit a hem/onc specialist, regardless of expected source of payment. The bias favoring specialty care for younger patients may be attributable to age-specific recommendations in the treatment of cancer [31, 32].

Even after controlling for patient age, gender, ethnicity, and payment source, hem/onc specialists saw fewer Blacks than other physicians. Epidemiologic data suggest Blacks tend to be diagnosed at later stages [33–35] and, in the case of breast cancer, with more aggressive forms of the disease when compared to Whites [36]. In general, chemotherapeutic interventions are more likely part of the standard treatment protocol for later stage cancers than those diagnosed at earlier stages. Thus, this finding is particularly surprising. These results may provide some insight into the overall disparities in patient survival observed between Blacks and Whites by cancer site. Since non-hem/onc specialists see a disproportionate share of affected communities, efforts to reduce cancer care disparities through educational initiatives may find it necessary to target a broad based group of specialists, including non-hem/onc specialists and their patients.

This study is among the first reports of physician specialties and the differences between cancer patients who visit hem/onc specialists and non-hem/onc specialists over a 10-year period. However, several limitations should be considered when interpreting the findings of this study. First, the analysis did not account for NAMCS sampling protocol. Sample weights applicable to the nature of our statistical analyses were not provided; thus, certain populations may be broadly underrepresented, or overrepresented. Likewise, standard errors may similarly be downward biased due to clustering at the clinic level. Second, although the sample size is relatively large (N=5037), minority populations compose a small proportion of the sample. This is particularly important in the logistic regressions models used to examine patient attributes by cancer site, which may have power less than 0.80 to identify racial and ethnic disparities. Third, we classified cancer visits based on the primary ICD-9 code that identifies cancer and labeled it diagnostic. Reliance on ICD-9 codes to characterize patient care may not distinguish between the receipt of cancer care and unrelated care. Fourth, an arbitrary prevalence cutoff (1%) was applied to emphasize the prevalence of cancer visits among certain specialties. We conducted a sensitivity analysis varying this cutoff from 0.1% to 5%, which did not meaningfully change the results.

The findings in this paper support the notion that research and educational initiatives aimed at cancer patients and/or physicians treating cancer patients should target hem/onc and other specialists alike. Doing so may improve the capacity of clinical, policy, and educational interventions that promote the quality of cancer care delivery and reach a diversity of cancer patient populations. For instance, studies examining patient outcomes by hem/onc versus other specialties have found differences related to quality. McClave, Jones, and Evans found that internists and primary care physicians are less likely compared to all other physician specialties to order the recommended tests for esophageal cancer as identified by national guidelines [37]. They suggest that disease staging and treatment may be impacted by the non-use of recommended tests. Thus, health services research and educational interventions in the area of esophageal cancer indicate a need to include the full range of physician specialties that see cancer patients to increase awareness of and adherence to the most current standardized cancer care guidelines.

Future research may include the evaluation of specialties in surveillance of and quality initiatives in cancer. Perez makes a similar call for the identification and inclusion of all relevant physician types to improve the quality of care for non small cell lung cancer [38]. This review reveals that different physician specialties and sub-specialties have equally different opinions on disease management; it suggests that as new treatment guidelines and

therapies are developed, dissemination of knowledge should be directed at audiences beyond the traditional medical oncologist. Mandelblatt et al (2006) found differences in the treatment and follow up recommendations for early stage breast cancer, such as non-oncology specialists ordering tests and follow-up outside recommended guidelines [39]. Therefore, further research is needed to identify the prevalence of inconsistencies in the quality of cancer care in relation to physician type. This evidence suggests that current research trends, which focus on the opinions of oncologists in the care of cancer patients, may not represent the full spectrum of providers who treat cancer patients.

References

1. Pollack LA, Adamache W, Ehemann CR, Ryerson AB, Richardson LC. Enhancement of identifying cancer specialists through the linkage of Medicare claims to additional sources of physician specialty. *Health Serv Res.* 2009; 44(2 Pt 1):562–76. [PubMed: 19207588]
2. Ward E, Jemal A, Cokkinides V, et al. Cancer disparities by race/ethnicity and socioeconomic status. *CA Cancer J Clin.* 2004; 54(2):78–93. [PubMed: 15061598]
3. Zhang W, Ayanian JZ, Zaslavsky AM. Patient characteristics and hospital quality for colorectal cancer surgery. *Int J Qual Health Care.* 2007; 19(1):11–20. [PubMed: 17000710]
4. Basu J, Mobley LR. Trends in racial disparities among the elderly for selected procedures. *Med Care Res Rev.* 2008; 65(5):617–37. [PubMed: 18490701]
5. Gregory PC, Han E, Morozova O, Kuhlemeier KV. Do racial disparities exist in access to inpatient stroke rehabilitation in the state of Maryland? *Am J Phys Med Rehabil.* 2006; 85(10):814–9. [PubMed: 16998428]
6. Gregory PC, LaVeist TA, Simpson C. Racial disparities in access to cardiac rehabilitation. *Am J Phys Med Rehabil.* 2006; 85(9):705–10. [PubMed: 16924182]
7. Minden SL, Hoaglin DC, Hadden L, Frankel D, Robbins T, Perloff J. Access to and utilization of neurologists by people with multiple sclerosis. *Neurology.* 2008; 70(13 Pt 2):1141–9. [PubMed: 18362274]
8. Hillner BE, Smith TJ, Desch CE. Hospital and physician volume or specialization and outcomes in cancer treatment: importance in quality of cancer care. *J Clin Oncol.* 2000; 18(11):2327–40. [PubMed: 10829054]
9. Luft HS, Bunker JP, Enthoven AC. Should operations be regionalized? The empirical relation between surgical volume and mortality. *N Engl J Med.* 1979; 301(25):1364–9. [PubMed: 503167]
10. Grilli R, Minozzi S, Tinazzi A, Labianca R, Sheldon TA, Liberati A. Do specialists do it better? The impact of specialization on the processes and outcomes of care for cancer patients. *Ann Oncol.* 1998; 9(4):365–74. [PubMed: 9636826]
11. Sainsbury R, Rider L, Smith A, MacAdam A. Does it matter where you live? Treatment variation for breast cancer in Yorkshire. The Yorkshire Breast Cancer Group. *Br J Cancer.* 1995; 71(6):1275–8. [PubMed: 7779723]
12. Harrold LR, Field TS, Gurwitz JH. Knowledge, patterns of care, and outcomes of care for generalists and specialists. *J Gen Intern Med.* 1999; 14(8):499–511. [PubMed: 10491236]
13. Feldman SR, Fleischer AB Jr. Skin examinations and skin cancer prevention counseling by US physicians: a long way to go. *J Am Acad Dermatol.* 2000; 43(2 Pt 1):234–7. [PubMed: 10906644]
14. Bhosle M, Samuel S, Vosuri V, Paskett E, Balkrishnan R. Physician and patient characteristics associated with outpatient breast cancer screening recommendations in the United States: analysis of the National Ambulatory Medical Care Survey Data 1996–2004. *Breast Cancer Res Treat.* 2007; 103(1):53–9. [PubMed: 17028978]
15. Shepherd HL, Tattersall MH, Butow PN. Physician-identified factors affecting patient participation in reaching treatment decisions. *J Clin Oncol.* 2008; 26(10):1724–31. [PubMed: 18375902]
16. Lemieux J, Goodwin PJ, Pritchard KI, et al. Identification of cancer care and protocol characteristics associated with recruitment in breast cancer clinical trials. *J Clin Oncol.* 2008; 26(27):4458–65. [PubMed: 18802158]
17. Kravitz RL, Greenfield S. Variations in resource utilization among medical specialties and systems of care. *Annu Rev Public Health.* 1995; 16:431–45. [PubMed: 7639881]

18. Greenfield S, Nelson EC, Zubkoff M, et al. Variations in resource utilization among medical specialties and systems of care. Results from the medical outcomes study. *Jama*. 1992; 267(12): 1624–30. [PubMed: 1542172]
19. Group Health Association of America. Patterns in HMO Enrollment. Washington DC: Group Health Association of America; 1995.
20. Jensen GA, Morrissey MA, Gaffney S, Liston DK. The new dominance of managed care: insurance trends in the 1990s. *Health Aff (Millwood)*. 1997; 16(1):125–36. [PubMed: 9018949]
21. National Center for Health Statistics. National Ambulatory Medical Care Survey: 1997–2006. U.S. Department of Health and Human Services: Centers for Disease Control and Prevention; Hyattsville, MD: 2008.
22. AMA: helping doctors help patients. Vol. 2008. American Medical Association; 1995–2008.
23. Richardson LC, Tangka FK. Ambulatory care for cancer in the United States: results from two national surveys comparing visits to physicians' offices and hospital outpatient departments. *J Natl Med Assoc*. 2007; 99(12):1350–8. [PubMed: 18229771]
24. SAS. 9.1.3. Cary, NC, USA: SAS Institute Inc; 2008. The data management for this paper was generated using SAS software, Version 9.1.3 of the SAS System. Copyright © 2008 SAS Institute Inc. SAS and all other SAS Institute Inc. product or service names are registered trademarks or trademarks of SAS Institute Inc., Cary, NC, USA
25. Stata. 9. College Station, TX: StataCorp LP; 2005.
26. Brawley OW, Barnes S. The epidemiology of prostate cancer in the United States. *Semin Oncol Nurs*. 2001; 17(2):72–7. [PubMed: 11383246]
27. Haas GP, Sakr WA. Epidemiology of prostate cancer. *CA Cancer J Clin*. 1997; 47(5):273–87. [PubMed: 9314822]
28. Hoffman, ED.; Klees, BS.; Curtis, CA. Health Care Financing Review/2007 Statistical Supplement. Office of the Actuary, Centers for Medicare & Medicaid Services, Department of Health and Human Services; 2007. Brief Summaries of Medicare & Medicaid.
29. Centers for Medicare & Medicaid Services. Medicare Enrollment Reports. 2008. Medicare Enrollment - Disabled Beneficiaries: as of July 2006.
30. Population Estimates Program. Fact Sheet: 2005–2007 American Community Survey 3-Year Estimates. United States Census Bureau; 2008.
31. Kunkler IH, Williams LJ, King CC, Jack W. Breast Radiotherapy: Considerations in Older Patients. *Clin Oncol (R Coll Radiol)*. 2009
32. Merrick GS, Wallner KE, Galbreath RW, et al. Biochemical and functional outcomes following brachytherapy with or without supplemental therapies in men < or = 50 years of age with clinically organ-confined prostate cancer. *Am J Clin Oncol*. 2008; 31(6):539–44. [PubMed: 19060584]
33. Halpern MT, Ward EM, Pavluck AL, Schrag NM, Bian J, Chen AY. Association of insurance status and ethnicity with cancer stage at diagnosis for 12 cancer sites: a retrospective analysis. *Lancet Oncol*. 2008; 9(3):222–31. [PubMed: 18282806]
34. Haas JS, Earle CC, Orav JE, Brawarsky P, Neville BA, Williams DR. Racial segregation and disparities in cancer stage for seniors. *J Gen Intern Med*. 2008; 23(5):699–705. [PubMed: 18338215]
35. Clegg LX, Reichman ME, Miller BA, et al. Impact of socioeconomic status on cancer incidence and stage at diagnosis: selected findings from the surveillance, epidemiology, and end results: National Longitudinal Mortality Study. *Cancer Causes Control*. 2008
36. Lund MJ, Butler EN, Bumpers HL, et al. High prevalence of triple-negative tumors in an urban cancer center. *Cancer*. 2008; 113(3):608–15. [PubMed: 18484596]
37. McClave SA, Jones WF, Evans WB. Do physician attitudes and practices limit use of EUS in the staging and the treatment of esophageal carcinoma? *Gastrointest Endosc*. 2005; 61(7):840–8. [PubMed: 15933685]
38. Perez EA. Perceptions of prognosis, treatment, and treatment impact on prognosis in non-small cell lung cancer. *Chest*. 1998; 114(2):593–604. [PubMed: 9726750]
39. Mandelblatt JS, Lawrence WF, Cullen J, et al. Patterns of care in early-stage breast cancer survivors in the first year after cessation of active treatment. *J Clin Oncol*. 2006; 24(1):77–84. [PubMed: 16382116]

Fig. 1.**Proportion of Cancer Visits by Physician Specialty**

Figure 1 excludes oncology and hematology specialties that primarily serve cancer patients. Other specialty surgery includes thoracic, cardiothoracic, cardiovascular, vascular, abdominal, and colorectal surgery

Table 1

Cancer Patient Attributes by Physician Specialty^a

Cancer Patient Attributes (N=5037)		Cancer Specialty (%)	Primary Care (%)	Surgical Specialty			Medical Specialty (%)
				General (%)	Urology (%)	Other (%)	
Number of Cancer Patients		1527 (100)	291 (100)	711 (100)	1905 (100)	294 (100)	309 (100)
Age in Years							
Less than 50		244 (16)	47 (16)	135 (19)	76 (4)	56 (19)	68 (22)
50 to 64		473 (31)	76 (26)	242 (34)	400 (21)	91 (31)	83 (27)
65 to 79		611 (40)	108 (37)	263 (37)	953 (50)	109 (37)	108 (35)
80 or more		199 (13)	61 (21)	71 (10)	476 (25)	38 (13)	49 (16)
Sex							
Male		550 (36)	122 (42)	185 (26)	1772 (93)	150 (51)	164 (53)
Female		977 (64)	169 (58)	526 (74)	133 (7)	144 (49)	145 (47)
Race							
White		1374 (90)	253 (87)	640 (90)	1619 (85)	256 (87)	284 (92)
Black		107 (7)	35 (12)	50 (7)	248 (13)	24 (8)	19 (6)
Other race		46 (3)	3 (1)	21 (3)	38 (2)	15 (5)	6 (2)
Ethnicity							
Hispanic		61 (4)	17 (6)	36 (5)	114 (6)	9 (3)	22 (7)
Non-Hispanic		1466 (96)	274 (94)	675 (95)	1791 (94)	285 (97)	287 (93)
Primary Expected Source of Payment							
Private Insurance		641 (42)	105 (36)	363 (51)	591 (31)	138 (47)	151 (49)
Medicare		733 (48)	134 (46)	249 (35)	1143 (60)	115 (39)	127 (41)
Medicaid		61 (4)	23 (8)	43 (6)	57 (3)	15 (5)	9 (3)
Other		92 (6)	26 (9)	57 (8)	114 (6)	26 (9)	22 (7)
Site of Malignant Neoplasm							
Genitourinary organs		199 (13)	70 (24)	14 (2)	1867 (98)	3 (1)	12 (4)
Breast, female		473 (31)	67 (23)	363 (51)	0 (0)	38 (13)	12 (4)
Digestive organs & peritoneum		244 (16)	44 (15)	185 (26)	0 (0)	21 (7)	37 (12)
Respiratory & intrathoracic organs		168 (11)	35 (12)	14 (2)	0 (0)	68 (23)	34 (11)
Skin, melanoma		15 (1)	6 (2)	50 (7)	0 (0)	21 (7)	71 (23)
Lip, oral cavity, & pharynx		15 (1)	3 (1)	0 (0)	0 (0)	65 (22)	0 (0)

Cancer Patient Attributes (N=5037)	Cancer Specialty (%)	Primary Care (%)		Surgical Specialty		Medical Specialty (%)	
		General (%)	Urology (%)	Other (%)	Other (%)	Other (%)	Other (%)
Lymphatic & hematopoietic tissue	305 (20)	29 (10)	28 (4)	0 (0)	6 (2)	22 (7)	
Other & unspecified	92 (6)	38 (13)	57 (8)	38 (2)	71 (24)	117 (38)	

^aHem/Onc includes Hematology/Oncology, Medical Oncology, Hematology, Musculoskeletal Oncology, Surgical Oncology, and Gynecological Oncology. Surgical specialty excludes General Surgery and Urology.

Table 2

Association between Patient Attributes and Odds of Seeing a Cancer Specialist versus a Non-cancer Specialist by Cancer Site

	All (N=5,037)	Colorectal (N=544)	Female Breast (N=948)	Male Genitourinary (N=1,892)
Patient Attributes ^a	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)
Age in Years				
Less than 50	1.48 (1.17 to 1.88)	1.01 (0.51, to 1.97)	1.75 (1.07 to 2.84)	3.02 (1.39 to 6.55)
50 to 65	1.47 (1.21 to 1.8)	1.72 (0.98 to 3)	1.61 (1.05 to 2.45)	0.67 (0.33 to 1.33)
65 to 80	1.00	1.00	1.00	1.00
80 or more	0.73 (0.61 to 0.89)	0.83 (0.49 to 1.43)	0.82 (0.51 to 1.34)	1.11 (0.69 to 1.8)
Sex				
Male	0.28 (0.25 to 0.32)	0.87 (0.62 to 1.23)		
Female	1.00	1.00		
Race				
White	1.00	1.00	1.00	1.00
Black	0.68 (0.53 to 0.86)	0.87 (0.46 to 1.63)	0.96 (0.59 to 1.56)	0.52 (0.24 to 1.14)
Other race	1.06 (0.71 to 1.57)	1.72 (0.52 to 5.62)	0.8 (0.34 to 1.9)	2.06 (0.78 to 5.41)
Ethnicity				
Hispanic	0.87 (0.64 to 1.17)	1.57 (0.72 to 3.41)	0.91 (0.48 to 1.73)	0.45 (0.14 to 1.47)
Non-Hispanic	1.00	1.00	1.00	1.00
Primary Expected Source of Payment				
Private Insurance	0.69 (0.57 to 0.83)	0.77 (0.45 to 1.31)	0.47 (0.31 to 0.72)	1.1 (0.64 to 1.89)
Medicare	1.00	1.00	1.00	1.00
Medicaid	0.76 (0.54 to 1.06)	0.43 (0.18 to 1.07)	0.67 (0.33 to 1.39)	1.1 (0.32 to 3.79)
Other	0.57 (0.42 to 0.77)	0.43 (0.19 to 0.96)	0.45 (0.25 to 0.82)	0.5 (0.15 to 1.65)

^aThe base case represents a White, non-Hispanic woman aged 65 to 80 with Medicare coverage. For male genitourinary cancer, the base case is male.

Abbreviations: OR, odds ratio; CI, Confidence Interval.