Published in final edited form as:

World J Surg. 2008 April ; 32(4): 522–528. doi:10.1007/s00268-007-9383-x.

Disparities in Oncologic Surgery

Caprice C. Greenberg,

Center for Surgery and Public Health, Brigham and Women's Hospital, 75 Francis Street, Boston, Massachusetts 02115, USA. Center for Outcomes and Policy Research, Dana-Farber Cancer Institute, 44 Binney Street, Boston, Massachusetts 02115, USA

Jane C. Weeks, and

Center for Outcomes and Policy Research, Dana-Farber Cancer Institute, 44 Binney Street, Boston, Massachusetts 02115, USA

Steven C. Stain

Department of Surgery, Albany Medical College, 47 New Scotland Avenue, Albany, New York 12208, USA

Caprice C. Greenberg: CCGREENBERG@PARTNERS.ORG

Abstract

Surgical oncology is one of the most frequently studied surgical specialties with regard to disparities in quality of care. There is variation in the care received according to nonclinical factors such as age, race and ethnicity, education, income, and even geographic region. Differences exist with regard to who gets treatment, what treatment is received, and the outcomes of those treatments. Although the existence of such disparities is no longer in doubt, the etiology is still being investigated. Ongoing research and quality improvement initiatives move beyond the mere description of existing disparities in one of three ways: (1) identifying and understanding the factors that lead to disparities; (2) advancing available methods to measure and track disparities; and (3) developing an approach to improvement. In this article, we start out by offering a framework to describe potential factors that lead to disparities, using examples from surgical oncology. We then describe the approaches to measuring and tracking disparities that are being used in research and quality improvement. Finally, we attempt to illustrate how all of these factors interact and offer some potential strategies to close the gap and alleviate disparities within the discipline.

Quality care of the oncology patient requires a collaborative effort among members of multiple disciplines, including surgery. For most patients with cancer, surgery plays a pivotal role, as few patients with solid tumors achieve a cure without surgical intervention. The outcomes of cancer patients have been tracked for decades through cancer registries rich in clinical and sociodemographic data. Given the integral role of surgical management in cancer outcomes and the rich data available, it is not surprising that surgical oncology is one of the most frequently studied surgical specialties with regard to disparities in quality of

care. There is variation in the care received according to nonclinical factors such as age, race and ethnicity, education, income, and even geographic region. For example, racial disparities have been documented in rates of surgical resection for breast, esophageal, colorectal, and non-small-cell lung cancer (NSCLC) [1–5]. There are also disparities in the postoperative management of patients, with lower rates of radiation therapy among some demographic groups after breast-conserving surgery (BCS) or resection for rectal cancer [3, 6]. Socioeconomic status (SES) has been shown to influence surgical decision making, with lower SES associated with lower rates of BCS and postmastectomy reconstruction for breast cancer, less sphincter-sparing surgery for rectal cancer, and lower rates of staging procedures for NSCLC [2, 3, 7–11].

These are just a few examples from a vast body of literature documenting disparities in surgical oncology. Thus, although the existence of such disparities is no longer in doubt, their etiology is still being investigated and appears to be far from simple. Ongoing research and quality-improvement initiatives move beyond the mere description of existing disparities in one of three ways: (1) identifying and understanding the factors that lead to disparities; (2) advancing available methods to measure and track disparities; and (3) developing an approach to improvement.

In this article, we start out by offering a framework to describe the potential factors that lead to disparities, using examples from surgical oncology. We then describe the approaches to measuring and tracking disparities that are being used in research and quality improvement. Finally, we attempt to illustrate how all of these factors interact, and we offer some potential strategies to close the gap and alleviate disparities within the discipline.

Developing a framework

As we learn more about how and why different individuals receive different healthcare, it is becoming clear that one, simple answer does not exist. In fact, disparities in healthcare are likely the result of a complex interplay of numerous events and factors that are encountered throughout the entire healthcare experience. Before it is possible to understand how these factors interact, a systematic classification schema must be developed. One approach focuses on their etiology; do they result from differences in the patients themselves, in the actions and decisions of the healthcare providers, or in the design of the healthcare system as a whole? Additionally, classification can exist according to the point of care: (1) differences in getting treatment; (2) differences in treatment administered; and (3) differences once treatment is given. Table 1 offers one approach with the primary classification according to point of care and subclassification by etiology. These classifications are obviously a simplification of the complex interplay, but they offer a framework for constructing a discussion of the factors involved.

Differences in getting treatment: access to care and the role of the healthcare system

Many people believe that disparities in healthcare result primarily from differences in access to care. “Access to care” can be defined as the extent to which an individual is able to receive the right service at the right time in the right place for a given health condition [12–14]. It is a function of whether people can enter and use a healthcare system to attain a given

service. For the purposes of this discussion, the aspect of the healthcare system we refer to is the discipline of surgical oncology, and the treatment is operative management of a patient with cancer. Traditional definitions of access to care have been limited to whether a patient is able to enter the healthcare system (including such factors as the insurance status of the patient, whether specialized services are available to a given patient, and whether the patient has a primary care provider to help them negotiate the system and, sometimes, the travel distances). Such definitions do not include what happens once the patient enters the system. Nevertheless, the use of this type of definition will simplify our discussion and distinguish the factors that are encountered at the “point of entry” from the factors that are encountered within the healthcare system. This distinction is important to help target interventions. Data suggest that a lack of access to primary care providers contributes to racial disparities in specialty referral, a key step in accessing cancer care [15]. Equally important may be access to a surgeon with special expertise in the cancer being treated. Additionally, there are systematic differences, in the types of hospitals accessed, and such differences contribute to disparities in outcomes [16]. Patients of lower SES and minorities are more likely to access healthcare systems, institutions and primary care providers with limited resources and limited access to specialists [17].

Differences in treatment administered: the role of the patient and the provider

Access to care does not appear to account for all disparities in surgical oncology care, however. Once patients enter the healthcare system, there are documented differences in the treatment that is provided. Unlike differences in getting treatment, which can be primarily attributed to the healthcare system, differences in treatment administered can have several different etiologies.

The patient: clinical and psychosocial factors—Uninsured and racial minorities have been shown to seek medical care at a later stage of disease for a number of different cancers, including breast and colorectal [3, 18, 19]. Patients who present with locally advanced or meta-static disease are less likely to undergo operative resection than patients who present earlier. In addition, more advanced cancers tend to present as urgent or emergent cases, which can alter the treatment received. For example, patients with a perforated colon cancer are more likely to receive a colostomy than those who undergo elective resection. Newly diagnosed cancer patients of lower SES have also been found to have an increased prevalence of co-morbidities, which increases operative risk and can lead to lower rates of surgical resection [20, 21]. Although access to care may contribute to these racial differences in clinical presentation, the differences may also reflect variations in tumor biology and aggression.

In addition to this myriad of clinical factors, there are psychosocial factors that can lead to the observed differences in treatment [22, 23]. Racial and ethnic groups have different attitudes and preferences regarding healthcare that can lead to different decisions regarding their treatment options, including the decision to forgo [24–27].

The provider and interpersonal factors—There are limited data regarding the role of provider bias in disparities [27]. In particular, it is difficult to distinguish provider bias from

interpersonal factors such as communication and trust. One could hypothesize that provider bias could contribute to the observed socioeconomic and racial disparities in surgical oncology in at least two ways. First, among patients without clinical contraindications, providers could hypothetically alter which, if any surgical options are discussed with the patients based on race, insurance, or socioeconomic characteristics. Second, even if providers offer a full range of surgical options, the content and effectiveness of those discussions may vary because of cultural, educational, or language barriers between patient and provider, or because of differences in the provider's presentation of the risk/benefit ratios associated with the procedure.

Prior literature documents racial and ethnic variations in physician–patient communication and in patient perceptions of the quality of their communication with physicians [28–31]. Rectal cancer patients reported difficulties with interpersonal aspects of cancer care, including coordinating care and accessing information, according to race and ethnicity [32]. Less educated breast cancer patients were less likely to report a discussion that the physician documented in the chart [31]. Black patients with lung cancer perceived communication with their physician to be less supportive, less partnering, and less informative than their white counterparts [28]. Interestingly, although there were no pre-visit racial variations in trust, black patients reported significantly lower trust in their providers after discussions of their disease and the treatment options. These differences in the quality of communication and provider trust may hinder a patient's ability to understand the options and make informed decisions that are in keeping with personal values and preferences.

Differences following treatment: outcomes and regret

Clinical outcomes—The discipline of disparities research was born of the observation that clinical outcomes varied by nonclinical factors such as race, insurance status, and education. Although many of the factors that have already been discussed contribute to these observations, there are other factors that must be considered. For example, we have already discussed the effect that the increased rate of co-morbidities has on operative risk and decision making, but this added risk can also increase the overall mortality rate. Several studies have documented racial variations in the risk of death from noncancer causes [21, 33]. Such variations may result in part from the underuse of necessary care for co-morbid conditions among cancer survivors in vulnerable populations, including African-American, poor, and elderly patients [34]. Finally, there is evidence to suggest that there may be racial differences in tumor biology. Although these differences could contribute to a more advanced stage at presentation, it could also lead to a more aggressive clinical course, with shortened disease-free intervals and survival [35–38].

Putting it all together: examples in surgical oncology

There are several important examples from the literature that illustrate the crucial role surgical treatment of cancer plays in observed racial disparities in survival; these examples also highlight the important contribution and interdependency of the factors described above. In the *Journal of Clinical Oncology*, Steyerberg and colleagues report a study of disparities in locoregional esophageal cancer [4]. The increased mortality rate among black patients with esophageal cancer (OR 1.18, $p = 0.004$) can be attributed to lower rates of

operative treatment. However, a number of the factors described above were also found to contribute to this difference, including access, clinical factors, and psychosocial or interpersonal factors. Black patients were less likely to be assessed by a surgeon, suggesting difficulty with accessing the system. They tended to have more co-morbid conditions and were less likely to undergo surgery even after seeing a surgeon, suggesting a difference in patient preference or patient-provider communication.

Another example is non-small-cell lung cancer, where black patients have a higher incidence as well as a lower 5-year overall survival [2, 39]. The survival difference is primarily observed in early stage disease and is again due to differences in surgical management. Black patients are less likely to see a specialist and undergo invasive staging procedures, suggesting difficulties at the point of access. Furthermore, once staged, they are less likely to have a surgical resection for several reasons. First, providers are less likely to recommend surgery, suggesting bias. Patients are also more likely to refuse surgery, suggesting differences in patient preference and decision making. Finally, differences in genetic susceptibility, tobacco use, and occupational exposures may play a role.

Approaches to measuring and tracking

Now that we have described what disparities exist and have suggested possible explanations, we consider ways to gather data to enrich our understanding and design interventions. There are two primary reasons for measuring and tracking disparities in healthcare: research and quality improvement. In designing an approach to quality measurement, this distinction is crucial because the goal of research is very different from the goals of quality improvement. The goal of research is mainly descriptive, whereas quality improvement focuses on action. Research leads to advancement of the field as a whole through the development of new methodologies and the recording of new observations, whereas quality improvement seeks to effect change, primarily at the institutional level. To that end, research must be generalizable, valid, and novel, and quality improvement must be institution-specific, feasible, and actionable.

There are a number of national and regional sources of data that can be used for research. These include the SEER (Surveillance Epidemiology and End Result) and SEER-Medicare databases, the National Cancer Data Base, and other sources of “claims data.” The SEER database is maintained by the National Cancer Institute [40] and is comprised of 18 cancer registries, representing cities, states, or other geographic areas chosen for their epidemiologic characteristics. The population covered by SEER is representative of the general U.S. population with regard to measures of poverty and education. The 18 cancer registries represent approximately 26% of the U.S. population. The SEER registries collect tumor data on each patient, including stage, histology, and initial treatment. They also collect basic demographics such as age and race and are linked to census-tract level data regarding socioeconomic information, such as income and education.

The linkage of SEER data with Medicare claims provides more comprehensive data for patients 65 years and older [41]. Inpatient and outpatient Medicare claims, physician, laboratory, durable medical equipment, home health, and hospice billings are available from

the SEER-Medicare database. In addition to the SEER data, claims data for a 5% random sample of patients without cancer residing in the SEER areas is also available as a comparison group. Readers interested in using SEER-Medicare data to investigate patient characteristics, such as race or sociodemographics, are referred to a detailed review of the topic offered by Bach et al. in an issue of *Medical Care* devoted to the use of SEER-Medicare data for research [42]. The major limitation of this rich data source is that it only includes Medicare enrollees in 18 regions. This is a major difficulty, especially in the study of cancers that occur in younger patients.

The National Cancer Data Base (NCDB) is a joint program of the American College of Surgeons and the American Cancer Society [43]. It includes data from over 14,000 programs that are approved by the American College of Surgeons Commission on Cancer. This is a rich database that captures 75% of the newly diagnosed cancers in the United States. High-quality data are collected by each participating institution on stage, histology, and initial surgical therapy; however, data are limited regarding other treatment modalities and outcomes.

Many investigators have developed novel datasets by linking state registries with claims from local payers [44, 45]. These datasets offer the depth of data available within SEER-Medicare without the age limitations. Limitations, however, include the expense and effort required to purchase, clean, and link the data.

Finally, individual hospitals and investigators maintain their own tumor registries and clinical databases. Although these data exist on a very small scale, they can be custom-designed to answer a specific research question. Perhaps more important, increasingly of these databases are being linked to tissue banks, with a focus on translational research. The ability to link tissue with sociodemographic and clinical data can lead to important discoveries.

Quality improvement efforts almost always require data from local, institutional sources. In the past, data were derived primarily from focused chart reviews. Increasingly, however, institutions are investing in enhanced informatics systems that generate data to support not only patient care but also systematic monitoring of quality of care. Such systems can provide crucial infrastructure for quality improvement efforts to eliminate disparities in care. However, they will be successful only if information on factors potentially associated with disparities, including race and ethnicity, are captured accurately and reliably.

Historically, most hospitals collected demographic information at the time of admission, often by “inspection,” and they used a classification system that did not distinguish between race and ethnicity. Over the past decade, most governmental agencies have suggested or required that race and ethnicity be treated as two distinct entities, allowing for separate designations. This system fails to recognize the diversity of cultural and racial identity in the United States, however, and more recently, many healthcare institutions (and the U.S. Bureau of the Census), have replaced these mutually exclusive categories with a more flexible approach that permits multiple responses. There is also growing recognition that, compared with the gold standard of the patient’s self-report, information on race and

ethnicity in medical records or hospital administrative databases may systematically undercount disadvantaged minorities [46].

Strategies to close the gap

In 1994, the National Institutes of Health (NIH) published guidelines for the inclusion of women and minorities in clinical research [47]. This initiative has been updated in new NIH guidelines [48]. At present, all grant applications involving patient-oriented research must address subject selection criteria and rationale, as well as outreach plans for recruitment. Reviewers of grants must evaluate the inclusion plans, and unacceptable plans cannot be funded. To foster interest in health care research, the NIH has developed a loan repayment program that will repay up to \$35,000 per year of educational debt for doctoral level investigators who commit 50% of their total level of effort toward research on health disparities. These two objectives, inclusion of women and minorities in clinical research and encouraging health disparity research, may pay long-term dividends.

The health disparities experienced in cancer care are replicated in other diseases and conditions. In 2003, Smedley et al. published a report requested by Congress, titled *Unequal Treatment: Confronting Racial and Ethnic Disparities in Health Care* [49]. This report recommended (1) increasing awareness by the general public, health care providers, insurance companies, and policy makers of health disparities; (2) promoting consistency and equity of care by the use of evidence-based guidelines, and structuring payment systems to ensure an adequate supply of services to minority and underserved patients; (3) reducing the fragmentation of health care by stabilization of patient-provider relationships, and enhancing the ability of patients to negotiate the healthcare system. Finally, the group recommended an increase in the proportion of underrepresented U.S. racial and ethnic minorities among health professionals, because racial concordance has been reported to be associated with greater participation in care processes, and minority providers are more likely to serve in underserved communities.

The NIH assessed the progress in narrowing the gap in health disparities in 2006 by examining its health disparities research plan [50]. They found no evidence that the strategic plans for health disparities research of the individual NIH Institutes and Centers were developed in concert with the trans-NIH strategic planning process. They also discovered that NIH had placed inadequate emphasis on social and behavioral determinants of health and the interaction of such determinants with biologic factors. Although, continued investigation into the effect of tumor biology on health disparities is warranted, the solutions to why ethnic and racial minority have reduced health outcomes will likely be multifactorial.

Specifically, as the disparity in care relates to cancer, the National Cancer Institute (NCI) has embarked on several strategies to address the issue (Table 2). In 2001, the NCI established the Center to Reduce Cancer Health Disparities (CRCHD), which supports research on the topic, expands minority participation (as investigators and patients) in health disparity research and clinical trials, and supports evidence-based prevention, screening, treatment, and survivorship interventions to allow better understanding of cancer health disparities and to reduce their effect.

Much of what has been studied about the differences in the treatment and survival of racial and ethnic minority cancer care has been retrospective, documenting what many investigators have either already suspected or known. Randomized trials of specific treatments are conducted among highly selected patients and providers, and they may not reflect outcomes in the real world. In an editorial about equal survival among black and white colon cancer patients in NSABP trials, Brawley and Freeman commented that although equal cancer treatment yields equal cancer outcome, there are numerous studies of colorectal and other cancers suggesting that *there is not equal treatment* [51]. The Cancer Care Outcomes Research and Surveillance (CanCORS) Consortium has established collaboration among investigators from around the United States in examining the care delivered to population-based cohorts of newly diagnosed patients with lung and colorectal cancer in multiple regions of the country and assessing outcomes associated with that care [52]. The CanCORS study aims to study *why* racial, ethnic, and socioeconomic differences in cancer care and outcomes occur, particularly with regard to use of effective adjuvant therapy and curative surgery, postoperative mortality, and overall survival. As of December 2006, the CanCORS study had enrolled 10,189 newly diagnosed patients with colorectal and lung cancer, and it aims to evaluate the specific effects of treatment on survival, quality of life, and satisfaction with care.

All the study in the world will not alter patient outcomes without changes in the healthcare system and the behavior of individual providers. These changes are likely to include improving the access of patients to high-quality surgery; effectively communicating the need for operation to the patient in an understandable, culturally sensitive way; navigating the healthcare system with the patient, to ensure that evidence-based adjuvant care is provided, that the patient is monitored throughout the recovery phase, and that those results are recorded and tracked.

Ultimately, interventions will need to be designed, tested, analyzed, and if an effective method of reducing disparities is discovered, the results will have to be disseminated to healthcare providers and implemented in improved policy.

References

1. Bradley CJ, Given CW, Roberts C. Race, socioeconomic status, and breast cancer treatment and survival. *J Natl Cancer Inst.* 2002; 94:490–496. [PubMed: 11929949]
2. Lathan CS, Neville BA, Earle CC. The effect of race on invasive staging and surgery in non-small-cell lung cancer. *J Clin Oncol.* 2006; 24:413–418. [PubMed: 16365180]
3. Morris AM, Billingsley KG, Baxter NN, et al. Racial disparities in rectal cancer treatment: a population-based analysis. *Arch Surg.* 2004; 139:151–155. discussion 156. [PubMed: 14769572]
4. Steyerberg EW, Earle CC, Neville BA, et al. Racial differences in surgical evaluation, treatment, and outcome of locoregional esophageal cancer: a population-based analysis of elderly patients. *J Clin Oncol.* 2005; 23:510–517. [PubMed: 15659496]
5. Cooper GS, Yuan Z, Landefeld CS, et al. Surgery for colorectal cancer: race-related differences in rates and survival among Medicare beneficiaries. *Am J Public Health.* 1996; 86:582–586. [PubMed: 8604797]
6. Joslyn SA. Racial differences in treatment and survival from early-stage breast carcinoma. *Cancer.* 2002; 95:1759–1766. [PubMed: 12365025]

7. Christian CK, Niland J, Edge SB, et al. A multi-institutional analysis of the socioeconomic determinants of breast reconstruction: a study of the National Comprehensive Cancer Network. *Ann Surg.* 2006; 243:241–249. [PubMed: 16432358]
8. Dolan JT, Granchi TS, Miller CC 3rd, et al. Low use of breast conservation surgery in medically indigent populations. *Am J Surg.* 1999; 178:470–474. [PubMed: 10670855]
9. Gilligan MA, Kneusel RT, Hoffmann RG, et al. Persistent differences in sociodemographic determinants of breast conserving treatment despite overall increased adoption. *Med Care.* 2002; 40:181–189. [PubMed: 11880791]
10. Michalski TA, Nattinger AB. The influence of black race and socioeconomic status on the use of breast-conserving surgery for Medicare beneficiaries. *Cancer.* 1997; 79:314–319. [PubMed: 9010104]
11. Roetzheim RG, Gonzalez EC, Ferrante JM, et al. Effects of health insurance and race on breast carcinoma treatments and outcomes. *Cancer.* 2000; 89:2202–2213. [PubMed: 11147590]
12. Rogers A, Flowers J, Pencheon D. Improving access needs a whole systems approach. *BMJ.* 1999; 319:866–867. [PubMed: 10506023]
13. Gold M, Stevens B. Measuring access to care through population-based surveys in a managed care environment. Synopsis and priorities for future efforts. *Health Serv Res.* 1998; 33(3 Pt 2):611–624. [PubMed: 9685109]
14. Gulliford M, Figueroa-Munoz J, Morgan M, et al. What does “access to health care” mean? *J Health Serv Res Policy.* 2002; 7:186–188. [PubMed: 12171751]
15. Basu J, Clancy C. Racial disparity, primary care, and specialty referral. *Health Serv Res.* 2001; 36(6 Pt 2):64–77. [PubMed: 16148961]
16. Lucas FL, Stukel TA, Morris AM, et al. Race and surgical mortality in the United States. *Ann Surg.* 2006; 243:281–286. [PubMed: 16432363]
17. Bach PB, Pham HH, Schrag D, et al. Primary care physicians who treat blacks and whites. *N Engl J Med.* 2004; 351:575–584. [PubMed: 15295050]
18. Bradley CJ, Given CW, Roberts C. Disparities in cancer diagnosis and survival. *Cancer.* 2001; 91:178–188. [PubMed: 11148575]
19. Roetzheim RG, Pal N, Tennant C, et al. Effects of health insurance and race on early detection of cancer. *J Natl Cancer Inst.* 1999; 91:1409–1415. [PubMed: 10451447]
20. Schrijvers CT, Coebergh JW, Mackenbach JP. Socioeconomic status and comorbidity among newly diagnosed cancer patients. *Cancer.* 1997; 80:1482–1488. [PubMed: 9338473]
21. Tammemagi CM, Nerenz D, Neslund-Dudas C, et al. Comorbidity and survival disparities among black and white patients with breast cancer. *JAMA.* 2005; 294:1765–1772. [PubMed: 16219879]
22. Mulley AG Jr. Developing skills for evidence-based surgery: ensuring that patients make informed decisions. *Surg Clin North Am.* 2006; 86:181–192. xi. [PubMed: 16442428]
23. Sepucha KR, Fowler FJ Jr, Mulley AG Jr. Policy support for patient-centered care: the need for measurable improvements in decision quality. *Health Aff (Millwood).* 2004; (Suppl Web Exclusives):VAR54–62. [PubMed: 15471772]
24. Dein S. Explanatory models of and attitudes towards cancer in different cultures. *Lancet Oncol.* 2004; 5:119–124. [PubMed: 14761816]
25. Jones C. The impact of racism on health. *Ethn Dis.* 2002; 12:S2–10–3. [PubMed: 11913627]
26. Whaley AL. Ethnicity/race, ethics, and epidemiology. *J Natl Med Assoc.* 2003; 95:736–742. [PubMed: 12934873]
27. Rathore SS, Krumholz HM. Differences, disparities, and biases: clarifying racial variations in health care use. *Ann Intern Med.* 2004; 141:635–638. [PubMed: 15492343]
28. Gordon HS, Street RL Jr, Sharf BF, et al. Racial differences in trust and lung cancer patients’ perceptions of physician communication. *J Clin Oncol.* 2006; 24:904–909. [PubMed: 16484700]
29. Johnson RL, Roter D, Powe NR, et al. Patient race/ethnicity and quality of patient–physician communication during medical visits. *Am J Public Health.* 2004; 94:2084–2090. [PubMed: 15569958]
30. Bird ST, Bogart LM. Perceived race-based and socioeconomic status(SES)-based discrimination in interactions with health care providers. *Ethn Dis.* 2001; 11:554–563. [PubMed: 11572421]

31. Keating NL, Weeks JC, Borbas C, et al. Treatment of early stage breast cancer: do surgeons and patients agree regarding whether treatment alternatives were discussed? *Breast Cancer Res Treat.* 2003; 79:225–231. [PubMed: 12825857]
32. Ayanian JZ, Zaslavsky AM, Guadagnoli E, et al. Patients' perceptions of quality of care for colorectal cancer by race, ethnicity, and language. *J Clin Oncol.* 2005; 23:6576–6586. [PubMed: 16116149]
33. Dignam JJ. Efficacy of systemic adjuvant therapy for breast cancer in African-American and Caucasian women. *J Natl Cancer Inst Monogr.* 2001; 30:36–43. [PubMed: 11773290]
34. Earle CC, Neville BA. Under use of necessary care among cancer survivors. *Cancer.* 2004; 101:1712–1719. [PubMed: 15386307]
35. Eberhard DA, Johnson BE, Amler LC, et al. Mutations in the epidermal growth factor receptor and in KRAS are predictive and prognostic indicators in patients with non-small-cell lung cancer treated with chemotherapy alone and in combination with erlotinib. *J Clin Oncol.* 2005; 23:5900–5999. [PubMed: 16043828]
36. Freedland SJ, Isaacs WB. Explaining racial differences in prostate cancer in the United States: sociology or biology? *Prostate.* 2005; 62:243–252. [PubMed: 15389726]
37. Mitsudomi T, Kosaka T, Endoh H, et al. Mutations of the epidermal growth factor receptor gene predict prolonged survival after gefitinib treatment in patients with non-small-cell lung cancer with postoperative recurrence. *J Clin Oncol.* 2005; 23:2513–2520. [PubMed: 15738541]
38. Zhang X, Chang A. Somatic mutations of the epidermal growth factor receptor and non-small-cell lung cancer. *J Med Genet.* 2007; 44:166–172. [PubMed: 17158592]
39. Stewart JH. Lung carcinoma in African Americans: a review of the current literature. *Cancer.* 2001; 91:2476–2482. [PubMed: 11413540]
40. [Accessed on 12 August 2007] <http://seer.cancer.gov/>
41. [Accessed on 12 August 2007] <http://healthservices.cancer.gov/seermedicare/>
42. Bach PB, Guadagnoli E, Schrag D, et al. Patient demographic and socioeconomic characteristics in the SEER-Medicare database applications and limitations. *Med Care.* 2002; 40(8 Suppl):IV–19–25.
43. [Accessed on 12 August 2007] <http://www.facs.org/cancer/ncdb/>
44. Eberl MM, Watroba N, Reinhardt M, et al. Linked claims and medical records for cancer case management: evaluation of mammography abnormalities. *Cancer.* 2007; 110:518–524. [PubMed: 17577210]
45. Hillner BE, McDonald MK, Desch CE, et al. A comparison of patterns of care of nonsmall cell lung carcinoma patients in a younger and Medigap commercially insured cohort. *Cancer.* 1998; 83:1930–1937. [PubMed: 9806651]
46. West CN, Geiger AM, Greene SM, et al. Race and ethnicity: comparing medical records to self-reports. *J Natl Cancer Inst Monogr.* 2005; 35:72–74. [PubMed: 16287889]
47. [Accessed on 18 August 2007] <http://grants.nih.gov/grants/guide/notice-files/not94-100.html>
48. [Accessed on 18 August 2007] <http://grants.nih.gov/grants/guide/notice-files/NOT-OD-02-001.html>
49. Smedley, BD.; Stith, AY.; Nelson, AR., editors. *Unequal Treatment: Confronting Racial and Ethnic Disparities in Health Care.* National Academies Press; Washington, DC: 2003. Committee on Understanding and Eliminating Racial and Ethnic Disparities in Health Care.
50. Thomson, GE.; Mitchell, F.; Williams, M., editors. *Examining the Health Disparities Research Plan of the National Institutes of Health: Unfinished Business.* Washington, DC: National Academies Press; 2006. Committee on the Review and Assessment of the NIH's Strategic Research Plan and Budget to Reduce and Ultimately Eliminate Health Disparities.
51. Brawley OW, Freeman HP. Race and outcomes: is this the end of the beginning for minority health research? *J Natl Cancer Inst.* 1999; 91:1908–1909. [PubMed: 10564668]
52. Ayanian JZ, Chrischilles EA, Fletcher RH, et al. Understanding cancer treatment and outcomes: the Cancer Care Outcomes Research and Surveillance Consortium. *J Clin Oncol.* 2004; 22:2992–2996. [PubMed: 15284250]

Table 1

Factors that lead to disparities in the care of surgical oncology patients

Differences in getting treatment	
• System	
– Access to care	
Differences in treatment administered	
• Patient	
– Clinical factors	
♦ Stage at presentation	
♦ Co-morbidities	
– Psychosocial factors	
♦ Patient preference	
♦ Decision making	
♦ Patient perception	
• Provider	
– Bias	
• Interpersonal factors	
– Communication	
– Trust	
– Comprehension/understanding	
Differences once treatment is received	
• Patient	
– Clinical factors	
♦ Less care for noncancer conditions	
♦ More likely to die of other causes	
♦ Tumor biology	
– Psychosocial factors	
♦ Satisfaction	
♦ Decision regret	

Table 2**National Cancer Institute (NCI) Strategic Plan to Overcome Cancer Health Disparities**

-
- Understand the factors that cause cancer health disparities.
 - Work with communities to develop interventions targeted to the specific needs of underserved populations.
 - Provide the knowledge base for and develop interventions to enhance the integration of cancer services for underserved populations.
 - Work with others to develop a cadre of researchers and clinicians prepared to effectively address cancer health disparities.
 - Develop and work with others to implement innovative, educationally, and culturally appropriate approaches to disseminating information on research results to underserved populations.
 - Examine the role of health policy in reducing and eliminating cancer health disparities.
-