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Racial Differences and Disparities in Cancer Care and Outcomes: Where's the Rub?

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SYNOPSIS

Despite a profusion of studies over the past several years documenting racial differences in cancer outcomes, there is a paucity of data as to the root causes underlying these observations. This chapter will review work to date focusing on black-white differences in cancer outcomes, explore potential mechanisms underlying these differences, and identify patient- and health care system-factors that may account for persistent racial disparities in cancer care. Research strategies to elucidate the relative influence of these various factors and policy recommendations to reduce persistent disparities will also be discussed

Keywords

White; black; race; differences; disparities; cancer

RACIAL DIFFERENCES IN CANCER OUTCOMES: SCOPE OF THE PROBLEM

Although racial differences in outcomes have been reported for almost all cancer types, this article will focus primarily on the three leading causes of cancer death in the United States for which the “standard of care” is well defined and surgical resection is the cornerstone of therapy: invasive breast cancer, non-small cell lung cancer (NSCLC), and colorectal cancer (Table 1).² Recent statistics indicate that age-adjusted breast cancer mortality rates are higher among black than white women (Table 2).² Population-based studies suggest that

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while survival rates for women with breast cancer have improved over the past two decades, survival rates in black women have lagged behind, and the observed disparity is increasing.^{3–5} Black males have a significantly higher incidence rate and are almost 1.5 times as likely to die from lung and bronchus cancer compared to white males.² Similarly, black men and women have a significantly higher cancer incidence rate and are almost 1.5 more likely to die of colorectal cancer compared with their white counterparts.²

MECHANISMS UNDERLYING RACIAL DIFFERENCES IN CANCER OUTCOMES

Racial differences in cancer outcomes may be attributed to racial differences in stage at presentation, tumor biology, treatment efficacy, and/or failure to provide optimal cancer treatment.

CANCER STAGE

Data from the National Cancer Institute (NCI)'s Surveillance Epidemiology End Results (SEER) program has persistently shown that blacks with breast cancer, lung cancer, and colorectal cancer are more likely to present with advanced disease compared to whites (Figure 1).² Failure to uncover black-white differences in biological and tumor characteristics suggests that discrepancies in routine cancer screening between races may be involved.^{6–15} Studies further suggest that the effect of race on stage at presentation may be confounded by socioeconomic factors, including education, income, and insurance status.^{11,16} Irrespective of the mechanism(s) involved, it is important to note that black-white differences in cancer survival persist even when controlling for stage at presentation, suggesting that other factors likely account for observed racial differences in cancer outcomes (Figure 2).²

TUMOR BIOLOGY

Although racial differences in tumor biology (and natural history) may contribute to differences in cancer outcomes, their influence appears to be minimal. In a study combining breast cancer incidence data from various SEER registries and mortality data from the National Center for Health Statistics, breast cancer mortality rates were similar for blacks and whites until the late 1970s, after which time the mortality rates among black women increased.¹⁷ This observation was associated with an increase in the calendar period mortality curves for blacks, but not the birth cohort curves (which reflect differences in risk factors), suggesting that it may have been attributable to differences in access to care or response to new treatments during this period. Studies also suggest that there are no apparent racial differences in the biologic aggressiveness, tumor characteristics, or efficacy of treatments for colorectal cancer.^{10,14,18,19} In the NCI's Black/White Cancer Survival Study, the distribution of colon cancers by anatomic location, histology, and grade did not differ by race.¹⁴

TREATMENT TOXICITY AND EFFICACY

TREATMENT-RELATED MORTALITY—Several investigators have suggested that race is an independent predictor of poor outcomes after surgery.^{20–24} In a study using Medicare

data, black race was associated with an increased risk of death after 7 out of 8 major cardiovascular or cancer procedures (even when adjusting for comorbidity using administrative data codes).²³ This effect, however, was attenuated or nonexistent when controlling for the proportion of black patients treated at the operating hospitals.

In a more recent study using data from the National Surgery Quality Improvement Program (NSQIP) Patient Safety in Surgery Study, blacks were more likely to present with greater comorbidity and more likely to undergo emergency surgery compared to whites.²⁵ After controlling for all other patient/procedure-related factors, however, black race was associated with a higher risk of cardiac and renal postoperative occurrences, but was not an independent predictor of overall morbidity or mortality.

With the exception of the above report, these studies have relied largely on administrative datasets which are limited in the amount of clinical information available for accurate risk-adjustment and can only be used to generate rough measures of comorbidity, such as the Charlson Comorbidity Index (CCI).²⁶ As such, the apparent adverse effects of black race on postoperative outcomes in these studies may be due to failure to fully control for underlying comorbidity and/or structures and processes of care at the hospitals at which patients were treated, rather than race *per se* (see “Hospital Factors” below).

EFFICACY OF ADJUVANT THERAPY—Numerous studies suggest that there are no apparent racial differences in the efficacy or effectiveness of local and/or systemic therapy for breast, lung, or colorectal cancer.^{27–30} White and black women with early-stage breast cancer treated with breast-conservation therapy (BCT) have similar rates of local control.³¹ An analysis of several National Surgical Adjuvant Breast and Bowel Project (NSABP) trials between 1982 and 1994 revealed no differences in disease-free survival between racial groups.³² Survival in whites and blacks with early-stage NSCLC is similar after resection.^{33,34} In patients with more advanced disease, race-related survival is also comparable after radiation and systemic therapy.^{35,36} Re-analyses of randomized, NSABP colorectal cancer adjuvant therapy trials revealed similar rates of nodal involvement and no black-white differences in disease-free survival.^{18,19}

FAILURE TO PROVIDE OPTIMAL CANCER TREATMENT

There is a growing body of literature suggesting that black-white differences in cancer outcomes may be explained by failure to provide suitable cancer care in blacks, due to either underuse of therapy and/or receipt of suboptimal therapy.¹

UNDERUSE OF SURGICAL RESECTION—Surgical resection is the cornerstone of therapy in patients with non-metastatic breast cancer, NSCLC, and colorectal cancer. As such, failure to perform resection in these patients represents a serious breach in the standard of care and poses a serious threat to patients’ quality of life and long-term survival.

Although the majority of studies to date in breast cancer patients have focused primarily on black-white differences in the use of BCT, a 2002 report that linked data from the Metropolitan Detroit SEER registry to Michigan Medicaid enrollment files reported underuse of surgical resection among blacks with breast cancer.^{30,37–41} In a multivariate

analysis controlling for age, marital status, Medicaid enrollment, poverty status, and stage, black race was associated with an adjusted OR of resection of 0.62 (95% CI 0.42–0.90).⁴¹ In a recent study using a large, population-based sample of women with non-metastatic breast cancer, black race was associated with underuse of curative resection (94.9% versus 96.4%, $P<0.001$).⁴² Although black race had no apparent adverse effect on resection among rural patients, the adjusted OR for resection for urban black patients was 0.58 (95% CI 0.41–0.82). These studies suggest that underuse of resection among urban black women with breast cancer is real and appears to extend across geographically diverse communities, independent of comorbidity or SES. Although the black-white differences in surgical resection rates in these studies are admittedly small, it is important to remember that long-term, breast cancer survival is impossible without surgical resection. Therefore, even minor differences in surgical treatment can be considered clinically significant, particularly when surgery carries minimal risks to the patient.

Approximately one-third of patients with the most common type of lung cancer, NSCLC, present with early (stage I or II), potentially curable disease. If treated with resection, the five-year survival of these patients approaches 40%. In contrast, the median survival of patients who are not resected or patients with locally advanced/metastatic disease is less than one year.⁴³ Several studies have reported lower rates of lung resection among blacks with NSCLC, even when controlling for stage at presentation. Greenwald et al reported that patients with stage I NSCLC in Detroit, San Francisco, and Seattle were less likely (by 12.7%) to undergo resection if they were black or of lower SES.⁴⁴ In a seminal study using SEER-Medicare data from 1985 to 1993, the rate of surgery in black patients with stage I-II NSCLC was only 64.0%, compared to 76.7% among whites ($P<0.001$).³³ Black race was associated with a relative risk of resection of 0.54, even when controlling for the effects of age, gender, comorbidity, median income, and tumor stage. Overall, five-year survival was lower for blacks compared to whites (26.4% versus 34.1%, $P<0.001$). In contrast, the five-year survival of black and White patients who underwent surgery was roughly similar (39.1 v. 42.9%, $P=0.10$), as was survival among patients who did not undergo surgery (4% v. 5%, $P=0.25$). The authors concluded that the racial disparity in resection rates largely accounted for the lower survival rate among blacks in their study. In a more recent study of all cases of non-metastatic NSCLC reported to the South Carolina Central Cancer Registry between 1996–2002, overall use of surgical resection (across races) was lower than previously reported, and blacks were significantly less likely to undergo surgery compared to whites (44.7% v. 63.4%, $P<0.001$).⁴⁵ After controlling for sociodemographics, comorbidity, and tumor factors, the adjusted odds ratio for resection for blacks was 0.43 (95% CI, 0.34–0.55).

Several recent studies using state cancer registry data, SEER data, and the National Cancer Data Base (NCDB) have also reported lower rates of definitive resection among blacks with resectable colon and rectal cancers.^{6,15} A study of over 80,000 Medicare beneficiaries with colorectal cancer, reported that only 68% of blacks underwent surgical resection, compared with 78% of whites.⁴⁶ A study using SEER data reported rates of surgery of 94% among stage II–III black rectal cancer patients compared with 96% among white patients.^{6,9} In a more recent study, underuse of surgery was far greater among blacks with rectal cancer (82.0% vs. 89.3% in whites, $P<0.001$) compared with blacks with colon cancer (92.9% vs.

94.5% in whites, $P < 0.001$).⁴⁷ In a nationwide, hospital-based sample of 35,695 patients with rectal cancer treated between 2003 and 2005 culled from the NCDB, only 85.1% percent of blacks underwent definitive resection compared with 90.7% of whites.¹⁵ Black race was independently associated with underuse of surgery on multivariate analysis (OR, 0.62; 95% CI, 0.54–0.71) even when controlling for comorbidity and socioeconomic/insurance status.

UNDERUSE OF ADJUVANT THERAPY—In addition to underuse of surgical resection, underuse of adjuvant radiation and/or systemic therapy in blacks with non-metastatic breast, NSCLC, and colorectal cancer may partly explain observed differences in survival. Despite similar rates of comorbidity, insurance coverage, and oncologic consultation, women with early-stage breast cancer from minority groups were half as likely to receive adjuvant therapy compared to whites.⁴⁸ Several population-based studies using SEER data have also reported lower rates of adjuvant radiation therapy after breast-conservation therapy.^{49,50}

A study that used SEER data reported that black race was associated with underuse of adjuvant radiotherapy, contradicting a previous analysis that used SEER-Medicare data.^{6,51} In a more recent study from the NCDB, however, there was no association between race and receipt or type of adjuvant therapy.¹⁵ A study of three population-based databases in California similarly found no association between race/ethnicity and use of adjuvant therapy when controlling for comorbidity, education, and poverty status.⁵² Taken as a whole, these studies suggest that whatever race-related barriers to surgical care may exist among black patients with rectal cancer, they do not appear to affect the quality of their non-surgical cancer care.

FACTORS UNDERLYING UNDERUSE OF CANCER TREATMENT

PATIENT FACTORS

Misconceptions About Cancer and Its Treatment: Patients' misconceptions about cancer and its treatment may adversely impact their willingness to undergo surgery. In a national telephone survey, the misconception "Treating cancer with surgery can cause it to spread throughout the body," was endorsed by 41% of respondents.⁵³ A significant proportion of respondents endorsed other misconceptions, including: "The medical industry is withholding a cure for cancer from the public in order to increase profits" (27%), "All you need to beat cancer is a positive attitude, not treatment" (11%), and "Cancer is something that cannot be effectively treated" (13%). Respondents who were older, non-white, Southern, or indicated being less informed about cancer endorsed the most misconceptions.

In a related study of patients being treated at pulmonary and lung cancer clinics in Philadelphia, Los Angeles, and Charleston, 38% of patients stated that they believed that air exposure at surgery caused tumor spread, and black race was the most significant predictor of this belief.(ref. 54) Of note, 19% of black patients stated that this belief was a reason for avoiding surgery, and 14% stated that they would not accept their physicians' reassurance that the belief was false⁵⁴. In a recent prospective cohort study of patients with early stage lung cancer from North and South Carolina, 45% of patients agreed with this belief and

endorsement of this belief was significantly associated with subsequent failure to undergo surgery.⁵⁵

Patient Preferences: Patient's beliefs and preferences may affect their decision to undergo cancer treatment. Patients facing a tradeoff between quantity and quality of life may (paradoxically) opt to forgo potentially curative surgery. In one study, 20% of subjects facing T3 laryngeal cancer opted for radiation therapy (and a lower probability of survival of 30–40%) over laryngectomy (and a higher probability of survival of 60%) in order to preserve their speech.⁵⁶

In a prospective study of black and white veterans with carotid stenosis faced with the prospect of carotid angiography and carotid endarterectomy, blacks expressed higher aversion to surgery than whites.⁵⁷ During follow-up, 20% of whites and 14% of blacks underwent endarterectomy, and highest aversion quartile was associated with a lower likelihood on undergoing surgery, even when accounting for clinical appropriateness. In a secondary analysis, increased age, black race, no previous surgery, lower level of chance locus of control, less trust of physicians, and less social support were associated with greater likelihood of surgery risk aversion.⁵⁸

In a 2004 study, blacks with colorectal cancer were more likely to refuse surgery when reasons for non-receipt of surgery were analyzed using the SEER database.⁵⁹ Concerns or fears about receiving a permanent stoma may affect patients' willingness to pursue surgical consultation and/or follow with recommended surgery (which may explain why blacks with non-metastatic rectal cancer were more likely to forgo radical resection and opt for local excision in a recent study from the NCDB).¹⁵ In a prospective cohort study of patients with early stage lung cancer, the feeling that quality of life would be worse one year after lung cancer surgery was significantly higher among blacks than whites (42% versus 34%) and was associated with subsequent failure to undergo surgical resection.⁵⁵

HEALTH CARE SYSTEM FACTORS

Access to Care: Black-white differences in cancer care and outcomes may be partly explained by differences in access to care. In the Community Tracking Study Physician Survey, black Medicare beneficiaries were more likely to be cared for by physicians who were less well trained clinically and had more limited access to important clinical resources (e.g. specialists, high-quality imaging, high quality ancillary services, and non-emergency hospital admissions) than physicians who treated white patients.⁶⁰ Lack of a regular source of health care was recently shown to be associated with underuse of surgical resection in patients with early-stage lung cancer, particularly among blacks.⁵⁵

Although underuse of surgery could also be related to lower referral rates for surgical consultation among blacks, the widely varying black-white differences in resection rates in patients with breast, lung, and colorectal cancer patients argue against systematic under-referral of blacks. In addition, a recent study showed that black race was a powerful, negative predictor of surgical resection even when the analysis was limited to patients who had received surgical consultation and been previously staged with mediastinoscopy.³⁴

To what extent does “equal access” to appropriate cancer care reduce black-white differences in treatment and outcomes? Dominitz et al analyzed the effect of black race on surgery and adjuvant therapy in a cohort of 3,176 colorectal cancer patients treated within the Veterans Administration (VA)'s equal access health care system.⁶¹ Irrespective of SES, blacks and whites had similar rates of surgery, radiation therapy, and chemotherapy (likely due to the fact that referral patterns and payments were not barriers to care) and survival was similar across races. It is important to note, however, that equal health care coverage (i.e. insurance) may not be sufficient to ensure equal access to care. Rogers et al analyzed the effect of race on colorectal cancer outcomes in a population of elderly Tennesseans who were dually enrolled in both Medicaid and Medicare.¹³ Although there was no racial difference in overall mortality in a multivariate analysis controlling for comorbidity, stage, and treatment, only 86% of blacks received surgical therapy compared with 91% of whites ($P=0.02$).

Physician-Patient Communication: In a recent report from the cancer registry at the Henry Ford Health System in Detroit, black race had no apparent effect on the odds of being offered surgery for early-stage NSCLC (after controlling for comorbidity, pulmonary function, and tumor stage), but did have a negative effect on the rate at which surgery was declined by patients (OR, 4.1; 95% CI, 0.34–0.55).⁶² In another study, black patients evaluated by a surgeon were more likely to have a negative recommendation for surgery (71.4% versus 67.0%, $P<0.05$) and more likely to refuse surgery compared to whites (3.4% versus 2.0%, $P=0.013$), suggesting that that miscommunication or bias during the patient-physician encounter was likely involved.³⁴

Several factors can influence patients' decision to undergo treatment. In a study of patients with advance lung cancer, their caregivers, and medical oncologists, all 3 groups ranked the oncologist's recommendation as the most important factor in decision-making.⁶³ Patients and caregivers ranked faith in God second (above the ability of treatment to cure their cancer), while physicians ranked faith last. Patients who ranked faith first were less educated and may not have fully understood the technical aspects or risks/benefits of their cancer treatments. Failure by physicians to acknowledge their patients' strongly held beliefs may lead to unsatisfactory physician-patient interactions and suboptimal decision-making. In a recent study of patients with early-stage lung cancer, patients who agreed with the statements "faith alone cures disease" and "prayer will cure cancer" were less likely to receive subsequent surgical resection.⁵⁵ In addition, negative perceptions of physician-patient communication were associated with underuse of surgery across races.

In a recent analysis of audiotaped office visits between orthopedic surgeons and white versus black elderly patients, there were no significant differences in the content of various informed decision making elements by race.⁶⁴ However, when the encounters were evaluated for 4 relationship-building components of communication, coder ratings were significantly lower for responsiveness, respectfulness, and listening in visits with black patients. Not surprisingly, black patients were significantly less satisfied with the encounter and their surgeon, even after controlling for potential confounders.

Physician Beliefs and Biases: Persistent erroneous beliefs (reinforced by published reports) about the adverse effect of black race on surgical mortality and/or treatment efficacy may deter physicians from referring black patients with potentially curable cancers for surgical resection and/or adjuvant therapy.^{23,65} Race and SES can also affect physicians' perceptions of patients, and subsequent treatment recommendations. In a study of physicians from 8 New York hospitals, blacks and patients of low SES were perceived more negatively by physicians during a post-angiogram encounter.⁶⁶ More specifically, blacks were more likely to be rated as less intelligent and educated, less likely to have poor social support, and more likely to be at risk for non-compliance.

Perceived racism by patients can also undermine the physician-patient relationship and ultimately result in mistrust and refusal to proceed with recommended treatments. In a survey of Medicare beneficiaries with localized breast cancer, blacks reported perceiving more ageism and racism in the health care system compared to whites, and ageism was associated with higher rates of mastectomy (versus BCT) and omission of radiation after BCT.⁶⁷ In a study of patients from North and South Carolina, 62% of patients with early stage lung cancer (73% of blacks 50% of whites) agreed or mildly disagreed that patients receive worse care due to their race, and endorsement of this belief was associated with failure to undergo surgical resection for lung cancer. Furthermore, increasing distrust in the healthcare system was associated with almost a two-fold increase in failure to undergo surgery.⁵⁵

FACTORS UNDERLYING RECEIPT OF SUBOPTIMAL CANCER TREATMENT

PHYSICIAN KNOWLEDGE AND EXPERTISE: Black patients with non-metastatic cancer may be more likely to be referred to less experienced surgeons with worse perioperative outcomes. In a study from South Carolina, nearly 50% and 60% of lobectomies and pneumonectomies (respectively) for lung cancer were performed by general surgeons, and the perioperative mortality after lobectomy was significantly higher among patients treated by general surgeons (5.3% versus 3.0%, $P<0.05$).⁶⁸ In a study analyzing the effect of surgeon versus hospital volume on outcomes after rectal cancer resection, surgeon volume was not associated with either 30-day mortality or rate of sphincter preservation.⁶⁹ However, surgeon volume was strongly associated with 2-year mortality, and was a stronger predictor of long-term survival than hospital volume.

It is possible that black patients are more likely to be referred to less experienced surgeons, who in turn, may be more likely to recommend more radical (and perhaps less palatable) surgery. Some studies have reported lower rates of BCT and sphincter-preservation in blacks with breast and rectal cancer, respectively.^{6,37,70} More recent work, however, has reported underuse of surgery but similar rates of sphincter-preservation and adjuvant therapy among resected patients (suggesting that whatever barriers to care existed preoperatively, they did not appear to affect patients' intraoperative or postoperative care).¹⁵

HOSPITAL FACTORS: In a recent report from California, blacks were significantly more likely to undergo surgery at low-volume centers for 6 of 10 operations (including lung cancer resection and pancreatectomy), even when controlling for comorbidity, insurance

status, rural residence, and proximity to low-, medium-, and high-volume hospitals.⁷¹ In addition, Medicaid patients (and uninsured patients) were also more likely to receive care at low-volume hospitals compared with Medicare patients. A recent analysis from the Nationwide Inpatient Sample also revealed that blacks who underwent lung resection were less likely to undergo surgery at high-volume hospitals and more likely to die postoperatively.⁷² Of note, these and other studies risk-adjusted outcomes using administrative data and may have underestimated the true extent of comorbidity among precisely those patients that would have been more likely to receive care at low-volume centers (i.e. minority and underfunded patients). In contrast, a report from the VA-NSQIP detected no statistically significant association between procedure or specialty volume and 30-day mortality rate when outcomes were risk-adjusted using the more rigorous NSQIP methodology.⁷³ “Evidence-based hospital referral” of selected patients to high-volume centers may not be practical, could exacerbate current racial disparities in access to care, and may inadvertently erode the level of surgical care at “low-volume” hospitals in rural and underserved areas.^{74–77} Indeed, recent work suggests that surgeon volume is a better predictor of rectal cancer outcomes than hospital volume, and that the effect of hospital surgical volume may be negligible in patients who receive standard adjuvant therapy.^{69,78}

Hospital racial composition has also been shown to be associated with long-term outcomes in patients with breast and colon cancer and attenuate the effect of individual patients’ race within hospitals.⁷⁹ In a report of California Cancer Registry data, hospitals with a high Medicaid use rate (which cared for a disproportionate share of minority patients) had significantly higher 30-day and 1-year mortality rates compared to other hospitals.⁸⁰ Taken together, these studies suggest that financial and/or resource constraints at the hospitals at which minorities are cared for may result in suboptimal care and disparities in treatment and outcomes. In a study of Medicare beneficiaries with cancer, black race was associated with worse 1- and 3-year survival (largely due to later stage of disease at presentation and underuse of cancer-directed surgery); black race had no apparent adverse effect on outcomes, however, when the analysis was restricted to patients treated at NCI-designated cancer centers.⁸¹

MODERATORS OF RECEIPT AND QUALITY OF CANCER TREATMENT

SOCIOECONOMIC STATUS: To some extent, race is a sociocultural construct and its apparent effect on health care access, utilization, and outcomes can be mediated and moderated by SES.^{82–84} In the NCI’s Black/White Cancer Survival Study, 26% of blacks lived at or below 125% of the poverty level income, compared with only 9% of whites.¹⁴ Increasing income was associated with decreasing all-cause mortality, and controlling for poverty status eradicated the apparent, increased risk of cancer death among black patients with stage II–III colon cancer. In a previously recent study, black race was a powerful predictor of underuse of surgical resection in patients with rectal cancer, but its adverse was limited to patients living in poverty.⁴⁷ Similarly, underuse of radiation after BCT was higher among blacks living greater distances from a cancer center or in areas of high poverty, while this effect was not seen in whites.⁶⁷ Despite similar health care coverage, patients living in poverty may have worse access to financial and/or social resources needed to successfully negotiate the costs and inherent complexities of multidisciplinary cancer care.

URBAN/RURAL STATUS: Several studies have reported an association between rural residence and underuse of BCT (and adjuvant radiation after BCT) among women with invasive breast cancer.^{39,70,85,86} In a recent study, rural residence was associated with underuse of surgery across races, and black race had no apparent adverse effect on resection rates among rural patients.⁴² Rural women are less likely to have had a recent mammogram or breast examination compared to urban women (even when they report similar access to patient care) and tend to have more negative attitudes about breast cancer (despite having a similar knowledge base about the disease).⁸⁷ Rural residents also experience limited access to health care (due to longer travel distances), fewer benefits (such as paid sick leave), fewer support services (such as childcare), and scant access to specialty physicians, including surgeons.^{67,88–91}

RESEARCH RECOMMENDATIONS AND FUTURE DIRECTIONS

IMPROVE COLLECTION OF SOCIODEMOGRAPHIC DATA

Although race data are available in Medicare claims for patients over age 65, they are less likely to be reliably or accurately recorded in younger patients. Given persistent racial disparities in cancer treatment and outcomes (and a growing body of literature suggesting that hospital racial composition may partly explain differences in outcomes previously attributed to patient race), it is imperative that race and ethnicity, ideally assessed by self-report, be accurately captured in the medical record.^{82,92} Standardization of race and ethnicity codes (along federal standards published by the Office of Management and Budget) to meet “meaningful use” criteria for electronic health records will assist greatly in these efforts.

As noted earlier, the effects of race on health care access, utilization, and outcomes can be mediated and moderated by SES. As such, collection of socioeconomic data at the provider level and/or at the aggregate level is crucially important.⁹³ Although not always correlated with individual level data, census tract or zip code level socioeconomic data can often be used to estimate and control for SES.⁹⁴

USE OPTIMAL RISK ADJUSTMENT METHODOLOGY

Risk-adjustment systems that rely on administrative data (including the CCI and its various modifications) rely on categories of comorbidities drawn from the International Classification of Disease, Ninth Edition, Clinical Modification (ICD-9-CM) codes contained within hospital discharge/billing records.^{26,95,96} ICD-9-CM codes often lack detailed, standardized definitions for use by medical record coders and are open to clinical and coding interpretation.⁹⁷ Comorbidities are often underreported using ICD-9-CM codes; as such, the sensitivity and positive predictive value of administrative data to identify preoperative risk factors is poor.⁹⁸

The CCI was originally designed to empirically predict mortality among medical patients 1 year after admission.²⁶ Clinically based risk-adjustment methods (such as the ones used by the VA and ACS-NSQIP), on the other hand, were specifically developed to identify independent predictors of 30-day surgical morbidity and mortality.^{99,100} In a recent study comparing the ability of the two methods to predict 30-day mortality, the risk scores derived

from each method were essentially uncorrelated and the predictive value of the NSQIP method far exceeded that of the CCI.¹⁰¹ In fact, the ability of the CCI to correctly predict which patients would live or die after surgery was only marginally better than what would be expected by random chance. Nonetheless, the CCI has been widely used to control for comorbidity in several publications analyzing the effect of race, surgeon-volume, and hospital-volume on perioperative outcomes.^{102–104}

CONSIDER ALTERNATIVE RESEARCH METHODOLOGIES

QUALITATIVE RESEARCH—Although further work using large clinical and administrative datasets is needed to determine to what extent racial differences in cancer treatment are explained by differences in sociodemographic characteristics, access to care, and physician/hospital characteristics, qualitative research exploring the relative effects of other (potentially modifiable) patient-, physician-, and health care system- related factors on patients' willingness to undergo recommended cancer treatments are also warranted. In response to a study demonstrating significant underuse of surgical therapy among black patients with localized NSCLC in South Carolina, our program conducted a series of focus groups using white and black subjects at risk for lung cancer to explore their perceptions of cancer and its treatment, their attitudes about physicians and the health care system, and their potential willingness to undergo surgical resection if diagnosed with lung cancer (N. Esnaola, MD, Personal Communication, 2011).⁴⁵ Among black subjects, willingness to undergo resection was negatively associated with reported fear of cancer and its treatment, a widely held belief that exposing cancer to air during surgery causes the cancer to spread ("once they open you up, all it [cancer] does is spread to the rest of the body"), mistrust of surgeons ("doctors just want to cut you"), and mistrust of the health care system. Black subjects also expressed a strong desire to receive better medical information ("good information and direction"), information about the risks and benefits of lung cancer surgery and alternative treatments ("being walked through the treatment process"), access to testimonials from patients who had successfully undergone surgical resection for lung cancer, help with financial barriers to surgery (e.g., transportation barriers), and emotional support during the decision-making process ("receiving comfort would be helpful"). Similar work is needed to determine to what extent similar attitudes may underlie persistent underuse of surgical and/or adjuvant treatments for other cancer types.

COMMUNITY-BASED PARTICIPATORY RESEARCH—Community-based participatory research (CBPR) is a collaborative research approach whereby representatives from the communities affected by the issue being studied partner with organizations and researchers throughout the research process to facilitate and ensure a) co-learning/reciprocal transfer of expertise between groups, b) shared decision-making in the design and conduct of the research project, and c) mutual ownership of the process and end-product.¹⁰⁵ Knowledge and experiences shared via CBPR can strengthen the link between researchers and communities, refine research priorities, facilitate the creation of more culturally appropriate research instruments, and enhance the quantity and quality of collected data.

The Agency for Healthcare Research and Quality commissioned a study of the existing evidence on the conduct, process, and results of CBPR.¹⁰⁵ In the majority of the studies

analyzed, communities were actively involved in recruiting and retaining participants. Communities were involved in setting research priorities/generating hypotheses and in study design/implementation in only half of the studies, however. In the majority of the completed intervention studies, active community involvement resulted in enhanced intervention quality and enhanced recruitment; there was no evidence of diminished research quality resulting from CBPR.

HEALTH CARE POLICY IMPLICATIONS

IMPROVE ACCESS TO CARE

To what extent might a policy of providing insurance coverage to black, impoverished cancer patients mitigate racial disparities in treatment and outcomes? In response to the National Breast and Cervical Cancer Early Detection Program of 1991, several states established Best Chance Networks (BCN) to contract with providers and facilities to provide funding for screening and diagnostic follow-up services to low-income women with abnormal breast screening results (and later, treatment coverage under Medicaid). Despite the fact that approximately 60% of the women enrolled in South Carolina's BCN were black and/or resided in rural communities, a recent study reported persistent underuse of surgery among women with non-metastatic breast cancer in these groups (including Medicaid patients).⁴² In a study of elderly Tennesseans with colorectal cancer dually enrolled in both Medicaid and Medicare, blacks were significantly less likely to receive surgical resection compared to whites, despite apparently identical health care coverage.¹³ These studies suggest that although social programs to optimize access to care may be helpful, they are probably not sufficient (possibly due to persistent differences in access to care and specialists in the private sector, even among patients with similar insurance coverage).⁶⁰

INCREASE DIVERSITY IN THE PHYSICIAN WORKFORCE

Studies suggest that racial/ethnic concordance enhances physician-patient communication, and that providers are less likely to recommend surgical care for black patients compared with white patients.^{106,107} A recent analysis of surgical workforce diversity from 1996 to 2004 revealed an increase in the proportion of women in all 7 surgical specialties studied. In contrast, the proportion of black residents increased in only 4 surgical specialties and decreased in another three. In addition, the proportion of black residents in every board-certified specialty workforce was lower than in the overall board-certified workforce during the study period. These studies underscore the importance of ongoing efforts by the American College of Surgeons to increase the number of racial/ethnic minorities entering surgical specialties.¹⁰⁸ Enhanced financial incentives (such as loan-repayment programs) to qualified physicians who agree to practice in safety net hospitals that serve a disproportionate share of minority and "underfunded" patients should be strongly considered.

EXPAND USE OF PATIENT NAVIGATORS

Patient navigation interventions are an evidence-based approach to reducing cancer disparities. Dr. Harold P. Freeman created one of the first patient navigation programs in 1990 to help women in Harlem to navigate the process of breast cancer screening and

follow-up care.¹⁰⁹ Patient navigation is based on social support theory and is a barrier-focused intervention designed to ensure timely and efficient access to needed health services.^{110–113} Navigators focus on case identification, identify psychosocial and practical barriers to care, and implement a care plan.^{88,114}

Patient navigators (PNs) can provide patients with information, in simple lay language, about treatment options and side effects, reduce misconceptions, and emphasize the importance of cancer treatments while acknowledging patients' fears and concerns. PNs can develop trusted relationships with patients and help overcome potential mistrust of providers and the health care system.^{53,115,116} Navigators can address economic barriers by connecting patients with resources and support systems, arranging for financial support, establishing reliable transportation, and assisting with out-of-pocket costs of care.^{114,117,118} They can also contend with organizational and physician-patient communication barriers to cancer care by providing patients with patient friendly informational materials about cancer and its treatment, coordinating care among multiple specialists, linking patients with appropriate follow-up care services, and reminding patient reminders about appointments.^{109,113}

The NCI recently funded several sites to conduct and evaluate patient navigation interventions to promote cancer screening and treatment adherence.¹¹⁹ In a subsequent review, the increased adherence to diagnostic follow-up care (after patient navigation) ranged from 21% to 29.2%.¹⁰⁹ In a randomized trial of navigation in a sample of low income, ethnic minority women, the intervention group was much more likely to be adherent through diagnostic resolution and to experience timely treatment than the usual care group.¹²⁰ In a patient navigation intervention to improve follow-up of abnormal breast cancer screening in an urban population, women in the intervention group had 39% greater odds of having timely follow-up.¹¹⁴

EXPAND USE OF ACTIVE CO-MANAGEMENT

As noted earlier, the observed adverse effects of black race on postoperative outcomes after major cancer surgery may be partly explained by higher rates of underlying comorbidity at presentation and/or suboptimal structures or processes of care at the hospitals at which black and underfunded patients are treated.²⁵²³ As such, improved perioperative management of comorbid conditions could potentially improve postoperative outcomes among blacks undergoing major surgery. This could potentially be achieved by increasing active co-management of cancer surgery patients by hospitalists experienced with perioperative care, particularly at hospitals caring for a disproportionate number of racial minorities and underinsured patients. Previous work suggests that hospitalist co-management of orthopedic and cardiothoracic patients results in fewer complications, decreased mortality, and shortened lengths of stay.^{121–124}

INCREASE ADHERENCE TO BEST PRACTICES

Third party payers and regulatory agencies have begun focusing on National Quality Forum-endorsed, cancer-specific quality measures to reduce persistent variations in treatment across patient groups and communities. These measures are designed to enhance provider-

adherence to cancer-focused, best practice guidelines developed by organizations such as the National Comprehensive Cancer Network, the American Society of Clinical Oncology, and others. The American College of Surgeons Commission on Cancer (CoC) has incorporated accountability and quality improvement measures (centered around evidence-based adjuvant care for breast, colon, and rectal cancer) into the most current version of the Cancer Program Standards used to evaluate and rate institutions and programs seeking CoC-accreditation.¹²⁵ Programs participating in the CoC's Rapid Quality Reporting System can also track their performance with each of these measures in near-real time, and potentially intervene (at the patient- and/or provider-level) when non-compliance with otherwise indicated cancer care is noted.¹²⁶ To what extent these initiatives (and the eventual creation of cancer-specific pay-for-reporting and pay-for-performance process and outcome measures) may help reduce persistent racial disparities in cancer care and outcomes remains to be determined.

SUMMARY

The preponderance of the medical literature to date suggests that black-white differences in cancer outcomes are largely explained by failure to provide suitable cancer care, rather than racial differences in stage at presentation, tumor biology, or response to treatments. Further studies using novel research methodologies and accounting for sociodemographic, physician, and hospital factors are needed to identify potentially modifiable patient and health care system factors that may underlie persistent racial disparities in receipt and quality of surgical and adjuvant therapy in patients with non-metastatic breast, lung, and colorectal cancer. In the interim, ongoing efforts to improve access to care, enhance diversity in the surgical workforce, navigate minority cancer patients through the healthcare system, and enhance adherence to cancer-specific best practices are warranted.

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KEY POINTS

- Racial differences in outcomes have been reported for almost all cancer types.
- The preponderance of the medical literature to date suggests that black-white differences in cancer outcomes are largely explained by failure to provide suitable cancer care, rather than racial differences in stage at presentation, tumor biology, or response to treatments.
- Studies using novel research methodologies and accounting for sociodemographic, physician, and hospital factors are needed to identify potentially modifiable patient and health care system factors that may underlie persistent racial disparities in receipt and quality of surgical and adjuvant therapy.
- Ongoing efforts to improve access to care, enhance diversity in the surgical workforce, navigate minority cancer patients through the healthcare system, and enhance adherence to cancer-specific best practices are warranted.

Figure 1.

Stage of diagnosis by cancer type and race, United States, 1999 to 2006. Data from Siegel R, Ward E, Brawley O, Jemal A. Cancer statistics, 2011: the impact of eliminating socioeconomic and racial disparities on premature cancer deaths. *CA Cancer J Clin.* Jul-Aug 2011;61(4):212–236.

Figure 2.

Five-year relative survival rates by cancer type, stage, and race; United States, 1999 to 2006. Data from Siegel R, Ward E, Brawley O, Jemal A. *Cancer statistics, 2011: the impact of eliminating socioeconomic and racial disparities on premature cancer deaths. CA Cancer J Clin. Jul-Aug 2011;61(4):212–236.*

Table 1

Estimated New Cancer Cases and Deaths (by Gender), United States, 2011

	Males			Females		
	<i>No. of Cases</i>	<i>% of Cases</i>	<i>Rank</i>	<i>No. of Cases</i>	<i>% of Cases</i>	<i>Rank</i>
Estimated New Cases						
Breast	...	...	...	230,480	30	1
Lung & bronchus	115,060	14	2	106,070	14	2
Colon & rectum	71,850	9	3	69,360	9	3
Estimated Deaths						
Breast	...	...	...	71,340	26	2
Lung & bronchus	85,600	11	1	39,520	15	1
Colon & rectum	25,250	8	3	24,130	9	3

Table 2

Incidence and Mortality Rates (by Gender and Race), United States, 2011

	Males		Females	
	<i>White</i>	<i>Black</i>	<i>White</i>	<i>Black</i>
Incidence rates				
Breast	...	...	121.9	114.6
Lung & bronchus	84.3	103.5	57.0	51.8
Colon & rectum	56.1	67.2	41.4	50.7
Mortality rates				
Breast	...	...	23.4	32.4
Lung & bronchus	68.3	87.5	41.6	39.6
Colon & rectum	20.6	30.5	14.4	21.0