

Racial/Ethnic Disparities in Health Care Receipt Among Male Cancer Survivors

Nynikka R. A. Palmer, DrPH, MPH, Ann M. Geiger, PhD, Tisha M. Felder, PhD, MSW, Lingyi Lu, MS, L. Douglas Case, PhD, and Kathryn E. Weaver, PhD, MPH

Gender and racial/ethnic disparities in health care utilization are prevalent. Men are less likely than are women to use health care services, including physician office visits and preventive care visits.^{1,2} Minorities are also less likely to use health care services than are non-Hispanic Whites.^{3–6} Contributors to these disparities include low socioeconomic status^{7–10} and lack of health insurance.^{7,8,11,12} Even after controlling for socioeconomic status and health insurance coverage, racial/ethnic disparities in health care utilization persist.⁴ These disparities are associated with poorer health and higher mortality rates among minorities and have important implications for survival and well-being for men with serious and chronic health conditions such as cancer.⁵

Although numerous studies have documented racial/ethnic disparities in cancer screening, diagnosis, treatment, and mortality,^{10,13–18} little is known about how racial/ethnic disparities in health care among post-treatment cancer survivors influence follow-up care. Such care includes monitoring and managing late and long-term effects and follow-up tests to monitor for recurrence and detect second cancers. Management of noncancer comorbidities (e.g., diabetes) and preventive health care¹⁹ (e.g., vaccinations) are also recommended for cancer survivors.^{20–22} Follow-up care may include visits to both primary care and specialist providers.^{13,23–25} It is strongly recommended that cancer survivors receive lifelong follow-up care because of increased risk of recurrence, morbidity, and mortality.¹⁹

Prior studies have used administrative data to explore this issue,^{13,24,26,27} but few of these studies have focused on male cancer survivors and none included younger survivors who are not covered by Medicare. Additionally, it is not known how patterns of health care receipt might differ among men with and without a history of cancer.

Objectives. We examined racial/ethnic disparities in health care receipt among a nationally representative sample of male cancer survivors.

Methods. We identified men aged 18 years and older from the 2006–2010 National Health Interview Survey who reported a history of cancer. We assessed health care receipt in 4 self-reported measures: primary care visit, specialist visit, flu vaccination, and pneumococcal vaccination. We used hierarchical logistic regression modeling, stratified by age (<65 years vs ≥65 years).

Results. In adjusted models, older African American and Hispanic survivors were approximately twice as likely as were non-Hispanic Whites to not see a specialist (odds ratio [OR] = 1.78; 95% confidence interval [CI] = 1.19, 2.68 and OR = 2.09; 95% CI = 1.18, 3.70, respectively), not receive the flu vaccine (OR = 2.21; 95% CI = 1.45, 3.37 and OR = 2.20; 95% CI = 1.21, 4.01, respectively), and not receive the pneumococcal vaccine (OR = 2.24; 95% CI = 1.54, 3.24 and OR = 3.10; 95% CI = 1.75, 5.51, respectively).

Conclusions. Racial/ethnic disparities in health care receipt are evident among older, but not younger, cancer survivors, despite access to Medicare. These survivors may be less likely to see specialists, including oncologists, and receive basic preventive care. (*Am J Public Health.* 2013;103:1306–1313. doi:10.2105/AJPH.2012.301096)

We assessed racial/ethnic disparities in health care receipt among adult male cancer survivors and men without cancer using the National Health Interview Survey (NHIS).²⁸ We first wanted to compare cancer survivors to a noncancer group to shed light on whether the disparities are specific to cancer or reflect underlying disparities. We explored (1) racial/ethnic disparities in health care receipt among cancer survivors compared with men with no cancer history, (2) racial/ethnic disparities in cancer survivors, and (3) the extent to which predisposing, enabling, and need factors explain racial/ethnic disparities in health care receipt among male cancer survivors.

METHODS

We used data from the NHIS, combining years 2006 through 2010 to obtain a larger population of male cancer survivors. The NHIS is a nationally representative annual cross-sectional in-person survey of noninstitutionalized civilian households in the United States

that collects demographic and health information. The NHIS has a complex, multistage sample design that oversamples African Americans, Hispanics, and Asians to allow subgroup analyses. The overall response rate for sample adults in the years studied ranged from 60.8% to 70.8%.²⁸ We excluded respondents younger than 18 years and those with a diagnosis of “unknown,” squamous, or nonmelanoma skin cancers (because their treatment and prognosis is very different and they are excluded in Surveillance Epidemiology and End Results estimates). These exclusions are consistent with other NHIS-based studies of cancer survivors.^{29,30}

Outcome Variables

We examined 4 measures of health care service receipt that are relevant to cancer-related follow-up care: (1) primary care (saw or talked to a general practitioner or internist in past 12 months); (2) specialist (saw or talked to a specialist in past 12 months); (3) influenza vaccination (received seasonal flu vaccine in

past 12 months); and (4) pneumococcal vaccination (ever had pneumonia vaccine).

Both flu and pneumococcal vaccinations are considered to be important markers of quality of preventive care.^{31,32}

Independent Variables

We used Andersen's behavioral model for utilizing medical care³³ to identify factors that might play a role in racial/ethnic disparities in health care receipt. This model includes predisposing factors (individual tendency to use services), enabling factors (ability or means to access services), and need factors (illnesses that lead to health care utilization).

Predisposing factors included race/ethnicity, age, and marital status. We collapsed separate questions for Hispanic ethnicity and race into 3 categories: non-Hispanic African American (African American), non-Hispanic White, and Hispanic. We excluded respondents from other racial/ethnic groups because of small numbers of male cancer survivors. Married status included married couples and couples living together, whereas not married status included people who were divorced, separated, widowed, or never married.

Enabling factors included education, health insurance coverage, and health care access. We used education as a proxy for socioeconomic status because annual household income had a large percentage (30%) of missing data and was strongly correlated with education ($P \leq .001$). We categorized education as did not graduate from high school, was a high school graduate or earned the general equivalency diploma, finished some college, and graduated from college or more. We categorized health insurance coverage as private, public, or none. Private insurance included health maintenance organization or preferred provider organization with or without Medicare coverage. Public insurance included Medicare only, Medicaid, military, other government health care coverage, and other state-sponsored health care. We defined no insurance as not reporting any private or public health insurance coverage; this pertained only to those younger than 65 years because a very small number of men aged 65 years and older reported no health insurance. We assessed health care access with the question "Do you have a usual place for health care (yes, more than 1 place, or no)?"

Need factors included noncancer comorbidities, health status, functional limitations, time since cancer diagnosis, and the number of cancer diagnoses. Noncancer comorbidities were a count of 5 conditions: hypertension, diabetes, heart disease, lung disease, and stroke.³⁴ We assessed health status with a single question asking respondents to rate their overall health (excellent to poor). We assessed functional limitations by combining multiple measures of limitations (cannot carry, climb, etc.) into a dichotomous variable of any functional limitation (yes or no).³⁵ Finally, we calculated the total number of cancer diagnoses.

Statistical Analyses

Because of differences in health insurance access, we stratified all analyses into younger than 65 years versus aged 65 years and older. We restricted pneumococcal vaccination analyses to those aged 65 years and older because of vaccination guidelines.³⁶ Hereafter, we refer to men younger than 65 years as "younger" and those aged 65 years and older as "older." As a sensitivity analysis, we also further stratified models for the younger survivors (aged 18–39 and 40–64 years). Odds ratios (ORs) were similar; therefore, we have reported models for these combined.

After tabulating descriptive statistics, we used multiple, hierarchical logistic regression models to assess predictors of health care service utilization among cancer survivors and men with no cancer history. We included the interaction between cancer history and race/ethnicity to determine if the differences between the races/ethnicities were consistent for cancer survivors and men with no cancer history. We entered race/ethnicity into the model first, followed by predisposing, enabling, and need factors, to see if the race/ethnicity coefficients changed by adding other variables to the model. Preliminary analyses showed a main effect for age, so we controlled for age continuously in each age group in the multivariate models. We conducted all statistical analyses using the SURVEY procedures in SAS version 9.2 (SAS Institute, Cary, NC),³⁷ which incorporated strata and cluster information and sampling weights to account for the complex survey design of the NHIS.

RESULTS

We identified 51 033 adult men, 2714 of whom reported a history of cancer and 48 319 of whom did not. Table 1 shows the weighted distribution of predisposing, enabling, and need factors for the sample, stratified by age group and cancer history. Cancer survivors were more likely than were men with no cancer history to have a usual place for health care and to be older, non-Hispanic White, married, college educated, and privately insured. They were also more likely to have more comorbidities and functional limitations. Prostate cancer was the most common cancer in both groups, with approximately 10% of survivors reporting more than 1 cancer diagnosis. More than half (54%) of younger survivors were 5 years or less postdiagnosis, whereas more than half (55%) of older survivors were more than 5 years postdiagnosis.

Cancer Survivors Vs Men With No Cancer History

Having a history of cancer was associated with lower prevalence of no health care receipt in all age and racial/ethnic subgroups (Table 2). For younger men, differences in primary and specialist care among the racial/ethnic subgroups differed between those with and those without a history of cancer (overall interaction $P = .005$ and $P = .019$, respectively). In general, there were no significant differences in health care receipt by race/ethnicity among younger survivors, but we noted significant differences in men with no cancer history, with African Americans and Hispanics more likely to report lack of care.

More specifically, for younger men with no cancer history, African Americans were more likely than were non-Hispanic Whites to not see a primary care provider (OR = 1.25), whereas for cancer survivors, African Americans were less likely to not see a primary care provider (OR = 0.52; interaction $P = .008$). Similarly, Hispanics with no cancer history were more likely than were non-Hispanic Whites to not see a primary care provider (OR = 2.10), whereas there was little difference between Hispanic and non-Hispanic White cancer survivors (OR = 0.99; interaction $P = .028$). Additionally, younger Hispanic men with no cancer history were more likely to not see a specialist than were non-Hispanic Whites

TABLE 1—Characteristics of Adult Men With and Without a History of Cancer, Stratified by Age: National Health Interview Survey, United States, 2006–2010

Characteristic	Aged 18–64 Years		Aged ≥ 65 Years	
	Cancer Survivors (n = 1051), % (SE)	No Cancer History (n = 40 810), % (SE)	Cancer Survivors (n = 1663), % (SE)	No Cancer History (n = 7509), % (SE)
Race/ethnicity				
African American	9.8 (1.0)	12.2 (0.3)	6.5 (0.6)	8.5 (0.4)
Hispanic	5.4 (0.7)	17.0 (0.4)	3.9 (0.5)	7.9 (0.4)
Non-Hispanic White	84.8 (1.2)	70.8 (0.5)	89.6 (0.8)	83.6 (0.6)
Predisposing factors				
Age, y				
< 40	12.7 (1.4)	48.7 (0.4)	...	...
40–64	87.3 (1.4)	51.3 (0.4)	...	...
65–79	...	...	71.0 (1.3)	78.7 (0.6)
≥ 80	...	...	29.0 (1.3)	21.3 (0.6)
Marital status				
Married or living together	72.0 (1.5)	62.3 (0.4)	76.9 (1.2)	73.8 (0.6)
Not married	28.0 (1.5)	37.7 (0.4)	23.1 (1.2)	26.2 (0.6)
Enabling factors				
Education				
Not a high school graduate	11.0 (1.1)	15.4 (0.3)	19.8 (1.2)	24.2 (0.6)
High school graduate or GED	26.6 (1.5)	28.7 (0.3)	29.2 (1.3)	30.1 (0.7)
Some college, < bachelor's degree	28.0 (1.6)	29.5 (0.3)	22.9 (1.2)	20.5 (0.6)
≥ bachelor's degree	34.4 (1.8)	26.5 (0.4)	28.1 (1.4)	25.1 (0.7)
Insurance status				
Private with or without public	71.1 (1.6)	66.6 (0.4)	62.0 (1.4)	56.2 (0.7)
Public only	18.2 (1.3)	10.1 (0.2)	37.9 (1.4)	43.0 (0.7)
None	10.7 (1.1)	23.3 (0.3)	0.1 (0.1)	0.8 (0.1)
Has a usual place of care				
Yes	90.3 (1.1)	76.1 (0.4)	98.1 (0.4)	95.7 (0.3)
No	9.7 (1.1)	23.9 (0.4)	1.9 (0.4)	4.3 (0.3)
Need factors				
No. of comorbidities				
0	43.9 (1.7)	70.3 (0.3)	20.3 (1.2)	27.3 (0.6)
1	31.8 (1.6)	20.8 (0.3)	34.6 (1.4)	32.7 (0.6)
2	16.3 (1.3)	6.5 (0.2)	27.6 (1.2)	25.2 (0.6)
≥ 3	8.0 (0.8)	2.4 (0.1)	17.6 (1.1)	14.9 (0.5)
Health status				
Excellent	17.0 (1.5)	32.9 (0.3)	11.5 (0.9)	15.7 (0.5)
Very good	26.6 (1.6)	33.4 (0.3)	21.2 (1.2)	27.9 (0.6)
Good	27.4 (1.6)	24.4 (0.3)	37.1 (1.3)	32.6 (0.6)
Fair	17.4 (1.4)	7.0 (0.2)	22.3 (1.2)	17.6 (0.5)
Poor	11.5 (1.2)	2.3 (0.1)	7.9 (0.7)	6.1 (0.4)
Has functional limitations				
Yes	47.2 (1.8)	23.3 (0.3)	65.4 (1.4)	56.0 (0.8)
No	52.8 (1.8)	76.7 (0.3)	34.6 (1.4)	44.0 (0.8)

Continued

(OR = 2.38), whereas there was little difference between Hispanic and non-Hispanic White cancer survivors (OR = 1.04; interaction $P = .008$). We noted no other differences in racial/ethnic disparities between younger survivors and nonsurvivors.

By contrast to the pattern observed in the younger age group, we observed significant racial/ethnic differences in both older survivors and men with no cancer history. There was a significant interaction between cancer history and race/ethnicity among older survivors only for primary care (overall interaction $P = .044$). Older African American men with no cancer history were more likely than were older non-Hispanic Whites to not see a primary care provider (OR = 1.53); however, there was no statistically significant difference between African American and non-Hispanic White cancer survivors (OR = 0.62; interaction $P = .013$). The difference in primary care between Hispanics and non-Hispanic Whites was similar for those with and those without a cancer history (OR = 1.76 and 1.77, respectively; interaction $P = .99$). We found no other significant differences in racial disparities between older survivors and nonsurvivors.

Racial/Ethnic Disparities Among Male Survivors

We observed different patterns of racial/ethnic disparities in younger and older survivors (Table 2). There were no racial/ethnic differences in any health care receipt outcome among younger survivors. For older survivors, non-Hispanic White men were least likely and Hispanic men were most likely to report lack of health care receipt in all outcomes except for primary care receipt. Among older survivors, approximately 39% of African Americans and 42% of Hispanics did not see a specialist in the past year, compared with 26% of older non-Hispanic Whites. Likewise, about 40% of African American and Hispanic cancer survivors did not receive the flu vaccination in the past year, compared with 22% of non-Hispanic White cancer survivors. Similarly, 51% of African American and 59% of Hispanic cancer survivors did not report receiving a pneumococcal vaccination, compared with 29% of non-Hispanic White cancer survivors.

TABLE 1—Continued

Cancer site or type				
Prostate	23.7 (1.6)	...	53.2 (1.4)	...
Melanoma	15.5 (1.4)	...	10.9 (0.9)	...
Hematologic	12.2 (1.2)	...	6.0 (0.8)	...
Colorectal	9.4 (1.0)	...	11.8 (0.9)	...
Testicular	7.7 (1.0)	...	0.5 (0.2)	...
Lung	4.2 (0.8)	...	5.5 (0.6)	...
Other	34.7 (2.0)	...	22.6 (1.2)	...
No. of cancers				
1	91.7 (1.0)	...	89.1 (0.8)	...
> 1	8.3 (1.0)	...	10.9 (0.8)	...
Time since diagnosis, y				
< 1	7.2 (1.0)	...	6.4 (0.7)	...
1-5	46.5 (1.8)	...	38.7 (1.5)	...
6-9	17.6 (1.4)	...	17.0 (1.1)	...
≥ 10	28.7 (1.6)	...	38.0 (1.4)	...

Note. GED = general equivalency diploma. Weighted percentages are presented. We categorized comorbidities to include hypertension, diabetes, heart disease, lung disease, and stroke. All comparisons between survivors and those with no cancer history are statistically significant.

Multivariable Models of Racial/Ethnic Disparities Among Cancer Survivors

In regression analyses, we examined the collective effect of predisposing, enabling, and need factors on the racial/ethnic disparities in health care receipt outcomes among male cancer survivors, stratified by age (Tables 3 and 4). Among younger survivors (Table 3), adding sets of the predisposing, enabling, and need factors to the crude model marginally increased the ORs for lack of specialist care receipt comparing African Americans to Non-Hispanic Whites from 1.29 to a high of 1.92. The enabling and need factors accounted for the greatest increase. The statistically significant difference did not emerge until we added the need factors. Younger African American cancer survivors were more likely (OR = 1.92) not to see a specialist in the past year than were younger non-Hispanic White cancer survivors. Adjusting for predisposing, enabling, and need factors had little impact on racial/ethnic differences in flu vaccination.

Among older survivors (Table 4), adding sets of the predisposing, enabling, and need factors to the crude model had little effect on the ORs for specialist care but slightly decreased the ORs for flu vaccination and pneumococcal vaccination, with significant racial/ethnic differences remaining. African American and

Hispanic survivors were more likely than were non-Hispanic White survivors to not see a specialist (OR = 1.78 and OR = 2.09, respectively), to not receive the flu vaccine in the past year (OR = 2.21 and OR = 2.20, respectively), and to not ever receive the pneumococcal vaccine (OR = 2.24 and OR = 3.10, respectively).

DISCUSSION

We have expanded current knowledge about health care utilization after cancer by exploring racial/ethnic disparities in health care receipt among cancer survivors compared with men with no cancer history. We found that racial/ethnic disparities among nonsurvivors are greater than are those among cancer survivors, specifically for primary care receipt among both age groups and specialist care receipt among the younger group. Although male cancer survivors have higher rates of health care receipt than do men with no cancer history, a surprisingly high number do not report use of important health care services, such as care by a specialist and receiving the flu vaccination. The finding that survivors are using health services more than are men with no cancer history is consistent with other population-based studies.^{27,38} However, it is concerning that nearly 20% of younger male

survivors reported they did not see a primary care provider in the past year. Almost 40% of younger survivors and 30% of older survivors did not see a specialist, presumably including oncologists.

Despite pertinent vaccination guidelines, 24% of older cancer survivors did not receive the flu vaccine and 32% did not receive the pneumococcal vaccine. These findings are consistent with other reports of health care use among cancer survivors.^{13,39} The reported lack of health care receipt raises questions about the adequacy of cancer-related follow-up care for male cancer survivors. Although cancer survivors need screening and treatment of recurrence and second cancers, they also merit regular medical care for noncancer comorbidities, such as diabetes and heart disease, and preventive care.¹⁹ Prior studies have demonstrated that colorectal cancer survivors are more likely to receive preventive care services when they see both oncology and primary care providers.^{13,24,26}

Our second aim was to assess racial/ethnic disparities in cancer survivors. We identified few racial/ethnic disparities among younger cancer survivors. Having cancer at a younger age is less common and, therefore, may enhance both need and motivation to seek health care services, whether driven by patients' or physicians' diligence. Racial/ethnic disparities were evident among older survivors, such that non-Hispanic Whites consistently reported more health care receipt than did African Americans and Hispanics, except for primary care receipt. Racial/ethnic differences may not exist in primary care receipt because of greater availability of primary care services and the need to access primary care as the first point of contact with specialized health care services.⁴⁰ Previous studies have reported similar racial/ethnic differences in health care use in the general US population³⁻⁶ and among cancer survivors in Surveillance Epidemiology and End Results–Medicare studies.^{13,24,26,27}

Our third aim was to determine whether the racial/ethnic disparities could be explained by predisposing, enabling, or need factors. Racial/ethnic disparities among older male survivors remained even after adjusting for factors related to health care receipt. This finding is consistent with previous reports of racial/ethnic differences in health care use in

TABLE 2—Racial/Ethnic Differences in Self-Reported Lack of Health Care Receipt in the Past Year Among Adult Men With and Without a Cancer History: National Health Interview Survey, United States, 2006–2010

	No Primary Care		No Specialist		No Flu Vaccine		No Pneumococcal Vaccine	
	% (SE)	OR (95% CI)	% (SE)	OR (95% CI)	% (SE)	OR (95% CI)	% (SE)	OR (95% CI)
Cancer survivors								
African American	11.3 (3.1)	0.52 (0.27, 0.99)	43.5 (5.3)	1.26 (0.81, 1.98)	59.3 (5.6)	1.04 (0.63, 1.71)		
Hispanic	19.6 (5.1)	0.99 (0.51, 1.93)	38.6 (6.9)	1.04 (0.57, 1.90)	65.1 (6.5)	1.33 (0.74, 2.40)		
White	19.8 (1.6)	1.00 (Ref)	37.8 (1.8)	1.00 (Ref)	58.4 (2.3)	1.00 (Ref)		
Nonsurvivors								
African American	43.6 (0.9)	1.25 (1.16, 1.34)	84.3 (0.6)	1.66 (1.52, 1.82)	81.0 (0.7)	1.26 (1.15, 1.38)		
Hispanic	56.6 (0.8)	2.10 (1.96, 2.25)	88.5 (0.5)	2.38 (2.16, 2.63)	85.0 (0.5)	1.68 (1.53, 1.84)		
White	38.3 (0.4)	1.00 (Ref)	76.4 (0.3)	1.00 (Ref)	77.2 (0.3)	1.00 (Ref)		
Interactions with cancer history								
Overall								
Non-Hispanic White and African American	.119		.594		.671			
Non-Hispanic White and Hispanic	<.001		<.001		<.001			
Interactions with cancer history								
Overall	.005		.019		.599			
Non-Hispanic White and African American	.008		.234		.455			
Non-Hispanic White and Hispanic	.028		.008		.44			
Cancer survivors								
African American	5.1 (1.6)	0.62 (0.31, 1.25)	39.3 (3.8)	1.82 (1.29, 2.57)	40.2 (4.2)	2.41 (1.64, 3.53)	51.0 (3.9)	2.54 (1.81, 3.57)
Hispanic	13.2 (5.0)	1.76 (0.73, 4.25)	41.7 (6.5)	2.01 (1.17, 3.47)	42.1 (6.8)	2.61 (1.47, 4.61)	59.1 (6.5)	3.52 (2.05, 6.05)
Non-Hispanic White	7.9 (0.8)	1.00 (Ref)	26.3 (1.3)	1.00 (Ref)	21.8 (1.4)	1.00 (Ref)	29.1 (1.4)	1.00 (Ref)
Nonsurvivors								
African American	21.6 (1.7)	1.53 (1.24, 1.90)	65.5 (2.0)	1.72 (1.43, 2.06)	50.7 (2.0)	1.97 (1.65, 2.34)	62.5 (1.7)	2.33 (2.00, 2.71)
Hispanic	24.1 (2.1)	1.77 (1.39, 2.26)	65.9 (1.6)	1.75 (1.51, 2.03)	46.9 (2.1)	1.69 (1.41, 2.02)	66.6 (2.1)	2.79 (2.30, 3.38)
Non-Hispanic White	15.2 (0.6)	1.00 (Ref)	52.5 (0.8)	1.00 (Ref)	34.3 (0.8)	1.00 (Ref)	41.7 (0.7)	1.00 (Ref)
Interactions with cancer history								
Overall	.044		.857		.27			.67
Non-Hispanic White and African American	.013		.77		.341			.653
Non-Hispanic White and Hispanic	.99		.626		.16			.412

Note. CI = confidence interval; OR = odds ratio.

TABLE 3—Association of Race/Ethnicity With Self-Reported Lack of Health Care Receipt Among Adult Men (Aged 18–64 Years) With a Cancer History: National Health Interview Survey, United States, 2006–2010

Reported Regression Estimate	No Primary Care Provider		No Specialist Provider		No Seasonal Flu Vaccination	
	OR (95% CI)	P	OR (95% CI)	P	OR (95% CI)	P
Unadjusted		.144		.537		.531
African American	0.53 (0.28, 1.00)		1.29 (0.82, 2.02)		1.07 (0.65, 1.76)	
Hispanic	0.99 (0.52, 1.92)		1.07 (0.59, 1.96)		1.41 (0.77, 2.56)	
Adjusted for predisposing factors		.132		.539		.663
African American	0.51 (0.26, 0.98)		1.30 (0.82, 2.06)		1.05 (0.62, 1.77)	
Hispanic	0.92 (0.48, 1.76)		1.04 (0.57, 1.88)		1.34 (0.71, 2.50)	
Adjusted for predisposing and enabling factors		.516		.272		.632
African American	0.67 (0.34, 1.32)		1.46 (0.92, 2.32)		1.16 (0.69, 1.95)	
Hispanic	0.95 (0.48, 1.89)		0.98 (0.52, 1.82)		1.35 (0.69, 2.63)	
Adjusted for predisposing, enabling, and need factors		.732		.045		.619
African American	0.76 (0.37, 1.52)		1.92 (1.14, 3.24)		1.17 (0.69, 1.98)	
Hispanic	0.93 (0.43, 2.00)		1.04 (0.53, 2.01)		1.37 (0.69, 2.74)	

Note. CI = confidence interval; OR = odds ratio. Reference group is non-Hispanic White. Adjusted models include only nonmissing data. Adjusted for predisposing factors (age and marital status), enabling factors (education, health insurance, and usual place of care), and need factors (comorbidities, health status, functional limitations, time since diagnosis, and number of cancer diagnoses). Sample includes only those with no missing covariates. The sample size was n = 1051.

the general US population.^{4,41} Although older men in this analysis were largely covered by Medicare, there may be differences in types of Medicare health plans and supplemental insurance (e.g., different copays). Weaver et al.²⁹ reported that African Americans (survivors and adults without a history of cancer) are more likely than are non-Hispanic Whites

to forgo medical care because of cost, with larger disparities in adults older than 65 years. This suggests that out-of-pocket expenses may be a barrier for this population.

Racial/ethnic disparities in health care receipt may also be attributed to factors we did not measure, including but not limited to patient-level factors, provider-level factors, and

health system factors.^{5,33} Future in-depth studies focusing on survivors are needed to further investigate the influence of these factors on disparities. Patient-level factors may include patients' health beliefs (i.e., attitudes, values, and knowledge), their perceived need for health care services, their views about physicians, and their preference. For example,

TABLE 4—Association of Race/Ethnicity With Self-Reported Lack of Health Care Receipt Among Adult Men (Aged ≥ 65 Years) With a Cancer History: National Health Interview Survey, United States, 2006–2010

Reported Regression Estimate	No Primary Care Provider		No Specialist Provider		No Seasonal Flu Vaccination		No Pneumococcal Vaccination	
	OR (95% CI)	P	OR (95% CI)	P	OR (95% CI)	P	OR (95% CI)	P
Unadjusted		.127		< .001		< .001		< .001
African American	0.57 (0.27, 1.19)		1.80 (1.26, 2.59)		2.40 (1.62, 3.54)		2.51 (1.77, 3.54)	
Hispanic	1.78 (0.74, 4.29)		2.06 (1.19, 3.56)		2.62 (1.48, 4.64)		3.51 (2.03, 6.04)	
Adjusted for predisposing factors		.173		< .001		< .001		< .001
African American	0.57 (0.27, 1.18)		1.78 (1.24, 2.56)		2.23 (1.50, 3.31)		2.42 (1.70, 3.43)	
Hispanic	1.52 (0.67, 3.43)		2.08 (1.22, 3.56)		2.64 (1.49, 4.65)		3.46 (2.03, 5.90)	
Adjusted for predisposing and enabling factors		.219		< .001		< .001		< .001
African American	0.52 (0.24, 1.13)		1.79 (1.23, 2.60)		2.14 (1.42, 3.23)		2.32 (1.62, 3.33)	
Hispanic	1.18 (0.51, 2.74)		2.01 (1.15, 3.52)		2.37 (1.31, 4.30)		3.14 (1.79, 5.48)	
Adjusted for predisposing, enabling, and need factors		.151		.002		< .001		< .001
African American	0.48 (0.22, 1.05)		1.78 (1.19, 2.68)		2.21 (1.45, 3.37)		2.24 (1.54, 3.24)	
Hispanic	1.22 (0.53, 2.82)		2.09 (1.18, 3.70)		2.20 (1.21, 4.01)		3.10 (1.75, 5.51)	

Note. CI = confidence interval; OR = odds ratio. Reference group is non-Hispanic White. Adjusted models include only nonmissing data. Adjusted for predisposing factors (age and marital status), enabling factors (education, health insurance, and usual place of care), and need factors (comorbidities, health status, functional limitations, time since diagnosis, and number of cancer diagnoses). Sample includes only those with no missing covariates. The sample size was n = 1663.

minority patients may choose not to tolerate discomfort from an injection or may have a mistrust of vaccinations,^{42,43} thereby contributing to health care disparities.

Future studies should examine differences in survivors' perceptions about the importance of various preventive health services after cancer and preferences for cancer-related follow-up care delivery by primary or specialty providers. Provider-level factors may include physician biases, patient-provider communication, and a lack of clarity about who should be responsible for follow-up care for cancer survivors. Even when patients seek health care having the same condition, race/ethnicity is associated with negative evaluations or lower rates of referral for clinical services.⁵ Studies with diverse populations of survivors should examine racial/ethnic differences in perceived patient-provider communication in the follow-up care setting, perceptions of care coordination, and perceived quality of follow-up care.

Finally, health system factors may include policy, resources, and organization. Fragmentation of health care can contribute to disparities, such that patients encounter different levels of coverage that influence the kinds and quality of services received.⁵ Beneficiaries of public insurance (e.g., Medicare) may be subject to health care systems that are financially strained, which may influence clinical practice norms. Likewise, this disparity may reflect the possibility that providers treating African American patients are less trained and less likely to recommend appropriate care than are providers treating non-Hispanic White patients.⁴⁴

It is important for future studies to examine more subtle differences in health insurance coverage among survivors (e.g., differences in supplemental Medicare coverage or enrollees in Medicare managed care) to determine how coordination and copay differences may affect health care utilization after cancer. It is also important to explore potential racial/ethnic differences when health care practitioners provide cancer-related follow-up care to survivors.

Limitations

The primary limitation of our study is that the NHIS is not linked to cancer registry or insurance claims data and may be subject to recall bias because it uses self-reported data. Future studies could use administrative claims

data sets such as the Surveillance Epidemiology and End Results–Medicare data to validate these findings. However, there is a trade-off in that Medicare claims data sets are restricted to adults older than 65 years and may lack data about potential predictors and covariates of health care use. Our study adds to the existing literature by using patient-level variables and including younger survivors and those with multiple cancers.

Second, we were underpowered to examine differences by cancer site; we suggest that future studies with larger subgroup samples include cancer site as a potential contributing factor. Third, we were limited in assessing the role of financial constraints. We used education as a proxy for socioeconomic status, which is highly associated with income,⁴⁵ but further studies are needed to explore the role of out-of-pocket costs and financial need.

Finally, the NHIS excludes cancer survivors residing in health care facilities; therefore, our results may not generalize to the subset of cancer survivors whose health is most fragile. Although there is an underrepresentation of minorities in the survivor sample compared with men with no cancer history, it is likely not because of racial/ethnic differences in the underreporting of cancer diagnoses. The number of African American and Hispanic male cancer survivors in our sample is low; however, our estimates are consistent with the Surveillance Epidemiology and End Results cancer registry prevalence data⁴⁶ and likely reflect differences in incidence, age of onset, and survival after cancer.

Conclusions

Cancer survivors require regular medical care to address cancer screening and surveillance, late and long-term effects of cancer and its treatment, and screening and treatment of noncancer comorbidities.¹⁹ Unfortunately, we do not know if more frequent physician visits yield better health outcomes. Future studies are needed to assess whether lower rates of health care receipt among racial/ethnic minority male survivors are associated with lower receipt of cancer-related follow-up care and poorer health outcomes.

We found that racial/ethnic disparities in health care receipt among older male cancer survivors persisted even after adjusting for

sociodemographic, health care access, and medical need factors. These results indicate that older minority male survivors may not be receiving appropriate follow-up and preventive care, a particular concern for those with more comorbidities. Further study is merited to identify patient-level, provider, or health system factors that may influence racial/ethnic disparities among male survivors and may be amenable to change with targeted interventions. It is also important to document the impact that reduced health care receipt may have on mental and physical health functioning. Overall, our results suggest that older minority male cancer survivors may need specific support to ensure receipt of necessary posttreatment health care. ■

About the Authors

Nymikka R. A. Palmer, Ann M. Geiger, Lingyi Lu, L. Douglas Case, and Kathryn E. Weaver are with the Division of Public Health Sciences, Wake Forest School of Medicine, Winston-Salem, NC. Tisha M. Felder is with the South Carolina Cancer Prevention and Control Program, University of South Carolina, Columbia.

Correspondence should be sent to Kathryn Weaver, PhD, MPH, Division of Public Health Sciences, Department of Social Sciences and Health Policy, Wake Forest School of Medicine, Medical Center Boulevard, Winston-Salem, NC 27157 (e-mail: keweaver@wakehealth.edu). Reprints can be ordered at <http://www.ajph.org> by clicking the "Reprints" link.

This article was accepted September 30, 2012.

Contributors

N. R. A. Palmer was responsible for the study concept and design with input from A. M. Geiger, T. M. Felder, and K. E. Weaver. N. R. A. Palmer wrote the initial draft of the article and all coauthors participated in reviewing and revising drafts. L. Lu and L. D. Case conducted data analyses, and all authors assisted with the interpretation of the data.

Acknowledgments

The National Cancer Institute, National Institutes of Health (awards 1R03CA156641 to A. M. G., L. L., L. D. C., and K. E. W. and 5R25CA122061 to N. R. A. P.) supported this research.

This research was presented in part at the Sixth Biennial Cancer Survivorship Research Conference: Translating Science to Care; June 14–16, 2012; Arlington, VA (poster presentation A-67).

We thank Karen Klein for her editing expertise.

Note. This article reflects the views of the authors and does not reflect any official position of the National Institutes of Health.

Human Participant Protection

This study was reviewed and granted exemption status from the Wake Forest School of Medicine institutional review board as a secondary data analysis of deidentified publicly available data.

References

- Pinkhasov RM, Wong J, Kashanian J, et al. Are men shortchanged on health? Perspective on health care utilization and health risk behavior in men and women in the United States. *Int J Clin Pract*. 2010;64(4):475–487.
- Vaidya V, Partha G, Karmakar M. Gender differences in utilization of preventive care services in the United States. *J Womens Health (Larchmt)*. 2012;21(2):140–145.
- Centers for Disease Control and Prevention. CDC health disparities and inequalities report—United States, 2011. *MMWR Surveill Summ*. 2011;60(suppl):1–2.
- Dunlop DD, Manheim LM, Song J, Chang RW. Gender and ethnic/racial disparities in health care utilization among older adults. *J Gerontol B Psychol Sci Soc Sci*. 2002;57(4):S221–S233.
- Smedley BD, Stith AY, Nelson AR; Institute of Medicine. *US Committee on Understanding and Eliminating Racial and Ethnic Disparities in Health Care. Unequal Treatment: Confronting Racial and Ethnic Disparities in Health Care*. Washington, DC: National Academy Press; 2003.
- Vargas Bustamante A, Chen J, Rodriguez HP, Rizzo JA, Ortega AN. Use of preventive care services among Latino subgroups. *Am J Prev Med*. 2010;38(6):610–619.
- American Cancer Society. *Cancer Facts and Figures for African Americans 2011–2012*. Atlanta, GA: American Cancer Society; 2011.
- Gornick ME. A decade of research on disparities in Medicare utilization: lessons for the health and health care of vulnerable men. *Am J Public Health*. 2008;98(9 suppl):S162–S168.
- Shavers VL. Measurement of socioeconomic status in health disparities research. *J Natl Med Assoc*. 2007;99(9):1013–1023.
- 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.
- Mayberry RM, Mili F, Ofili E. Racial and ethnic differences in access to medical care. *Med Care Res Rev*. 2000;57(4 suppl):108–145.
- Ward E, Halpern M, Schrag N, et al. Association of insurance with cancer care utilization and outcomes. *CA Cancer J Clin*. 2008;58(1):9–31.
- Earle CC, Neville BA. Under use of necessary care among cancer survivors. *Cancer*. 2004;101(8):1712–1719.
- American Society of Clinical Oncology. Health disparities in the United States: facts and figures. 2009. Available at: <http://www.asco.org>. Accessed February 10, 2011.
- Casillas J, Ayanian JZ. Disparities in care for cancer survivors. In: Feuerstein M, Ganz PA, eds. *Health Services for Cancer Survivors*. New York, NY: Springer; 2011: 153–168.
- Chornokur G, Dalton K, Borysova ME, Kumar NB. Disparities at presentation, diagnosis, treatment, and survival in African American men, affected by prostate cancer. *Prostate*. 2011;71(9):985–997.
- Morris AM, Rhoads KF, Stain SC, Birkmeyer JD. Understanding racial disparities in cancer treatment and outcomes. *J Am Coll Surg*. 2010;211(1):105–113.
- White A, Vernon SW, Franzini L, Du XL. Racial and ethnic disparities in colorectal cancer screening persisted despite expansion of Medicare's screening reimbursement. *Cancer Epidemiol Biomarkers Prev*. 2011;20(5):811–817.
- Hewitt ME, Greenfield S, Stovall E, eds; US National Cancer Policy Board, Committee on Cancer Survivorship. *Improving Care and Quality of Life. From Cancer Patient to Cancer Survivor: Lost in Transition*. Washington, DC: National Academies Press; 2006.
- Sunga AY, Eberl MM, Oeffinger KC, Hudson MM, Mahoney MC. Care of cancer survivors. *Am Fam Physician*. 2005;71(4):699–706.
- Centers for Disease Control and Prevention. Prevention and control of influenza with vaccines: recommendations of the Advisory Committee on Immunization Practices (ACIP), 2010. *MMWR Recomm Rep*. 2010;59(RR-8):1–62.
- Centers for Disease Control and Prevention. Cancer, the flu, and you: what cancer patients, survivors, and caregivers should know about the flu. Available at: <http://www.cdc.gov/cancer/flu>. Accessed July 17, 2012.
- Earle CC. Quality of non-breast cancer health maintenance among elderly breast cancer survivors. *J Clin Oncol*. 2003;21(8):1447–1451.
- Snyder CF, Earle CC, Herbert RJ, Neville BA, Blackford AL, Frick KD. Preventive care for colorectal cancer survivors: a 5-year longitudinal study. *J Clin Oncol*. 2008;26(7):1073–1079.
- Snyder CF, Frick KD, Peairs KS, et al. Comparing care for breast cancer survivors to non-cancer controls: a five-year longitudinal study. *J Gen Intern Med*. 2009;24(4):469–474.
- Snyder CF, Earle CC, Herbert RJ, Neville BA, Blackford AL, Frick KD. Trends in follow-up and preventive care for colorectal cancer survivors. *J Gen Intern Med*. 2008;23(3):254–259.
- Snyder CF, Frick KD, Herbert RJ, et al. Preventive care in prostate cancer patients: following diagnosis and for five-year survivors. *J Cancer Surviv*. 2011;5(3):283–291.
- National Center for Health Statistics. *Data File Documentation, National Health Interview Survey* [machine-readable data file and documentation]. Hyattsville, MD: Centers for Disease Control and Prevention; 2006–2010.
- Weaver KE, Rowland JH, Bellizzi KM, Aziz NM. Forgoing medical care because of cost. *Cancer*. 2010;116(14):3493–3504.
- Yabroff KR, Lawrence WF, Clauser S, Davis WW, Brown ML. Burden of illness in cancer survivors: findings from a population-based national sample. *J Natl Cancer Inst*. 2004;96(17):1322–1330.
- McGlynn EA, Asch SM, Adams J, et al. The quality of health care delivered to adults in the United States. *N Engl J Med*. 2003;348(26):2635–2645.
- Jha AK, Perlin JB, Kizer KW, Dudley RA. Effect of the transformation of the Veterans Affairs Health Care System on the quality of care. *N Engl J Med*. 2003;348(22):2218–2227.
- Andersen RM. Revisiting the behavioral model and access to medical care: does it matter? *J Health Soc Behav*. 1995;36(1):1–10.
- Pratt LA. Serious psychological distress, as measured by the K6, and mortality. *Am Epidemiol*. 2009;19(3):202–209.
- Hewitt M, Rowland JH, Yancik R. Cancer survivors in the United States: age, health, and disability. *J Gerontol A Biol Sci Med Sci*. 2003;58(1):82–91.
- Centers for Disease Control and Prevention. Prevention of pneumococcal disease: recommendations of the Advisory Committee on Immunization Practices (ACIP). *MMWR Recomm Rep*. 1997;46(RR-8):1–24.
- SAS version 9.1.2. Cary, NC: SAS Institute; 2004.
- Centers for Disease Control and Prevention. Surveillance of demographic characteristics and health behaviors among adult cancer survivors—behavioral risk factor surveillance system, United States, 2009. *MMWR Surveill Summ*. 2012;61(suppl 1):1–23.
- Egede LE, Zheng D. Racial/ethnic differences in influenza vaccination coverage in high-risk adults. *Am J Public Health*. 2003;93(12):2074–2078.
- Starfield B, Shi L, Macinko J. Contribution of primary care to health systems and health. *Milbank Q*. 2005;83(3):457–502.
- Rangel MC, Shoenbach VJ, Weigle KA, Hogan VK, Strauss RP, Bangdiwala SI. Racial and ethnic disparities in influenza vaccination among elderly adults. *J Gen Intern Med*. 2005;20(5):426–431.
- Armstrong K, Berlin M, Schwartz JS, Propert K, Ubel PA. Barriers to influenza immunization in a low-income urban population. *Am J Prev Med*. 2001;20(1):21–25.
- Harris LM, Chin NP, Fiscella K, Humiston S. Barrier to pneumococcal and influenza vaccinations in Black elderly communities: mistrust. *J Natl Med Assoc*. 2006;98(10):1678–1684.
- Bach PB, Pham HH, Schrag D, Tate RC, Hargraves JL. Primary care physicians who treat Blacks and Whites. *N Engl J Med*. 2004;351(6):575–584.
- Corrieri S, Heider D, Matschinger H, Lehnert T, Raum E, König H-H. Income-, education- and gender-related inequalities in out-of-pocket health-care payments for 65+ patients—a systematic review. *Int J Equity Health*. 2010;9:20.
- Surveillance epidemiology and end results. National Cancer Institute. Available at: <http://seer.cancer.gov/faststats/index.php>. Accessed January 4, 2012.