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Decomposing Differences in Medical Care Access Among Cancer Survivors by Race and Ethnicity

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Abstract

More research is needed to identify significant factors that explain why minority cancer survivors ages 18-64 are more likely to delay or forgo care when compared with whites. Data were merged from the 2000-2011 National Health Interview Survey to identify 12,125 adult survivors who delayed care due to cost, organization and transportation barriers. The Fairlie decomposition technique was applied to explore contributing factors. Compared to whites, Hispanics were more likely to delay medical or treatment due to organizational barriers (OR: 1.38; $p < .05$) and African Americans were more likely to delay care due to transportation barriers (OR: 1.54; $p < .05$). Age, insurance, perceived health, comorbidity, nativity and year were leading factors that contributed to the disparities. While expanded insurance coverage through the Affordable Care Act is expected to increase access, it is important to recognize the role of organizational convenience and transportation in facilitating timely health services for survivors.

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Introduction

The number of cancer survivors increased by 50% in the last decade, from nine million in 2002 to 13.7 million in 2012.^{1,2} The incidence of cancer in 2012 alone reached 1.6 million people and the number is projected to increase by 45% by 2030 (1.6 million to 2.3 million); racial and ethnic minorities are expected to represent 28% of the cases.³ The gravity of these statistics cannot be overlooked, realizing that racial and ethnic disparities in treatment, outcome, and mortality continue to exist.⁴⁻⁸ This is especially important since Hispanics are the fastest growing segment of the American population and minorities are projected to represent the majority of the population by 2050.⁹

In light of these projections, when compared to the general population, cancer survivors are more likely to report lower perceived health status, psychological distress, poorer mental health, greater role impairment due to emotional problems and poorer social well-being;^{2,10-13} and minority survivors are disproportionately impacted.^{4-6,14} Inequities associated with cost, organizational, and transportation barriers are partially responsible for these racial and ethnic differences.¹⁵⁻²⁰

The Affordable Care Act (ACA) is expected to help increase access to care and promote continuity of care for cancer survivors.²¹ As components of the legislation are phased in through 2019, it is important to consider the growing numbers of minorities, greater cancer incidence projections and the current capacity of medical providers. Nationally representative investigations are needed to examine access barriers across racial/ethnic survivors. Furthermore, exploration of trends using an adult sample (ages 18-64) will complement prior studies that have focused on barriers among those with Medicare. Deeper analyses aimed at uncovering contributing factors to access disparities by race/ethnicity will help shape policy and practice that will: 1) improve survivors' quality of life, 2) help close the gap in treatment and mortality disparities; and 3) strengthen national healthcare reform efforts.

This study examines the likelihood of cost, organizational, and transportation barriers in delaying or forgoing medical care for whites, African Americans and Hispanics. While a number of investigations have examined access barriers among cancer survivors,^{15,22-25} this 11-year analysis contributes to the literature by examining the magnitude of the disparity by race and ethnicity and by decomposing social-demographic contributing factors. Findings will support more culturally-tailored interventions and services aimed at increasing the percentage of minority cancer survivors who have access to timely care.

Conceptual Framework

The Andersen Model of Behavioral Health Services Use focuses on predisposing, enabling, and need factors.²⁶ Predisposing factors include demographics, social characteristics or individual beliefs about health services. Enabling factors include access to prerequisite resources and the availability of health services in the local community. Need refers to an individual's perceived severity of illness and subsequently, the need for accessing health services.²⁶

Described as the concept of “fit” between the patient's needs and the system's ability to meet those needs, Penchansky and Thomas's five Dimensions of Access guided the study.²⁷ Accessibility captures the relationship between location of supply and location of clients. Accommodation refers to the state in which supply services are organized and able to meet client specific needs. Availability is defined as the relationship between need and physical availability. Affordability is based on the relationship of prices or fees and the clients' perception of value. Acceptability is defined as the relationship of clients' service expectations compared to what is actually delivered.^{17,27} In this study, three outcome variables that are linked to four dimensions are examined: delayed care due to cost (Affordability) delayed care due to organizational barriers (Accommodation), and delayed care due to transportation (Availability, Accessibility). Due to survey limitations, outcome measures that explore Acceptability barriers are not explored.

Methods

Data from the 2000-2011 National Health Interview Survey (NHIS) were merged and analyzed to achieve a sufficient sample size. The NHIS is based on approximately 35,500 households or 87,500 persons in the noninstitutionalized civilian population in the United States.²⁸ The survey is designed to track the incidence and prevalence of illness, accidental injuries, the prevalence of chronic conditions and impairments, the extent of disability, and the utilization of healthcare services. The NHIS survey design includes clustering, stratification, and multistage sampling. A different sample population is identified each year. African Americans and Hispanics are over sampled.²⁸

Survivors are defined as persons age 18-64 who reported “ever having” any form of cancer.²⁹ Due to sample size limitations, racial/ethnic groups are restricted to white, African American and Hispanic. Binary variables are constructed for each of the survey questions. Three dependent variables are explored and some survey questions are collapsed for sufficient sample size.

1. Delay or forgo medical care or treatment because of cost (Affordability). Includes four different questions: a) did not obtain medications because of cost; b) did not obtain care because of cost; c) delayed care because of cost; and d) did not obtain mental health because of cost.
2. Delay medical care because of organizational barriers (Accommodation). Includes four different questions: a) delay care because doctor's office not open; b) delayed care because could not get through on the phone; c) delay care because the wait is too long in the doctor's office; and d) delay care because could not get an appointment soon enough.
3. Delay medical care because of lack of transportation (Accessibility).

Independent Variables

Predisposing factors controlled in this study include: sex, age, marital status (never married or married/widowed/divorced/separated), education (no degree, high school/GED, some college or more), income (<\$24,999, 25,000-54,999, 55,000-74,999, >75,000) region,

(West, Northeast, North/Central/Midwest, South) language of interview (English, Spanish or other) which served as a proxy for native language and nativity. Enabling factors include insurance (uninsured, public, private insurance), and usual source of care (yes, no). Need factors include perceived health status (poor, fair, good, very good, excellent) and comorbidities (no,yes). Comorbidities include the presence of one or more noncancerous conditions that typically require medical attention within the past 12 months: coronary artery disease, stroke, liver conditions, diabetes, heart conditions, hypertension, weak or failing kidneys, arthritis, ulcer, asthma, and bronchitis. A binary variable that equaled 1 was constructed for those who had any of the conditions and 0 otherwise.

Data Analysis

First, the demographic characteristics of adults with a history of cancer are summarized by race and ethnicity (Table 1). Second, multivariate logistic regressions are applied to estimate the likelihood of delaying or forgoing medical care or treatment because of cost, organizational, and transportation barriers (Table 2). Race and ethnicity, and other covariates are controlled in the regressions. Race and ethnicity classifications are in accordance with the Office of Management and Budget. Year indicators are controlled to measure aggregated market changes over the 11-year period.

Lastly, the Fairlie decomposition method is applied to decompose the mean differential for each dependent variable between whites (reference) and African Americans and Hispanics³⁰ (Table 3). In order to obtain robust standard errors, bootstrapping is conducted at 100 simulation. The output of the model expresses the predicted probability for each race/ethnic group in reporting barriers. After controlling for all covariates, the output also allows for the calculation of a total explained percentage, which represents how much of the observed characteristics are explained by the model. Statistically significant independent variables that contribute to the disparities are presented. Stata 12.0 survey commands are used for all analyses to account for sample weighting and the complex survey design for correct variance estimation.

Results

Table 1 provides characteristics of the sample population. There were 12,125 adults who reported ever having at least one or more forms of cancer: white – 9,951 (82.0%); African American – 1,143 (9.4%); Hispanic – 1,033 (8.5%). Out of the 12,125, the majority were women (67.2%). The majority of white respondents were married (44.0%); 47.0% of African Americans and 41.2% of Hispanics were widowed, divorced or separated. The majority of survivors across all groups self-reported a perceived health status as good, very good, or excellent. Sixty percent (60.3%) of all respondents attained education beyond high school. The majority of white (58.0%), African American (68.0%) and Hispanics (66.8%) reported annual incomes below \$24,999. More than 90% of survivors reported a usual source of care. Compared to whites, private insurance for African Americans and Hispanics was 15.1 and 14.3 percentage points lower, respectively. The interview was conducted in Spanish with 24.5% of Hispanics. Almost half (48.7%) of Hispanics in the sample were not US born.

Compared to whites, African Americans and Hispanics were more likely to report cost, organizational, and transportation barriers ($p<.05$). There was a 30.5 percentage point gap between Hispanics and whites who reported cost barriers, 53.7% vs. 23.2%, respectively. The percentage of African Americans (7.7%) who reported transportation barriers was higher than whites (2.8%) and Hispanics (5.1%) ($p<.05$).

To determine the overall percentage of survivors by race and ethnicity who did not receive timely care due to all of the barriers combined, the three outcome measures are collapsed into one dummy variable. Trends are assessed by plotting those percentages by race/ethnicity over the 11-year period (Figure 1). Findings illustrate a modest increase in the percentages of minority survivors who reported barriers over the 11-year period. The 11-year percent average of those who did not receive timely care due those barriers was highest among Hispanics (42.0%) followed by African Americans (39.4%) and whites (32.5%).

Multivariate Regression and Decomposition Results

Table 2 displays the adjusted model of cancer survivors who did not receive timely care due to cost, organizational and transportation barriers. Adjusted odds ratios for each independent variable by race and ethnicity are presented and reported at a 95% confidence interval. The model controls for all independent variables, including year.

Cost Barriers

There were no statistically significant findings in cost barriers between whites and minorities (Table 2). Compared to those between the ages of 18-24, survivors between the ages of 55-64 were least likely to delay care because of cost (OR .45; $p<.001$). Widowed, divorced or separated survivors were also more likely to report cost barriers (OR 1.48 $p<.001$) compared to those who were never married. There was also a negative correlation between perceived health status and likelihood to delay care or treatment because of cost – the better the perceived health, the less likely to delay or forgo care. Survivors with comorbidities and no usual source of care were also more likely to delay or forgo health services due to cost (OR 1.41, OR 2.55; $p<.001$, respectively). Compared to those who were uninsured, survivors with private and public insurance were less likely to delay (OR .27 $p<.001$; OR .38 $p<.001$ respectively). Residents of the Western region were least likely to delay care because of cost compared to residents of other regions. There were also significant findings in the likelihood for survivors to delay care due to cost in years 2004-2005 (consecutively) compared to 2000 (reference)

Table 3 presents the results of the decomposition model. The top panel presents the results of the predicted likelihood of delaying/forgoing any care for each race/ethnicity group. The bottom panel lists individual factors associated the disparities. Decomposition estimations controlled for all explanatory variables. Variables that are significantly associated with access disparities are reported.

The predicted probability of delaying care or treatment due to cost was .29 for Whites, .35 for African Americans and .40 for Hispanics. The observed differences in cost barriers explain 99% of disparities in African Americans and 34% of disparities in Hispanics when compared to Whites. Insurance and perceived health were significant explanatory variables

associated with cost disparities among African Americans and Hispanics. Comorbidity was an explanatory variable that was unique for African Americans and insurance, health status, nativity and year were significant factors in delaying care due to cost between whites and Hispanics.

Organizational Barriers

Hispanics were more likely to delay care due to organizational barriers (OR 1.38 $p<.05$) than Whites (reference) (Table 2). There were also negative correlations between the survivors' age and likelihood to delay care because of organizational barriers – the younger the survivor, the greater the likelihood to delay. Consistent with cost barriers, the better the perceived health, the less likely to delay or forgo care because of organizational barriers. Persons with comorbidities (OR 1.48 $p<.001$) and public insurance (OR 1.40 $p<.001$) were also more likely to delay care due to organizational issues. Survivors who reside in the South (OR 1.46 $p<.001$) were also more likely to report organizational barriers, compared to those who reside in the west (reference). Year 2011 was the only year in which survivors were more likely to delay due to organizational barriers (OR 1.44 $p<.05$); 2000 (reference).

The predicted probability of delaying care due to organizational barriers was .14 for whites, .18 for African Americans and .22 for Hispanics (Table 3). The decomposition model explained 53% of the observed differences in the African American population. Private insurance and perceived health status were key factors associated with the disparity in African Americans. While the model explained 13% of the organizational access disparities in Hispanics, there were no significant findings of variables that contribute to the disparity.

Transportation Barriers

Compared to whites, African Americans were more likely to delay care due to transportation (OR 1.54 $p<.001$) (Table 2). Widowed, separated or divorced survivors were more likely to delay care due to transportation barriers than those who were never married (OR 1.39 $p<.05$). Consistent with cost and organizational barriers, there was a negative correlation between perceived health status and likelihood to delay because of transportation – the better the perceived health, the less likely to delay or forgo care because of transportation. Survivors with comorbidities (OR 1.63 $p<.001$) and public insurance (OR 1.87 $p<.001$) were also more likely to experience transportation barriers while those with private insurance were least likely to experience these barriers (OR .35 $p<.001$). Year 2009 was the only year in which survivors were more likely to experience transportation barriers (OR 2.12 $p<.05$) compared to 2000 (reference).

The predicted probability of delaying care due to transportation was .03 for whites, .09 for African Americans and .06 for Hispanics (Table 3). The transportation decomposition model explained 58% of the observed differences in African Americans and 8% of the observed differences in Hispanics. Perceived health was the only factor associated with the disparity between whites and African Americans. The model could not explain significant contributing factors to transportation access disparities in the Hispanic population.

Discussion

This study contributes to the literature by exploring factors that may explain access disparities between white and minority survivors. Insurance was an enabling factor that contributed to disparities in preventing or delaying care due to cost in African Americans and Hispanics compared to whites. Findings suggest that African Americans and Hispanics are not as likely to experience cost barriers when they have access to public insurance. Furthermore, the disparity in delaying care due to cost can be explained by minorities having disproportionate access to private insurance when compared to whites.

Through Medicaid expansion and health insurance exchanges, the provisions of the ACA are expected to help close the gap in delaying care or treatment due to costs.^{21,31} However, findings suggest that increasing access to public and private insurance alone will only partially address the disparity. Enabling factors, such as transportation and organizational barriers play a key role.^{16,18} According to the adjusted model, African Americans and Hispanics with public insurance were more likely to delay care due to transportation barriers and African American survivors were more likely to experience transportation challenges than whites. A number of investigations provide insight into the causes of this phenomena: 1) Communities of color are more likely to be medically underserved, requiring patients to travel farther distances for care;^{32–34} 2) Primary care physicians may be less likely to accept patients with Medicaid or other forms of public insurance, requiring them to travel farther distances;^{35–37} and 3) Minorities are more likely to seek racially and linguistically concordant providers.^{8,38,39} These preferences, coupled with national shortages of minority providers, may contribute to increased travel time and associated expenses.^{8,39,40} Policies and patient management practices that acknowledge the relevance of these factors in facilitating care should be supported and implemented.

Lewin-Epstein (1991) describes a usual source of care as the patient's entry point into a complex and bureaucratic healthcare system that promotes continuity and links patients to specialty care and other support services.⁴¹ These findings corroborate the relationship between a usual source of care and reporting cost as a barrier. Survivors without a usual source of care were 2.5 times more likely to report cost as a barrier. Therefore, there are opportunities to close the gap in cost barriers by implementing comprehensive efforts to increase the number of survivors with a usual source of care.

In the wake of national efforts to increase access to a usual source of care, timely receipt of care will rely upon convenient and responsive access to providers. Ease of obtaining an appointment, hours of operation, wait times and other patient-centered factors are relevant factors for increasing access-to-care for minority populations.⁴² Deficiencies in these areas result in treatment delays and exacerbation of health issues.⁴³

Compared to whites, Hispanic survivors were more likely to delay care due to organizational barriers. Nativity was identified as a contributing factor to cost related barriers between White and Hispanics. Unobserved factors, such as cultural background, complex or confusing health policies or procedures, and limited orientation to a system of care also contribute to organizational access barriers.^{8,14,42,44} One strategy that has been effective in

breaking down acculturation barriers has been the inclusion of patient navigators in the practice model.¹⁴ Cancer care providers can take advantage of patient navigator demonstration projects funded by the Department of Health and Human Services as part of the ACA.⁴⁵ Providers may also consider employing navigators or developing linkages with organizations that employ navigators. These efforts will improve access to timely and appropriate care, help retain persons in care, and ultimately reduce or eliminate racial/ethnic cancer mortality disparities.

It is clear that the current capacity of the nation's healthcare system cannot support the 32 million Americans expected to benefit from expanded coverage; 13 million of whom are projected to be Medicaid beneficiaries.⁴⁶ Again, these projections are especially relevant since persons with Medicaid were more likely to encounter organizational barriers even when other predisposing, enabling and need factors are controlled. While the ACA does include funding initiatives that address these issues, there are opportunities for surveillance and future research to examine how minority cancer survivors and those with Medicaid fare post ACA implementation.

Perceived need is explored by including perceived health and comorbidity in the decomposition model. Perceived health was a significant explanatory variable in the cost model for African American and Hispanic survivors. The difference is likely due to poorer health status associated with higher acuity and comorbidities that may have been exacerbated by underinsurance, caused by the absence of preventive care.^{4,6,7,24} Again, this may be the result of a higher population of Hispanics with comorbidities and exacerbated conditions caused by delaying or forgoing care over time.^{8,47}

Based on the 11-year analysis, consecutive annual trends in the likelihood of survivors to delay care or treatment from years 2004-2011 were found. This finding is noteworthy since adjusted odds ratios range from 2.45($p<.001$) to 3.37($p<.001$) compared to 2000 (reference). Since this time period overlaps with the Great Recession of 2007-2009⁴⁸, findings corroborate prior investigations that have found a downward trend in health services utilization across racial and ethnic populations during the recession.^{49,50} African American survivors in the North/Central/Midwest, Northeast, and Southern regions of the United States and Hispanics in the South may have been especially burdened by the recession.

As a result of these findings, a plethora of survivors delayed medical care. Comprehensive efforts should be underway to help survivors understand the ACA, their respective entitlements, as well as various modalities for enrolling and accessing services. These types of initiatives will be instrumental for promoting continuity of subsequent care.

Limitations

There are several limitations to highlight. First, the NHIS questionnaire relies on patient recall and thus survey answers may have recall bias. Second, co-morbidities were restricted to only eleven health conditions. Third, in order to achieve a sufficient sample size, anyone who reported one or more forms of cancer were collapsed into one dataset. Therefore, access-to-care barriers could not be analyzed by cancer type. Fourth, the NHIS did not collect respondent's type of community during the time period (i.e. rural, metropolitan,

suburban); therefore, transportation barrier by type of community could not be analyzed. Fifth, the NHIS questions do not specifically ask if delayed care was directly related to cancer care services; therefore, it cannot be assumed that reported delays were directly associated with cancer treatment or services that facilitate treatment. Finally, the NHIS does not collect information about survivors' cancer stage, so acuity levels could not be controlled.

Conclusion

Findings from this study suggest that cost, organizational, and transportation barriers negatively impact survivors' ability to obtain timely care. Differences by race and ethnicity corroborate the need for culturally-tailored research, policies, and practice. Furthermore, widespread communication is needed to ensure survivors understand the ACA and how they may benefit. Collectively, these efforts will promote health equity and improve quality of life for all cancer survivors.

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Figure 1. Percent of Cancer Survivors who Delayed Care Due to all Barriers Combined

Table 1
Demographic Characteristics of Adults with a History of Cancer

	Whites n(%)	African Americans n(%)	Hispanics n(%)
Outcome Variables			
<i>Delay/forgo due to cost barriers</i>	2320(23.2)	360(31.5)*	362(53.7)*
<i>Delay due to organizational barriers</i>	1333(13.3)	192(16.8)*	200(19.3)*
<i>Delay due to transportation barriers</i>	274(2.8)	87(7.7)*	52(5.1)*
Sex			
Male	3414(34.8)	328(28.8)	232(23.9)
Female	6537(65.2)	813(71.2)	801(76.1)
Age			
18-24	262(2.9)	35(3.7)	46(4.4)
25-34	779(7.7)	107(9.8)	135(12.2)
35-44	1558(15.1)	168(15.9)	244(23.1)
45-54	2938(29.3)	340(29.0)	299(29.2)
55-64	4432(45.0)	493(41.6)	312(31.1)
Marital Status			
Never married	1308(16.6)	308(31.0)	179(19.7)
Married	3429(44.0)	215(22.0)	332(39.1)
Widowed/divorced/separated	3266(39.4)	508(47.0)	382(41.2)
Perceived Health Status			
Poor	788(7.9)	166(13.0)	130(11.7)
Fair	1525(15.3)	340(28.9)	248(22.5)
Good	2863(28.6)	355(32.3)	341(34.2)
Very good	2836(28.8)	196(18.4)	200(20.8)
Excellent	1921(19.6)	82(7.4)	112(10.8)
Comorbidity			
No	4273(43.1)	304(27.0)	453(42.0)
Yes	5678(56.9)	837(73.0)	580(58.0)
Education			
No degree	933(9.3)	256(22.6)	345(29.6)
High school	2646(26.3)	317(28.6)	250(23.6)
College or more	6335(64.4)	550(48.8)	436(46.8)
Income			
<\$24,999	4636(58.0)	685(68.0)	621(66.8)
\$25,000-\$54,999	2209(28.2)	202(21.2)	188(21.9)
\$55,000-\$74,999	686(8.6)	44(4.8)	30(3.5)
>\$75,000	422(5.2)	55(6.0)	68(7.8)
Usual Source of Care			
Yes	9190(92.1)	1055(92.3)	904(87.5)
No	771(7.9)	86(7.7)	129(12.5)

	Whites n(%)	African Americans n(%)	Hispanics n(%)
Insurance			
Uninsured	1018(10.2)	177(16.0)	235(21.5)
Public	4354(39.9)	585(49.2)	471(42.9)
Private	4579(49.9)	379(34.8)	327(35.6)
US Region			
West	1684(18.2)	148(13.6)	165(17.8)
Northeast	2541(25.5)	260(23.6)	88(9.3)
North Central/Midwest	3574(36.2)	621(55.1)	381(37.1)
South	2152(20.1)	112(7.7)	399(35.8)
Interview Language			
English	9910(99.9)	1137(100)	742(75.5)
Spanish or other	7(<.01)	-	289(24.5)
Nativity			
US Born	9654(97.0)	1092(95.7)	526(52.3)
Non US born	293(2.9)	49(4.3)	500(48.7)

Note: n=12,125 –categories may not equal due to missing values;

* = p<.05 using independent t-tests; Data Source: National Health Interview Survey, 2000-2011

Multivariate Logistic Regression: Survivors who Delay or Forgo Medical Care due to Cost, Organizational and Transportation Barriers

Table 2

	Cost Barriers			Organizational Barriers			Transportation Barriers		
	OR (95% CI)	P-value		OR (95% CI)	P-value		OR (95% CI)	P-value	
Race/Ethnicity									
Whites	1.00 (ref)			1.00(ref)			1.00(ref)		
African Americans	0.92	0.34		1.01	0.83		1.54	0.00	
Hispanics	1.24	0.06		1.38	0.01		1.45	0.19	
Age									
18-24	1.00(ref)			1.00(ref)			1.00(ref)		
25-34	1.23	0.19		0.84	0.42		0.45	0.02	
35-44	1.00	0.06		0.70	0.05		0.54	0.05	
45-54	0.79	0.14		0.55	0.00		0.35	0.00	
55-64	0.45	0.00		0.46	0.00		0.28	0.00	
Marital Status									
Never married	1.00(ref)			1.00(ref)			1.00(ref)		
Married	0.67	0.00		0.89	0.30		0.71	0.13	
Widowed/divorced/separated	1.48	0.00		0.94	0.54		1.39	0.05	
Perceived Health									
Poor	1.00(ref)			1.00(ref)			1.00(ref)		
Fair	0.69	0.00		0.88	0.28		0.69	0.02	
Good	0.45	0.00		0.75	0.01		0.22	0.00	
Very Good	0.27	0.00		0.57	0.00		0.16	0.00	
Excellent	0.16	0.00		0.41	0.00		0.13	0.00	
Comorbidity									
No	1.00(ref)			1.00(ref)			1.00(ref)		
Yes	1.41	0.00		1.48	0.00		1.63	0.00	
Education									
No degree	1.00(ref)			1.00(ref)			1.00(ref)		
High School/GED	1.03	0.69		1.05	0.62		0.84	0.29	
Some College or more	1.06	0.73		1.30	0.01		0.76	0.09	

	Cost Barriers			Organizational Barriers			Transportation Barriers		
	OR (95% CI)	P-value		OR (95% CI)	P-value		OR (95% CI)	P-value	
Income									
<\$24,999	1.00(ref)			1.00(ref)			1.00(ref)		
\$25,000-\$54,999	0.69	0.40		.78	0.08		.89	0.00	
\$55,000-\$74,999	0.28	0.65		0.31	0.72		.50	0.15	
>\$75,000	0.18	0.00		0.25	0.28		.20	0.09	
Usual Source of Care									
Yes	1.00(ref)			1.00(ref)			1.00(ref)		
No	2.55	0.00		0.92	0.50		1.10	0.68	
Insurance									
No insurance	1.00(ref)			1.00(ref)			1.00(ref)		
Public insurance	0.38	0.00		1.40	0.00		1.87	0.00	
Private insurance	0.27	0.00		.94	.51		0.35	0.00	
Language									
English	1.00(ref)			1.00(ref)			1.00(ref)		
Spanish or other	0.81	0.34		0.71	0.16		0.51	0.18	
US Region	1.00(ref)			1.00(ref)			1.00(ref)		
West									
Northeast	1.23	0.02		1.17	0.16		0.96	0.85	
North/Central/Midwest	1.23	0.01		1.13	0.23		0.91	0.62	
South	1.41	0.00		1.46	0.00		1.15	0.50	
Nativity									
US Born	1.00(ref)			1.00(ref)			1.00(ref)		
Non US Born	0.89	0.47		1.08	0.64		0.67	0.46	
Years									
2000	1.00(ref)			1.00(ref)			1.00(ref)		
2001	1.02	0.90		1.14	0.50		1.38	0.34	
2002	0.94	0.73		1.21	0.34		1.06	0.86	
2003	1.10	0.55		0.87	0.52		1.10	0.78	
2004	2.45	0.00		1.16	0.42		1.34	0.39	
2005	2.83	0.00		1.24	0.24		1.59	0.16	

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	Cost Barriers			Organizational Barriers			Transportation Barriers		
	OR (95% CI)	P-value		OR (95% CI)	P-value		OR (95% CI)	P-value	
2006	3.36	0.00		1.28	0.21		1.39	0.36	
2007	2.54	0.00		1.11	0.57		0.82	0.62	
2008	3.05	0.00		1.35	0.11		1.07	0.85	
2009	2.92	0.00		1.43	0.05		2.12	0.03	
2010	3.37	0.00		1.27	0.19		1.72	0.09	
2011	2.95	0.00		1.44	0.04		1.72	0.09	

Table 3
Decomposition Results for Barriers to Care by Race and Ethnicity

	Cost Barriers	Organizational Barriers	Transportation Barriers
Predicted Values	White (ref) = .29 African American = .35 Hispanic = .40	White (ref) = .14 African American = .18 Hispanic = .22	White (ref) = .03 African American = .09 Hispanic = .06
Whites / African Americans			
	Cost Barriers	Organizational Barriers	Transportation Barriers
<i>Significant Contributors</i>			
Private Insurance	X	X	
Public Insurance	X		
Health Status	X	X	X
Comorbidity	X		
Unexplained	1%	47%	42%
Whites / Hispanics			
<i>Significant Contributors</i>			
Private Insurance	X		
Public Insurance	X		
Health Status	X		
Nativity	X		
Year	X		
Unexplained	66%	87%	92%

Notes: Data source – National Health Interview Survey 2001-2011. “X” indicates the variable is a significant contributor to the predicted value difference between whites and the minority group. Nonsignificant covariates are excluded for each decomposition. All regression models include fixed year effects. Unobserved heterogeneity accounts for the unexplained share.