

This is a preprint of an article accepted for publication in *Journal of Consumer Health On the Internet*. Huang H., Apouey B. Andrews J. (2013). Racial and ethnic disparities in awareness of cancer genetic testing among online users: Internet use, health knowledge, and socio-demographic correlates. *Journal of Consumer Health on the Internet*.

Racial and Ethnic Disparities in Awareness of Cancer Genetic Testing Among Online Users: Internet Use, Health Knowledge, and Socio-demographic Correlates

Abstract

The increased availability of genetic information online has led to growing concerns regarding health disparities among racial and ethnic groups and the need to examine the role of race/ethnicity in genetic testing awareness. Online users from a national representative sample were analyzed to explain the racial/ethnic differences in genetic testing awareness. The analysis indicated that health-related knowledge, online information seeking behaviors, and information trust of the Internet were correlated with the prediction for awareness of online genetic testing information in different ethnic groups. The study also highlights these differences and identifies the priority ranking of the factors that reflect racial gaps. These findings suggest that the diversities in amount of trust of online information sources, education initiatives of health services, and knowledge of the existence of clinical trials and CDC need to be considered more closely for racial/ethnic subgroups.

Keywords: genetic testing, online information seeking, Internet use, racial and ethnic disparities

INTRODUCTION

As information related to genetic testing becomes more readily available online, and the potential benefits for enhanced screening, prevention, and early detection and treatment are becoming clearer, there remain increasing concerns over race/ethnicity-based disparities resulting from lack of awareness, access, and utilization of online genetic information for counseling and testing. As Hall and Olopade (2006) have stated, “Health care in [the U.S.] is neither distributed nor enjoyed equally” (p. 2198). Underserved populations include minorities, those with low socio-economic status, and those on the wrong side of the digital divide. As such these individuals are commonly the focus of efforts understand the major challenges to improving outcomes for all (Wideroff, Vadaparampil, and Breen 2003).

It can be argued that the increasing impact of a new genetics era on standard medical care presents a particularly complex information-seeking context for health consumers (Johnson, Andrews, and Alleny 2001; Johnson and Case 2012). Online genetic testing companies <<https://www.23andme.com/>> offer genetic testing services that direct marketing to health consumers. It is unclear how consumers seek for and trust online genetic test-related information. It is also uncertain whether online users share and discuss what they have found with health professionals. In addition, while the importance of genetic testing is well established, many minority groups’ awareness of genetic testing information remains lower than the national average (Honda 2003; Pagán et al. 2009; Vadaparampil, Wideroff, and Breen 2006; Vadaparampil, McIntyre, and Quinn 2010; Wideroff, Vadaparampil, and Breen 2003). The majority of genetic test information today is hosted online. Using the Health Information National Trends Survey (HINTS) in the US, the study identified the unequal distribution of

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Internet access of different racial/ethnic groups. HINTS data from 2007 shows that 71% of whites, but only 52% of Hispanics and 55% of African Americans accessed the Internet to obtain health-related information. Difficulty regarding sufficient awareness of important health advances and how they can impact individuals in making informed medical decisions is aggravated by the digital divide, i.e., lack of access to information technology and of information seeking skills necessary to navigate the complex health information available online (Chan and Huang 2013). It is necessary to understand whether Internet use and online information seeking behaviors are associated with the awareness of genetic testing in different racial/ethnic groups.

Racial/ethnic groups, such as African Americans and Hispanics, have shown disparities in digital information access and Internet use (Laz and Berenson 2012; Lorence, Park, and Fox 2006). It stands to reason that the racial/ethnic disparities within the digital divide may impact awareness of online genetic testing information. Major reasons for lower awareness of genetic testing among Hispanics include differences in education (Wideroff, Vadaparampil, and Breen 2003), length of residency (Pagán, et al. 2009), language, and acculturation factors in the U.S. (Ramirez, Aparicio-Ting, and de Majors 2006; Pagán, et al. 2009). Racial/ethnic differences in numeracy confidence might be related to the awareness of and ability to correctly interpret genetic test information (Huang, Chan, and Feng 2012). One study examining the possible cause of low awareness of genetic test information among African Americans showed that education level and place of residency are relevant contributing factors (Pagán, et al. 2009). Moreover, it was found that African Americans have had traditionally less success maintaining their family genealogical records (Bolnick, Fullwiley, and Duster 2007; Elliott and Brodwin 2002) which has limited their capability to access useful online cancer information relevant to their specific

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genetic histories (Wideroff, Vadaparampil, and Breen 2003). Other important contributing factors to racial and ethnic disparities to genetic services were reported in Vadaparampil's study (2010) such as limited knowledge of genetic testing, fear of test results, concerns about risks, and no physician referral for the use of genetic tests for cancer susceptibility.

In this paper, we present results from a major national survey (HINTS) in the United States that relate to the contributing factors related to the awareness of genetic testing for online users from traditionally underserved minority populations. In comparison to a previous study of factors correlated to lower rates of awareness of genetic testing among African Americans and Hispanics (in particular, Pagán et al. 2009), this study explores the variables for online users by looking at their information seeking behaviors in trust of information and information sharing, health knowledge, and examines the association of race and ethnicity on genetic testing awareness using 2007 HINTS survey data. In doing so, this study sought to better understand underlying factors that could be seen as central and, as such, that require attention in any information interventions designed to increase awareness and engagement for genetic testing information in these underserved groups.

METHODS

HINTS Data

This study used data from the National Cancer Institute's HINTS 2007 cross-sectional survey of 7674 American adults by telephone (using random digit dialing) and postal mail (using addresses from United States Postal Service records). The survey asked questions about health services and

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knowledge of specific cancers, awareness of service and knowledge, demographics, and health background of participants <<http://hints.cancer.gov/>>. The full list of variables and questions that were used in this article can be accessed at <<http://hints.cancer.gov/questions.aspx>>.

In this study, the research targeted online users. Specifically, using the question *Do you ever go online to access the Internet or World Wide Web, or to send and receive email?*, the respondents who answered “no” were excluded from the analysis sample, so that the sample only contained respondents who had already used the Internet. The study, focuses on the question pertaining to awareness of genetic testing: *Have you heard or read about any genetic tests?* Respondents answered “yes” or “no” to the question. All of the “don’t know” and “refused” responses for the studying variable were coded as missing, leaving the final sample for our analyses at 3,432 responders including whites (2,911), Hispanics (236), and African Americans (285). Several independent variables were incorporated in the analysis to reflect demographic status, Internet use, health knowledge, and health attitudes.

Socio-demographic Variables

Socio-demographic variables included in our analysis were race/ethnicity, gender, age, marital status, education, places of residence, and income. The income, marital status, and place of residence variables were collapsed into three categories (Table 1).

Information Seeking Behaviors

Other variables used in our analysis included online information seeking behaviors such as the response to “Have you ever looked for information about cancer from any source?” [HC08]. The variables also included respondents’ attitudes toward use for online information

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sources such as online health information discussion with health professionals [HS09] and the online search for diet and physical activity information [HC18d].

Trust of Online Information

Respondents were also asked to rate the degree to which they trusted information sources using a Likert scale consisting of “A lot”, “Some”, “A little”, and “Not at all”, which reflected the trust levels of how much they trusted information about health or medical topics from various sources including the Internet [HC07e] and religious organizations [HC07i].

Health Knowledge, Fatalistic Beliefs, and Self-efficacy

Other variables include health knowledge such as awareness of (yes/no) the CDC (Cancers for Disease Control and Prevention) and clinical trials. The study also investigated attitudes related to fatalistic beliefs. The respondents answered the following statement: “There's not much you can do to lower your chances of getting cancer.” [CS13]. The answers to these questions were collapsed into two categories (“yes/no” or “agree/disagree”). Attitudes about comfort levels regarding comprehension of the literacy (numeracy) knowledge in health statistics were also included in the study. They asked respondents to affirm or deny the following: “In general, I feel uncomfortable with health information that has a lot of numbers and statistics” [CS03]. The self-efficacy related question was “...how confident are you about your ability to take good care of your health?” [HS11].

[Insert Table 1 here]

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Statistical Analysis

All statistical analysis in this study was conducted using STATA 10.1 software (College Station, Texas, USA). The percentage distribution of all the variables across racial and ethnic groups was examined using the data of weighted samples. Multivariate logistic regression analysis was used to examine the relationships between race/ethnicity and the dichotomous outcome (awareness of genetic testing) with and without adjusting for all variables related to socio-demographics, online information seeking behaviors, Internet use, and health knowledge.

Next, we employed the non-linear Fairlie decomposition method (Fairlie 1999, 2005) to examine the extent to which there was an awareness gap among racial groups. This algorithm quantifies the contribution of each of the independent factors on racial differences and includes standard errors similar to the methods in Oaxaca and Ransom (1998). Given the fact that the ordering of variables can be sensitive for the non-linear decomposition computation, the randomization of the order of variables in each replication and the average estimated contribution results were computed for all possible orderings. Since the sample size of whites are larger than African Americans', and the non-linear decomposition required one-to-one matching of cases between the two groups, thus, we used a random drawing of whites with a size equals to the full sample of African Americans (Pagán et al. 2009). The contributions to the white-Black gap of each single variable in the regression were calculated. The process was repeated 500 times and the mean results to the white-Black gap in genetic testing awareness were reported. The algorithm procedure was repeated for the white-Hispanics gap in genetic testing awareness.

RESULTS

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Some of the socio-demographic variables (age, gender, education, marital status, and income) revealed racial and ethnic disparities in awareness of genetic test in the 2007 HINTS data (Table 1). For users seeking online health information, a greater percentage of whites had heard about genetic testing in comparison to Hispanics and African Americans, which is consistent with findings in previous studies (Pagán et al. 2009; Wideroff, Vadaparampil, and Breen 2003). The three racial and ethnic groups also differed considerably by age, residence types, and educational levels. Black and Hispanic respondents tended to be younger than whites, and a greater percent of Black respondents were female and divorced (Table 1). Black and Hispanic online users tended to have lower educational attainment and lower income than whites, and a higher percentage of whites lived in non-metro areas than Hispanics and African Americans (Table 1). In terms of attitudes towards online information seeking, whites showed a higher rate in seeking online health information, but less trust in online information than Hispanics, and they were more likely to have heard about clinical trials and CDC than Hispanics and African Americans. Regarding the fatalistic beliefs, Hispanics had the highest rate in believing that not much can be done to lower the chances of getting cancer (Table 1). A multivariate linear logistic regression analysis was run using awareness of genetic testing as the dependent variable, and all the variables in Table 1 as independent variables. The results from Table 2 show the associations between these explanatory variables and the awareness of genetic testing for online users. When considering the variables of ethnicity only, African Americans and Hispanics, compared to whites, had negative impacts on the prediction of genetic test awareness. This indicated that African Americans and Hispanics were significantly less likely than whites to have heard of genetic testing (Table 2). When including other explanatory variables, being older, active sharing and searching online health information, having better health knowledge, and

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having less fatalistic beliefs were positively correlated with the probability of knowing about online genetic testing.

[Insert Table 2 here]

Online users who had heard about genetic testing were also likely to have heard about clinical trials (OR=2.22) and CDC (OR=1.67)(Table 2) They also showed distinct online information behaviors, e.g., they actively looked for online information related to diet and physical activity (OR=1.18). However, these users were more likely to have some trust in online information, rather than a lot of trust (OR=1.23), and they preferred discussing what they had found online with health professionals (OR=1.35).

Table 3 reports the results of the Fairlie decomposition that explores the contributing factors to the racial gap in genetic testing awareness. The results indicate that hearing of clinical trials (31.4%), age (26.7%) and hearing about CDC (20.9%) are the most important contributors to explain the white-Hispanic difference in awareness of genetic tests for online users. The relatively low levels of health knowledge and education, younger age, and higher level of fatalistic beliefs observed in Hispanics (Table 3) also contribute to understand the white-Hispanic difference in online user's genetic testing awareness.

[Insert Table 3 here]

Results also indicate that higher trust in information provided by religious organizations (13.1%) is one of the main determinants in the gap between whites and African Americans regarding genetic testing awareness. Lower health knowledge related to clinical trials (13.1%),

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and lower educational level (11.5%) also contribute significantly to the gap in awareness of genetic testing for cancer risk between whites and African Americans (Table 3).

DISCUSSION

The goal of this study is to better understand the differences in awareness of genetic testing for online users in different racial/ethnic groups by examining the role of socio-economic factors, information seeking behaviors, and other structural contributors. This study reinforces evidence of low levels of awareness among minorities and provides several new findings. Foremost, the results reveal that online information seeking behaviors, health knowledge, trust of information provided by Internet or religious organizations, fatalistic beliefs, education, and age are among the influential factors underlying gaps between minorities and other populations-- findings that could help identify policy changes to remedy these gaps in awareness. Moreover, the importance of these factors rank differently in minority groups, indicating that uniform policy remedies might not work well across different minority groups and alternative strategies might improve awareness of genetic test information among different racial and ethnic groups. Tailored campaigns to increase genetic testing awareness among minorities should consider accounting for online information seeking behaviors, attitudinal factors, as well as socio-economic issues. Policy makers should pay special attention to factors that work well for specific ethnic groups in order to promote awareness of online genetic test information.

Disparity of information seeking behaviors were observed among African Americans (Matthews, Cummings, and Thompson 2002; Thompson et al. 2008) and Hispanics (Rutten, Squiers, and Hesse 2006). Both Hispanics and African Americans might not have equitable access to health information, and many in these two populations may not yet have sufficient

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skills for finding and using health information (Matthews, Cummings, and Thompson 2002). A low level of health information seeking among minority populations (Thompson et al. 2008) was indicated as a major reason for the disparity gaps of awareness of genetic testing in this study. Previous studies show that people who do more searching for online health information acquire more interest in genetic testing (Gooding et al. 2006). Awareness of available genetic testing information appears to provide an avenue for meeting information seekers' practical and emotional needs by helping them cope with emotional concerns about potential risks for genetic diseases. Additionally, active genetic information seeking enables them to better know about genetic concepts as well as make more well-informed (Bosompra et al. 2001) and better clinical decisions (Johnson, Andrews, and Allard 2001; Andrews et al. 2005; Kelly et al. 2007).

Knowledge of the CDC and clinical trials is a strong predictor of genetic testing knowledge in populations. The CDC promotes genetic testing on their website <http://www.cdc.gov/>, and this may be where many individuals learn about genetic testing. Another possible explanation for this finding is that the CDC may be the most visible government health institute online. Their increased exposure may be due to their sponsorship of ongoing health campaigns and their rapid response to impending epidemics. Consequently, consumers may turn to the CDC first when seeking out health information and in doing so find a reference to ClinicalTrials.gov. As a consequence, collaborating with the CDC could help maximize the reach of genetic testing promotions.

Furthermore, trust of information sources to promote genetic testing to minority audiences should also be explored. The massive amount of online information empowers online users. Even though online users who know about genetic testing actively seek online information, they carefully select and evaluate information resources on the Internet with suspicion about

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what they find. They end up checking the information they retrieve with health professionals if needed. This finding reinforces the important function of health professionals to provide proper intervention and guidance for utilizing online health information.

In a study for understanding racial differences in clinical trials awareness, Langford, Resnicow, and An (2010) report that Hispanics and African Americans are more likely to have greater trust in health information from religious organizations, and minorities reporting greater trust in religious organizations for health information were less likely to know about clinical trials. This research finds a similar pattern: minorities who indicated a greater trust in religious organizations for health information were less likely to know about genetic testing. One could view this trust variable as a possibly strong indicator for religiosity. African Americans and Hispanics in general participate actively in religious organizations (Johnson, Elbert-Avila, andTulsky 2005; Taylor, Chatters, and Jackson 2007). Research has reported that religiosity influences the way that some people (including minorities) encounter, interpret, and assess information about genetics, health, and medicine (Parrott et al. 2004; Harris, Parrot, and Dorgan 2004). Like clinical trials, genetic testing is a form of scientific knowledge. Non-religious individuals might pay more attention to it than religious individuals, and therefore may more likely be aware of scientific health services like clinical trials (Langford, Resnicow, and An 2010). Since religious organizations represent a great outreach channel for the minority community, health communicators might benefit from working with religious organizations in the articulation of health promotion messages, and thereby provide culturally sensitive guidelines that contribute to effective health promotion, care, and counseling, if such information is consistent with particular religious principles and values (Langford, Resnicow, and An 2010).

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Socio-economic facets including education and age were also observed as important contributing factors. The relative lower levels of education and younger ages seen in the Hispanic population help explain the differences between non-Hispanic whites and Hispanics in genetic testing awareness. Similarly, lower education levels among African Americans substantially contributed to the gap between whites and African Americans in awareness of genetic testing for cancer risk. Across all of the racial and ethnic minority groups, living locations, levels of fatalistic beliefs, trust of Internet information, online information sharing with health professionals accounted for a small but significant portion of the white-minority gap in genetic testing awareness. Racial/ethnic subgroups like African Americans and Hispanics hold more unproven beliefs about cancer risks and have more fatalistic views about cancer compared to Whites (Scroggins and Bartley 1999). Minorities living in non-metro or rural areas usually did not have a place to go when they needed health service. In addition to race/ethnicity, other variables were found to be associated with genetic testing awareness that may also inform message construction.

In order to reduce the inequitable gaps in Internet access and promote information seeking skills for minorities, additional support and educational efforts should be provided for minorities to help them acquire necessary health information seeking skills. There was an inverse relationship between fatalistic beliefs and genetic testing awareness. Fatalistic beliefs may lead to assumptions that diseases are an unavoidable event to develop; consequently, Hispanics and African Americans may be less likely to know and engage in health services (Laws and Mayo 1998; Thompson et al. 2003). Fatalistic beliefs that medical conditions are simply the result of God's will or punishment for past sins make it harder to change unhealthy lifestyle behaviors. If African Americans traditionally feel genetic testing could lead to further discrimination (Furr

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2002), then they obviously have a negative perception of genetic testing (Guidry, Matthews-Juarez, and Copeland 2003). Furthermore, some minority individuals may hold their fatalistic beliefs concerning disease as absolute predictors; such an attitude will likely prevent them from participating in preventive procedures because they feel without power to prevent disease risk (DeVries et al. 2005; Frosch, Mello, and Lerman 2005).

Strengths of this study include a nationally representative sample of U.S. adults as online users and assessment of multiple potential correlates/confounds of genetic testing awareness. This study also has some weaknesses. Many socio-economic factors included in this analysis proved relevant to genetic testing awareness; however, other factors for patient and health provider communication that possibly explain the awareness gaps were not included in this study (e.g., genetic counseling service and intervention). Moreover, further exploration is needed to elucidate the relationship between awareness of genetic testing and actual use of genetic testing.

Despite these limitations, given the current attention to racial/ethnic health disparities and growing findings showing genetic variants associated with heightened disease risk or particular treatment responses that differ significantly in frequency among racial/ethnic groups (Suther & Kiros 2009; Zeigler-Johnson et al. 2008), there will likely be increased interest in racial/ethnic differences in attitudes toward genetic testing. Uneven awareness across different racial and ethnic groups for genetic testing awareness will pose new challenges, particularly when personalized medicine and consumer directed genetic testing are offered to minorities. Improving genetic knowledge among minority groups for understanding the single-nucleotide polymorphism (SNP)-based genetic test, which involves many numeric risk estimates for certain diseases, will better prepare minorities for new genetic services that can provide the benefits of disease diagnostics, health prevention, and prediction for health outcomes. The findings from

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this study highlight the disparity of awareness of genetic testing for minorities and identify new predictors, strategies, and opportunities to reduce the gaps in awareness of available health services in personalized genetic risk management.

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Table 1. Percentage Distribution of All Variables Used in the Analysis by Different Racial and Ethnic Groups based on the 2007 HINTS Data

Variables	White (%) N=2911	Hispanic (%) N=236	African-America (%) N=285	All (%) N=3432
Awareness of genetic testing	38.9	27.9	29	37.2
Female	59.6	63.6	72.6	61
Age				
18-34	16.8	36.1	25.3	18.9
35-49	29.3	37.2	32.6	30.2
50-64	37.1	21.8	35.4	35.8
65-74	12.3	4.2	6.1	11.2
75+	4.5	0.7	0.6	3.9
Marital status				
Married	66.9	61.4	41.2	64.3
Divorce	17.2	14.3	24.4	18.9
Never married	14.3	24.2	34.5	16.8

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Income				
<\$35k	18.4	32.3	40.2	21.3
\$35k-\$75k	35.1	35.1	33.5	35.7
>\$75k	32.6	32.6	26.2	43
Education				
<High school	1.7	9.1	4.9	2.5
High school	17.2	22.1	18.9	17.7
Some college	31.4	38.6	38.7	32.6
College degree or higher	49.6	30.2	37.5	47.1
Living Region				
Metro area (population >1 million)	47.5	64.6	64.3	50.2
Metro area (population > 250,000)	21.9	23.9	18	21.7
Metro area (population <250,000)	12.1	8.1	7.9	11.4
Nonmetro area	18.5	3.5	9.8	16.7
Trust of info from Internet				
A lot	22.8	28.8	24.4	23.4
Some	60.5	52.3	55.8	59.5
A little	14.2	16.1	16.5	14.5
Not at all	2.5	2.8	3.4	2.6
Online info sharing with doctors (Yes)	29.1	23.5	27	28.6
Looked for information about cancer (Yes)	56.1	47.7	45.7	54.6
Online diet info search (Yes)	37.2	41.1	45.7	38.2
Trust of info from religion org				
A lot	34.4	25.3	15.2	32.1
Some	4.8	7.4	11.9	5.6
A little	25.7	32.5	34.8	27.2
Not at all	31.9	31.9	38.1	35.1
Heard of Clinical Trial (Yes)	85.5	62.8	76.2	83.1
Heard of CDC (Yes)	92.2	66.4	85.1	89.7
Numeracy				
Very easy	15.5	13	14.3	15.2
Easy	55.1	52.3	54.7	54.7
Hard	26.2	27.7	26.4	26.4
Very hard	3.2	7	6.1	3.7
Self-efficacy				
Completely confident	20.8	24.6	21.3	21.1
Very confident	53.8	44.2	49.4	52.7
Somewhat confident	25.4	31.2	29.3	26.1
Fatalism beliefs				

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Prevention is not possible (Yes)	17.7	31.6	22.9	19.1
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Table 2. Multivariable Analysis of Characteristics Associated with Awareness of Genetic Testing

Variable	Odds ratio (95% CI) Ethnics	Odds ratio (95% CI) Awareness
Ethnicity/race		
Hispanic	0.63*** (0.47 - 0.84)	1.09 (0.74 - 1.44)
African American	0.62*** (0.48 - 0.81)	0.80 (0.57 - 1.03)
White (reference)		
Education		
High school		0.90 (0.35 - 1.45)
Some college		1.13 (0.45 - 1.81)
College degree or higher		1.67 (0.67 - 2.67)
<High school (reference)		
Information Seeking		
Ever looked for information		1.29*** (1.09 - 1.49)
Discuss online health info with doctor		
		1.35*** (1.16 - 1.64)
Look for online diet and physical activity info		
		1.18** (1.02 - 1.41)
Trust info from Internet		
Some		1.23** (1.00 - 1.45)
A little		1.24* (0.92 - 1.56)
Not at all		0.86 (0.38 - 1.33)
A lot (reference)		
Trust info from religion org		
Some		1.43* (1.04 - 2.27)
Some A little		1.41*** (1.19 - 1.75)
A little Not at all		1.30*** (1.10 - 1.56)
A lot (reference)		
Self-efficacy		
Very confident		0.99 (0.80 - 1.76)
somewhat confident		0.79 (0.611 - 0.97)
Completely confident (reference)		
Fatalism beliefs		
Prevention is not possible ("agree")		0.69*** (0.54 - 0.83)
Numeracy		

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Hard to understand statistics	0.96 (0.54 - 1.38)
Easy to understand statistics	0.98 (0.56 - 1.40)
Very easy to understand statistics	1.45 (0.79 - 2.10)
Heard of CDC	1.67*** (1.28 – 2.44)
Heard of Clinical Trial	2.22***(1.79 – 2.94)
Gender	
Female	0.91 (0.77 - 1.06)
Age	
35-49	1.36*** (1.03 - 1.69)
50-64	1.84*** (1.40 - 2.29)
65-74	1.91*** (1.32 - 2.50)
75+	1.94*** (1.09 - 2.79)
18-34 (reference)	
Income	
\$35k-<\$75k	0.94 (0.73 - 1.15)
>\$75k	1.17 (0.89 - 1.46)
<\$35k (reference)	
Living Region	
Metro area (> 250,000)	0.78*** (0.64 - 0.94)
Metro area (<250,000)	0.82 (0.62 - 1.02)
Nonmetro area	0.70** (0.54 - 0.86)
Metro area (> 1 million) as reference	
N	3,432

*** p<0.01, ** p<0.05, * p<0.1

Table 3. Nonlinear Decomposition of the Differences among Hispanic and African-American and non-Hispanic Whites in the Percentage of Respondents Who Reported Having Heard of Genetic Testing for Cancer Risk.

	Decomposition analysis ^a			
	Hispanic		African-American	
	Coefficient (SE)	%	Coefficient (SE)	%
White percentage of awareness	0.393		0.393	
Specific group percentage of awareness	0.288		0.289	
Difference	0.105		0.104	
Contribution of different factors				
Female	0.000953 (-0.000882)	0.9	0.00285 (-0.00215)	2.7

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Age	0.0280*** (-0.00547)	26.7	0.0103*** (-0.00302)	9.9
Income	0.00428 (-0.00286)	4.1	0.00685 (-0.00479)	6.6
Education	0.0187*** (-0.00463)	17.8	0.0120*** (-0.00315)	11.5
Living region	-0.0113 (-0.00349)	-10.8	-0.0109*** (-0.00312)	-10.5
Trust info from Internet	0.00275* (-0.0016)	2.6	0.000818 (-0.00116)	0.8
Look for online diet & health info	-0.00133 (-0.001)	-1.3	-0.00246* (-0.00148)	-2.4
Discuss online info with doctor	0.00391*** (-0.00136)	3.7	0.00157** (-0.000734)	1.5
Heard of CDC	0.0219*** (-0.0067)	20.9	0.00467*** (-0.00151)	4.5
Heard of clinical trial	0.0330*** (-0.00446)	31.4	0.0136*** (-0.00193)	13.1
Information seeking	0.00543*** (-0.00197)	5.2	0.00639*** (-0.00229)	6.1
Numeracy	0.00357 (-0.00241)	3.4	0.00216 (-0.00177)	2.1
Trust info from religion org	0.00585** (-0.00229)	5.6	0.0136*** (-0.00408)	13.1
Fatalism belief	0.0107*** (-0.00291)	10.2	0.00471*** (-0.00138)	4.5
Self-efficacy	0.00224* (-0.00122)	2.1	0.00172* (-0.000981)	1.7
Observations	3,147		3,196	
All variables	0.128	122.5	0.0679	65.3

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

^a. Negative percentages reflect how a factor contributes to narrowing the gap; positive values imply a widening of the gap between whites and the specific minority group.