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## Correlates of Perceived Risk of Developing Cancer among African-Americans in South Los Angeles

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### Abstract

**Background**—There are differences in cancer-risk perception among racial/ethnic groups that may affect health risk behaviors.

**Methods**—Using a community partnered-participatory research approach, we conducted a survey on cancer screening, risk behaviors, and related knowledge/attitudes within 11 churches in South Los Angeles with predominantly African-American parishioners. This analysis examines correlates of perceived risk of developing cancer among 755 African American adults.

**Results**—Almost 15% of participants indicated higher perceived risk for cancer compared to the average man/woman of the same age, 38% indicated same risk, whereas 48% perceived lower risk. Sixty-nine individuals (9%) reported a cancer history and 63% reported at least one blood relative with cancer. Controlling for demographic characteristics and healthcare access, participants who reported higher risk of cancer had higher level of cancer-related knowledge; were current and ex-smokers; had poorer health status; had a blood relative with cancer; had a cancer history; and had discussed their risk of cancer with their doctor. The bivariate association between high perceived cancer risk and lack of exercise and obesity disappeared after adjusting for demographic characteristics and perceived health status.

**Conclusions**—Our data suggest that a substantial proportion of African Americans in South Los Angeles may underestimate their cancer risk. Additionally, lack of exercise and obesity are not recognized as independent cancer risk factors as much as smoking and personal and family history of cancer. Next steps will be to inform participating churches about our findings and explore their interest in taking steps to reduce health risk behaviors among their parishioners.

### Keywords

African-Americans; Community-Partnered Participatory Research; Cancer Health Disparities; Risk Factors

## INTRODUCTION

The latest reports from the American Cancer Society on cancer among African-Americans shows that African-Americans have higher cancer risk and mortality from cancer than any other racial or ethnic group.[1, 2] For all cancer sites combined, African-American men have a 16% higher incidence rate and 33% higher mortality rate than their Caucasian counterparts; whereas, African-American women have a 6% lower incidence rate but a 16% higher mortality rate than Caucasian women.[2] Additionally, African-American men and women have a much poorer survival rate once cancer is diagnosed. The 5-year relative survival is lower in this population than in Caucasians for most cancers at each age and stage of diagnosis.[3, 4] The disparate risk and cancer outcome in the African-American community therefore is a very significant cancer health disparity.

It is well established that barriers to receiving cancer screening and early detection contribute to a higher rate of mortality among African-Americans.[2] Literature review suggest that lack of knowledge and public awareness of cancer has been consistency associated with higher incidence and mortality[5] Additionally, review of meta-analyzed experimental evidence show that heightening risk appraisals changes intentions and behavior.[6] Previous research also suggests that there are racial differences in beliefs about cancer risk factors which then affect risk perception.[7] [8] The data from the 2007 Health Information National Trends Survey shows that perceived susceptibility is significantly associated with race/ethnicity. African-Americans perceived themselves at lower risk for getting cancer than their Caucasian counterparts and the differences remained after controlling for demographic characteristics.[9] Understanding of African-American beliefs about cancer prevention is important for designing and implementing culturally appropriate interventions to reduce cancer-health disparities.[10]

Weinstein and Klein define perceived risk as one's belief about the likelihood of personal harm.[11] Perceived risk is a central construct for numerous theories of health behaviors (e.g., the Health Belief Model, the Precaution Model, the Transactional Model of Stress and Coping, the Self-regulation Model of Health behavior, and the Protection Motivation Theory).[11, 12],[13] Risk perception originates from threat appraisal, which is considered to be a major motivating factor in preventative and protective health behaviors. Threat appraisal is constructed on beliefs about disease risk and severity.[14] Hence, it is important to understand both the determinants of risk perception and the patterns of association between perceived risk and specific health-related behaviors to develop interventions that will encourage the adoption of behaviors that promote health.

Adopting these theoretical frameworks, numerous investigational and interventional studies have examined the role of perceived susceptibility in cancer screening behaviors among African-Americans.[10, 15–26] Qualitative research has generated several possible explanations for why cancer risk perceptions are lower in African-American communities, including uncertainty of predominately Caucasian medical establishment, lack of personally relevant cancer information, and lack of perceived control over health outcomes.[27] The purpose of this analysis was to determine correlates of perceived risk of developing cancer in a large sample of African-American adults in one of the most underserved neighborhoods in Los Angeles.

## METHODS

### Survey development

The overarching goal of this study “Present Your Body” was to gather data from the African-American faith community in South Los Angeles about cancer awareness and

behaviors associated with prevention and screening for early detection. The African-American faith community is the most well attended hub of information dissemination, service and advocacy in the African-American Diaspora.

This study used a community partnered-participatory research approach to develop the study aims and survey. The Division of Cancer Research and Training at Charles R. Drew University of Medicine and Science (CDU) and UCLA's Jonsson Comprehensive Cancer Center Partnership was funded by NCI to address cancer disparities within the ethnically diverse, low-resource community of South Los Angeles, CA. Specifically, the Cancer Community Outreach, Prevention and Control Program in the Partnership utilizes a community-partnered participatory research strategy. The Program has engaged community member stakeholders, cancer survivors, faith-based institutions, community-based organizations, as well as academic researchers to form a Community-Academic Council (CAC). The CAC serves as a forum for bi-directional knowledge exchange, community engagement, capacity and relationship building, and knowledge transfer activities. Utilizing a community-partnered participatory approach pioneered by L. Jones and her colleagues, [28] a survey instrument was developed to gauge perceived risk taking into account well established risk factors. The survey was initially pilot-tested with a small number of community volunteers, after which additional modifications were made to ensure comprehension and appropriate length. Community partners approved of the final survey disseminated and participated in the analysis and interpretation of the data.

## Measures

**Perceived risk of developing cancer** was measured by asking participants “compared to the average man/woman your age, how would you rate your own risk of getting cancer? Would you say that your risk is: same, higher, or lower.”

**Cancer knowledge** was measured using 37 true-false items. Items were selected from Webpages of UCLA's Jonsson Comprehensive Cancer Center (Cancer Fact Sheet)[16], Women's Health (Women and Cancer)[29], the American Cancer Society (Learn about Cancer)[28] and the Cancer Fact Sheet.[30]. Sample true-false questions related to personal risk factors included the following:

- A diet rich in fruits and vegetables greatly reduces risk of developing cancer
- Too much drinking of alcohol regularly increases the risk for several types of cancer
- A diet high in animal fat increases the risk for several types of cancer
- Regular exercise reduces risk for many types of cancer
- One of the risk factor of prostate cancer is obesity
- A high intake of alcoholic beverages may raise the risk of developing lung cancer, regardless of smoking history

A knowledge score was created by counting correct responses corresponding to all 37 items. Subsequently, using the 33<sup>rd</sup> and 67<sup>th</sup> percentile, cancer-related knowledge was categorized into three groups: 1) low; 2) medium; and 3) high.

Other measures collected include **demographic data** (gender, age, education, marital status); **enabling factors** (health insurance, access to medical care and having a regular or primary care doctor); and **cancer risk factors** (perceived health status, smoking, exercise, obesity, and personal and family history of cancer). Perceived health status was assessed using a single item: “In general, would you say that your health is excellent, very good, good, fair,

or poor.” Smoking (never versus current or former smoker) was assessed using questions from the Behavioral Risk Factor Surveillance System. *Exercise* was assessed with one question: “how often do you exercise?” Response options included daily or more than 3 times a week; one to 3 times a week; do not exercise regularly. Complete data on self-reported height and weight were missing for almost 20% of the participants, hence it was not possible to calculate body mass index for all participants. Instead, respondents were classified as obese if they reported that a doctor ever told them that they were obese. Finally, participants were also asked if they had ever discussed their personal risk for any type of cancer with their doctor, since this may be closely linked with their perceived risk of developing cancer.

### Sample and recruitment

Over a four month period in 2012, the Community Principal Investigator (PI) conducted community-engagement tasks with 13 churches in South Los Angeles - successfully garnering participation of 11 predominantly African-American churches, including African Methodist Episcopal, Baptist, Seventh Day Adventist, and Non-Denominational churches. Church membership ranged from 50 to over 700 individuals. On the day of data collection, the PI and one of the Co-PI’s described the study and informed consent process to potential respondents at a designated time during the church service. Participants completed a paper and pencil questionnaire in English, which took between 30 and 45 minutes. Assistance with reading the questionnaire was provided to 45 respondents who requested help. Upon completion of the survey, participants received \$15 cash. Survey participation ranged from 11 to 149 participants per church. Almost all individuals who were approached decided to participate in the study; only 26 individuals refused. This study was approved by the Institutional Review Board of Charles R. Drew University of Medicine and Science.

### Statistical Analysis

The analysis includes 755 African-American adults out of the total sample of 801 respondents. The statistical analysis was performed with the SPSS® program (SPSS 20.0 for Windows, SPSS Inc., Chicago, IL, USA). Bivariate chi square tests were conducted to determine relationships between the outcome measure, perceived cancer risk, and other independent variables. In addition, a series of multiple multinomial logistic regressions were performed predicting three levels of perceived risk (same, lower or higher as the average man/woman). A p-value < 0.05, was utilized to identify statistically significant differences. To test for multicollinearity, inter-correlations among independent variables were examined. Additionally, data was examined for clustering effects and the intra-cluster correlation are shown to be relatively small, therefore, data was analyzed in a standard way.

## RESULTS

### Characteristic of Participants

This analysis included 755 African-American individuals who were between the ages of 18 to 94 years. Sixty-five percent of participants were 50 years of age or older, 68% were women and 46% reported having a college degree. Almost 20% of participants had no health insurance and no regular or primary care physician. More than 18% of participants reported fair or poor health. Among participants who reported height and weight (N=598, 79% of the sample), 37% were over-weight (body mass index  $\geq 25$ ) and 38% were obese (body mass index  $\geq 30$ ). However, only 27% reported that their physician had ever told them that they were obese. While 65% of participants reported that they had never smoked cigarettes regularly, 35% reported that they were current or former smokers (Table 1).

Sixty-nine individuals (9.0%) reported that they have been diagnosed with a cancer, including 25 with breast cancer, 17 with cervical cancer and 13 with prostate cancer. Although 479 (63%) of respondents reported that one of their family members (blood relatives) had been diagnosed with some type of cancer, 53% of respondents had never discussed their personal risk of cancer with a doctor, including 47% of respondents aged 50 and older (data not shown).

### Correlates of Perceived Risk of Developing Cancer

Almost 15% of the sample indicated that compared to the average man/woman of their age, they have a higher risk of developing cancer. In addition, 38% indicated that their risk is the same as others, whereas 48% perceived a lower risk than their counterparts. Table 1 reports both characteristics of study sample and the bivariate relationships between the perceived risk of developing cancer and independent variables. The following independent variables showed a statistically significant relationship with perceived risk:

Participants who reported that compared to the average man/woman their age, they have a higher risk of cancer include: 1) women; 2) those with a higher level of cancer-related knowledge; 3) those with fair or poor health status; 4) current and former smokers; 5) participants who reported not exercising regularly and those exercising 1–3 times a week versus more than 3 times a week; 6) those who had been told by their doctor that they were obese; 7) participants who reported a blood relative with cancer; 8) participants who had been diagnosed with a cancer; and 9) those who reported that they had discussed their risk of cancer with their health care provider.

Using multinomial logistic regression controlling for all variables, our data show similar relationships with two exceptions: After controlling for other variables, both exercise and obesity are no longer associated with perceived cancer risk (Table 2). Specifically, the relationship between exercise and obesity disappears after controlling for perceived health status. Table 2 shows that the highest odds ratios were found for the relationship between risk perception and personal history of cancer (OR: 4.04) and the relationship between risk perception and History of familial cancer (OR: 2.6 [1/.38]). Respondents who have not been diagnosed with a type of cancer, were more likely to be in the group of survey respondents who thought that they have a lower risk of developing cancer, rather than the group of survey respondents who thought they have a same risk for developing cancer. The odds of being in the group of survey respondents who perceived themselves as having a higher risk of developing cancer increases 4 times when participant has never been diagnosed with a cancer. Similarly respondents with history of familial cancer were 2.6 times more likely to indicate that they have a higher risk of cancer (Table 2).

## DISCUSSION

Few studies examine the correlates of perceived risk of cancer in the underserved African-American population. Our study was able to collect these and other data in a large African-American sample in South Los Angeles, in large part due to the intensive outreach of the Charles Drew University community faculty that has a long-standing relationship with the faith-based community in South Los Angeles. In addition, the survey was developed jointly by academic and community members. Community members were specifically interested in learning more about individuals' perceived cancer risk and its correlates. Perceived risk of cancer is a component of many health behavior theories and considered to be a key motivator for preventative screenings[12].

Overall, the variables that were assessed were associated with perceived risk in the direction expected. Individuals who were current and former smokers, did no or little exercise, were

informed they were “obese” by their physician, and who had a personal or family history of cancer felt at increased risk for cancer as compared to respondents without these risk factors. However, a substantial number of respondents with these risk factors, around 30%, felt that they had a lower risk for developing cancer than other people their age, and another 50% felt that their risk was the same as that of other people their age. Respondents may feel that their risk is the same as that for others who have similar lifestyles and cancer histories in their family. However, the fact that about 30% of respondents with cancer risk behaviors felt at lower risk is surprising. These data suggest that a substantial proportion of African-Americans in South Los Angeles may underestimate their cancer risk. This presents a significant opportunity for the academic and community partners to engage the community, including the churches participating in the survey, to address this disparity in perceived risk.

Risk factors associated with increased risk of cancer used in this study are well established, as are the tendencies of individuals to underestimate risk. For example, Chen and Kaphingst (2011) analyzed a large national dataset with a representative sample of U.S. adults and reported that current and former smokers are more likely than their non-smoker to report a higher level of susceptibility to cancer.[31] However, smokers are likely to minimize their own health risk and tend to inaccurately estimate their risk of developing lung cancer.[32] Review of literature demonstrate convincingly that smokers have a very imperfect understanding of the risks of smoking and of risk statistics in general.[32] In addition, previous research suggest there are racial differences in perceived risk of smoking.[33] Therefore, additional research is needed to examine how health education and promotion programs emphasizing the link between smoking and (all type of) cancer risk could be implemented without stigmatizing those at increased risk or substantially increasing their anxiety and worry.[31] Reengaging the community in discussion about risks associated with smoking, as well as providing navigation to low cost or no cost smoking cessation programs, will also be an important message to take back to the participating churches and partners.

Consistent with the present findings, studies have shown that African-Americans are less likely to perceive increased risk due to family history than other racial/ethnic groups.[27] They were less likely to believe that family history played a significant role in chronic disease development.[34] This may result from underrepresented individuals being less likely to report having a family history of cancer. Hence, important clues to familial cancer inheritance are missed because of limited knowledge of the relevance of family history of cancer.[35] Research suggests that tailored public health and health care provider delivered messages about the significance of family history for cancer risk and encouraging family communication about cancer may be a method of increasing awareness of cancer risk among underrepresented communities.[27]

Another important finding in this study is that lack of exercise and obesity were not recognized as independent cancer risk factors as much as smoking, personal, and family history of cancer. While both lack of exercise and obesity were significantly related to perceived risk in the bivariate analysis, this association disappeared after adjusting for other variables. Increasingly over the past 20 years, the relationship between physical activity and cancer etiology has been identified, including through several well-controlled clinical trials. [13] In addition to playing a role in primary prevention, physical activity also been shown to be associated with reduced all-cause cancer mortality, in addition to breast cancer-specific and colon cancer-specific mortality.[17] A number of studies have shown that the actual and perceived “built environment”, which takes into consideration urban design, land use, transportation, and patterns of human activity in a given physical environment affect the rates of physical activity of residents, including among African-American residents.[30, 36]

To compound the issue of built environment on physical activity, areas with high racially/ethnically underrepresented groups are more likely to have limited food options and increased difficulty meeting dietary guidelines.[36, 37] These factors may significantly contribute to the high levels of obesity identified among African-American communities. [36] Obesity is a well-established risk factor for several cancers, including breast, gastrointestinal, endometrial, and kidney cancers.[38] One recent study from the CDU/UCLA Cancer Center Partnership specifically identified cancer risk (in breast) in association with obesity in the SPA 6 region in South Los Angeles[39] which includes the churches included in the present survey. In sum, as interventions are launched to improve food and physical activity policies and environments in South Los Angeles, it should be emphasized in the communication with the community that healthy eating and physical activity have many health benefits, including primary cancer prevention. Particularly, the risk-association of obesity with different cancers should be communicated.

### Limitation

Limitations include the cross-sectional study design which only documents associations and precludes causal inferences. Additionally, respondents self-selected to complete the survey. However, 11 out of 13 churches that were approached agreed to participate, few participants refused, and the small incentive was also designed to increase participation. Finally, participants may have reported inaccurately on sensitive topics such as cancer-related diagnosis, leading to social desirability bias.

### Conclusions and Future Directions

This study generated local data that suggest that many African-Americans in South Los Angeles underestimate their risk for developing cancer, given their self-reported cancer risk factors. The community collaborators are very interested in better understanding risk perceptions and a dialogue has been initiated with pastors and community members about this issue. Next steps will be to inform participating churches about the findings and explore their interest in taking steps to reduce health risk behaviors among their parishioners.

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**Table 1**  
 Characteristics of Study Sample and Bivariate Relationships to Perceived Cancer Risk (N = 755)

Independent Variables	Total N (%)	Perceived Cancer Risk*			P**
		Same N (%)	Higher N (%)	Lower N (%)	
<b>Gender</b>					
Male	242 (32.0)	126 (52.0)	24 (10.0)	92 (38.0)	<b>0.048</b>
Female	513 (68.0)	236 (46.0)	84 (16.0)	193 (38.0)	
<b>Age</b>					
< 50 years	266 (35.0)	116 (44.0)	44 (16.0)	106 (40.0)	0.171
50 years	489 (65.0)	246 (50.0)	64 (13.0)	179 (37.0)	
<b>Education</b>					
No college degree	397 (54.0)	198 (50.0)	59 (15.0)	140 (35.0)	0.279
College degree	335 (46.0)	150 (45.0)	48 (14.0)	137 (41.0)	
<b>Marital Status</b>					
Single	521 (69.0)	246 (47.0)	79 (15.0)	196 (38.0)	0.588
Married	234 (31.0)	116 (50.0)	29 (12.0)	89 (38.0)	
<b>Has Health Insurance</b>					
Yes	607 (80.0)	297 (50.0)	82 (13.0)	228 (37.0)	0.364
No	148 (20.0)	65 (44.0)	26 (18.0)	57 (38.0)	
<b>Cancer Knowledge</b>					
Low	235 (33.0)	124 (53.0)	22 (9.0)	89 (38.0)	<b>0.033</b>
Medium	240 (34.0)	115 (48.0)	39 (16.0)	86 (36.0)	
High	233 (33.0)	97 (42.0)	42 (18.0)	94 (40.0)	
<b>Perceived Health Status</b>					
Fair/Poor	139 (18.0)	76 (55)	35 (25.0)	28 (20.0)	<b>0.001</b>
Good	329 (44.0)	171 (52.0)	50 (15.0)	108 (33.0)	
Excellent/Very Good	285 (38.0)	114 (40)	23 (8.0)	148 (52.0)	

Independent Variables	Total N (%)	Perceived Cancer Risk*			P**
		Same N (%)	Higher N (%)	Lower N (%)	
<b>Smoking</b>					
Never smoked	489 (65.0)	235 (48.0)	50 (10.0)	204 (42.0)	<b>0.001</b>
Current/ Former Smoker	266 (35.0)	127 (48.0)	58 (22.0)	81 (30.0)	
<b>Exercise</b>					
More than 3 times a week	229 (31.0)	110 (49.0)	19 (8.0)	97 (43.0)	<b>0.004</b>
One to 3 times a week	263 (35.0)	114 (43.0)	42 (16.0)	107 (41.0)	
Do not exercise regularly	252 (34.0)	129 (51.0)	45 (18.0)	78 (31.0)	
<b>Doctor told you are Obese</b>					
Yes	203 (27.0)	100 (49.0)	40 (20.0)	63 (31.0)	<b>0.011</b>
No	552 (73.1)	262 (48.0)	68 (12.0)	222 (40.0)	
<b>Family Member with Cancer</b>					
No	276 (37.0)	142 (51.0)	19 (7.0)	115 (42.0)	<b>0.001</b>
Yes	479 (63.0)	220 (46.0)	89 (19.0)	170 (35.0)	
<b>Doctor Told You have Cancer</b>					
No	686 (91.0)	323 (47.0)	86 (12.0)	277 (41.0)	<b>0.001</b>
Yes	69 (9.0)	39 (56.0)	22 (32.0)	8 (12.0)	
<b>Discussed Risk of Cancer With Doctor</b>					
Yes	354 (47.0)	156 (44.0)	71 (20.0)	127 (36.0)	<b>0.001</b>
No	401 (53.0)	206 (51.0)	37 (9.0)	158 (40.0)	

\*.Compared to the average man/woman your age";

\*\* Chi-square tests

**Table 2**  
Multinomial Logistic Regression between Independent Variables and Perceived Cancer Risk among African-Americans (n = 755).

Independent Variables	Higher Risk		p
	OR	95% CI	
<b>Gender</b>			
Female	<b>1.88</b>	<b>1.03 – 3.45</b>	0.073
Male	<b>1.00</b>	1.00	
<b>Age</b>			
< 50 years	<b>2.56</b>	<b>1.46 – 4.47</b>	<b>0.003</b>
50 years	<b>1.00</b>	1.00	
<b>Education</b>			
No College degree	1.06	0.63 – 1.79	0.88
College degree	<b>1.00</b>	1.00	0.727
<b>Marital Status</b>			
Single	0.96	0.55 – 1.68	0.99
Married	<b>1.00</b>	1.00	0.991
<b>Has Health Insurance</b>			
Yes	<b>0.40</b>	<b>0.21 – 0.76</b>	<b>0.022</b>
No	<b>1.00</b>	1.00	
<b>Cancer Knowledge</b>			
Low	<b>0.36</b>	<b>0.18 – 0.71</b>	<b>0.023</b>
Medium	<b>0.76</b>	0.43 – 1.34	0.76
High	<b>1.00</b>	1.00	
<b>Perceived Health Status</b>			
Fair/Poor	<b>2.62</b>	<b>1.24 – 5.44</b>	<b>0.001</b>
Good	1.37	0.74 – 2.55	<b>0.47</b>
Excellent/Very Good	<b>1.00</b>	<b>1.00</b>	<b>0.32 – 0.69</b>

<u>Independent Variables</u>	<u>Higher Risk</u>		<u>Higher Risk</u>		<u>P</u>
	<u>OR</u>	<u>95% CI</u>	<u>OR</u>	<u>95% CI</u>	
<b><u>Smoking</u></b>					
Never smoked	<b>0.42</b>	<b>0.25 – 0.70</b>	1.03	0.70 – 1.52	<b>0.002</b>
Current or Former Smoker	<b>1.00</b>		1.00		
<b><u>Exercise</u></b>					
More than 3 times a week	0.80	0.39 – 1.62	1.13	0.72 – 1.78	0.259
One to 3 times a week	1.61	0.90 – 2.87	1.18	0.76 – 1.83	
Do not exercise regularly	1.00		1.00		
<b><u>Doctor told you are Obese</u></b>					
Yes	1.10	0.64 – 1.88	0.83	0.56 – 1.26	0.575
No	1.00		1.00		
<b><u>Discussed Risk of Cancer With Doctor</u></b>					
Yes	<b>2.10</b>	<b>1.22 – 3.58</b>	1.06	0.73 – 1.53	<b>0.022</b>
No	<b>1.00</b>		1.00		
<b><u>Family Member with Cancer</u></b>					
No	<b>0.38</b>	<b>0.21 – 0.71</b>	1.15	0.80 – 1.66	<b>0.001</b>
Yes	<b>1.00</b>		1.00		
<b><u>Doctor told You have Cancer</u></b>					
No	<b>0.39</b>	<b>0.19 – 0.81</b>	<b>4.04</b>	<b>1.69 – 9.68</b>	<b>0.001</b>
Yes	<b>1.00</b>		<b>1.00</b>		

Notes: -2 Log Likelihood = 1154.7; Chi-Square = 152.3; Cox and Snell R-Square = 0.202; Nagelkerke R-Square = 0.233