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## Patterns of Information Behavior and Prostate Cancer Knowledge among African-American Men<sup>1</sup>

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### Abstract

**Objective**—To explore cancer information acquisition patterns among African-American men and to evaluate relationships between information acquisition patterns and prostate cancer prevention and control knowledge.

**Methods**—A random sample of 268 men participated in a state wide interviewer administered, telephone survey.

**Results**—Men classified as non seekers, non medical source seekers, and medical source seekers of prostate cancer information differed on household income, level of education, and beliefs about personal risk for developing prostate cancer. Results from multiple regression analysis indicated that age, education, and information seeking status were associated with overall levels of prostate cancer knowledge. Results from logistic regression analyses indicated that men who included physicians as one of many information resources (medical source seekers) had superior knowledge over non seekers and non medical source seekers on 33% of individual knowledge details.

**Conclusion**—The findings emphasize the need to connect lower income and lower educated African-American men to physicians as a source of prostate cancer control information.

### Introduction

As we continue to advance through the “information age,” prostate cancer prevention and control information continues to be produced and disseminated at a rapid pace. A great deal of publicly available information on prostate cancer is designed to help men who are thought to be cancer-free make informed decisions about participation in screening. Medical professionals recommend that men make informed decisions about participation in screening because all men do not receive the population benefits that are possible when undergoing prostate specific antigen testing (PSA) and digital rectal examinations (DRE) [1, 2]. Men cannot truly make informed screening decisions if they do not know about disease risk

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factors, available screening and early detection tests, and the potential advantages, limitations and disadvantages of participating in screening and early detection programs [3, 4]. It is important for all men to learn this information, especially those in high risk groups such as African Americans. African Americans have a higher lifetime probability of developing prostate cancer at every age of life than whites. African Americans have the highest worldwide incidence of prostate cancer. African Americans develop prostate cancer earlier in life than men from other racial and ethnic groups. African Americans also experience prostate cancer mortality at more than twice the rate of their white counterparts [5].

Information behavior refers to the totality of ways that individuals interact with information [6]. Information behavior is a multidisciplinary field of study with roots in communications, psychology, sociology, and library sciences. Published information behavior research is concentrated in four central areas: (1) information acquisition, (2) information organization, (3) information retrieval, and (4) information use. Information behavior research that focuses on how people acquire information is included under the term “information seeking” [6]. Until recently, information seeking has been viewed in a somewhat narrow manner. That is, information that is actively sought was the sole focus and information that is obtained through passive reception was ignored. Implicit in the research and discourse that was associated with earlier conceptualizations of information seeking was that learning only occurred when people are actively trying to do so. Models now exist in the literature, such as Longo’s expanded model of health information seeking behavior [7], which recognize that the knowledge people use to make health related decisions comes from active information searching and passive information acquisition (Figure 1).

Whether through active search or passive reception, men can acquire prostate cancer prevention and control information from an array of sources within two major communication channels—mass media and interpersonal. Within mass media channels men can learn by reading printed materials, viewing or listening to audiovisual resources, and by reviewing information found on the Internet [8, 9]. Mass media sources are useful for helping men develop a knowledge base about different aspects of prostate cancer at relatively inexpensive costs [8]. However, since important details may be omitted or eliminated from written prostate cancer prevention and control information because of newspaper and magazine space limits in lay publications or professional reports might be written at reading levels that are too high for some readers, prostate cancer information presented in print can be incomplete or inaccessible to some men [8]. Moreover, because reports presented via television may need to be trimmed down to accommodate late-breaking events or television reporters might add sensationalistic expressions to news stories to hold viewers attention, prostate cancer prevention and control information obtained via television can be incomplete or misleading [8, 9].

Within interpersonal channels men can learn from health care providers, family members, and peers [9]. Interpersonal sources are generally used to help men make sense of information that is complex, confusing, or contradictory to what they believe or already know [8, 9]. While physicians have been cited as one of the most accurate, reliable, up-to-date, and useful sources of health information [10], they are not equally accessible to all men. Even when physicians are accessible, small amounts of time allotted to the physician-patient encounter may prevent physicians from sustaining prostate cancer prevention and control discussions long enough for patients to gain a thorough understanding of the information being delivered. Other issues such as physician communication skills or physician bias may deter physicians from initiating discussions about prostate cancer with patients whom physicians feel will not receive the information well. While informal interpersonal sources of prostate cancer information (e.g., friends, family, co-workers) are

generally more accessible than physicians, the information men can obtain from these sources can be dangerously unreliable or less current than the information men can obtain from physicians. For these reasons, cancer control experts recommend that both channels be used in a complementary fashion [10], and that physicians be included among interpersonal sources because they are the producers of gold standard cancer prevention and control information [9, 11].

For decades, cancer control researchers have been calling for more studies of information behavior among “hard-to-reach” populations. Existing information behavior research with African Americans has provided insights into how African-American men generate knowledge to manage cancer after it has been diagnosed and how African-American men generate generalized, non-site specific knowledge [12, 13]. Studies are lacking in the information behavior literature which demonstrate how African-American men who are believed to be cancer free develop knowledge about prostate cancer prevention and control and how active and passive information acquisition influence knowledge. The purpose of the exploratory research presented in this manuscript is to describe patterns of prostate cancer information acquisition by a random sample of African-American men from the South and to evaluate associations between information acquisition patterns and prostate cancer prevention and control knowledge.

## Methods (Data Collection)

The data presented were collected within the context of the Deep South Network for Cancer Control-funded African Americans and Cancer Information Seeking project. During October 2003, cross-sectional data were collected from a random sample of 268 men via a telephone survey. Men were eligible for participation in this study if they (a) were African American, (b) were 40 years of age and older, (c) had not been diagnosed with prostate cancer, and (d) resided in Alabama. Details of the sampling procedures and interview protocol are described elsewhere [14].

## Measures

The research presented here used a subset of survey items that were collected for a larger cancer information seeking project. Descriptions of the items that were used are listed below.

**Demographic Information**—Information was collected regarding participants’ race, age, level of education, marital status, household income, employment status, insurance status, and place of residence.

**Exposure to Prostate Cancer Information**—Participants were asked if they ever sought prostate cancer information from any source? Men who answer “yes” to the global information seeking question were asked follow up questions about information seeking from five specific sources: (1) family members, coworkers or friends; (2) magazines, newspapers or pamphlets; (3) doctors, nurses or other healthcare professionals; (4) the Internet; and (5) television or radio. Response options for each of the abovementioned information seeking questions were “yes,” “no,” or “don’t know/not sure.”

**Family History of Prostate Cancer**—Participants were asked *if any of their blood relatives had ever been diagnosed with prostate cancer*. Response options were “yes,” “no,” or “don’t know/not sure.”

**Risk Perceptions for Developing Prostate Cancer**—Participants were read the statement “*One in 11 American men will develop prostate cancer during his lifetime*” and then asked the question, “*What do you think your chances are of getting prostate cancer someday?*” Response options were “*less than the average man,*” “*greater than the average man,*” or “*about the same as the average man.*”

**Prostate Cancer Knowledge**—To assess prostate cancer knowledge, participants were asked to complete a 6-item measure. Questions included in this measure were compiled and adapted from questions used in studies from the literature where prostate cancer knowledge was assessed [15, 16]. Following guidelines specified by Chan and colleagues [17], each knowledge item was presented as a factual statement to which participants could provide an “*agree,*” “*disagree,*” or “*don’t know/unsure*” response. Composite scores for this index range from 0 – 6, with higher scores indicating greater knowledge. Incorrect and “*don’t know*” responses were coded as incorrect. The Cronbach alpha for this index is 0.60.

## Data Analysis

The study sample was divided according to information seeking behavior as follows: (1) men who reported never seeking prostate cancer information from any source were considered “*non information seekers*”; (2) men who reported ever seeking prostate cancer information from one or any combination of the following sources—printed sources, mass media sources, peers, or the Internet—were classified as “*non-medical source information seekers*”; (3) men who reported ever receiving prostate cancer information from physicians and any combination of the following sources—printed sources, mass media sources, peers, or the Internet—were classified as “*medical source information seekers*”. These three groups were compared on demographic variables, risk characteristics and prostate cancer control knowledge.

Because small cell sizes created problems with making statistical comparisons for some demographic variables, employment status, education and income were collapsed into smaller categories. Employment status, which was originally collected as a categorical variable with 5 categories, was collapsed into two groups (employed and unemployed). Education, which was collected as an ordinal variable with 20 categories, was collapsed into three groups (less than high school, high school graduate, and greater than high school). Income, which was collected as a categorical variable with 7 categories, was dichotomized into <\$25,000 and ≥\$25,000.

Several statistical procedures were computed with the study variables organized as listed above. For univariate analyses, frequency tables and measures of central dispersion were computed to describe sample characteristics. For bivariate analyses, Chi-square and Fisher’s exact test were conducted to assess group differences for categorical variables. Independent samples t-test and analysis of variance (ANOVA) were conducted to assess group differences for continuous variables. Pearson’s correlation was conducted to assess relationships between continuous variables.

For multivariate analyses, multiple regression was conducted to investigate the effect of study variables on the knowledge scale. Multivariate logistic regression was conducted to investigate the effect of study variables on individual knowledge items. Variables significant at  $p < .05$  in bivariate analyses were included as independent variables in all multivariate analyses.

A referent group was selected for each of the independent variables in all of the logistic regression models. For education, greater than high school was the referent group. For employment status, employed was the referent group. For income, ≥\$25,000 was the

referent group. For information seeking category, medical source seekers was the referent group. All knowledge items used in logistic regression analyses were binary coded, where 0 = incorrect answer and 1 = correct answer.

## Results (Participant Characteristics)

Demographic and risk characteristics are presented in Table 1. The mean age of participants was 59 years. The age range was 40–89 years. A majority of participants (64%) were married, and most reported being unemployed (52%). A majority of respondents completed high school (85%), and most respondents reported an annual household income \$25,000 (56%). One fifth (20%) stated that they had a family history of prostate cancer. Most participants (93%) believed their levels of risk for developing prostate cancer was less than or about the same as the average man.

Using the information-seeking classification scheme described earlier, 49% of study participants were non seekers, 7% were non medical seekers, and 44% were medical seekers. Demographics by information seeking categories are also presented in Table 1. Men classified as non seekers were significantly more likely to have less than a high school diploma than any other group of information seekers ( $\chi^2 = 12.42, p = .01$ ). Men classified as medical information seekers were significantly more likely to have annual household incomes \$25,000 ( $\chi^2 = 17.45, p = .00$ ).

### Information Sources

Of the 51% of study participants who reported ever receiving prostate cancer prevention and control information from any source, 86% reported receiving information from physicians, 62% from the mass media (e.g., television or radio), 61% from printed sources, 36% from peers, and 18% from the Internet.

Seventy-nine percent of study participants who reported ever receiving prostate cancer information reported getting information from more than one source. The most common combinations of sources mentioned were physicians and mass media (56%), physicians and print (50%), print and mass media (42%), physicians and peers (33%), print and peers (27%), and mass media and peers (26%).

### Demographic Characteristics by Information Sources

Demographic characteristics by information sources were also evaluated and two significant relationships were found. Unemployed information seekers were significantly less likely to seek out information via the Internet than those who were employed ( $p = .03$ ). Unmarried information seekers were less likely to seek out information from the Internet than seekers who were married ( $p = .01$ ).

### Factors Associated with Knowledge (Bivariate Analyses)

Participant characteristics by levels of knowledge were evaluated and several significant relationships were found. Older men had higher levels of knowledge than younger men ( $r = -.232, p = .01$ ). Men who were employed had higher overall levels of knowledge than men who were unemployed (3.28 vs. 2.78; [ $t = -3.43, p = .00$ ]). Men with annual household incomes greater than or equal \$25,000 had higher levels of knowledge than men with annual household incomes less than \$25,000 (3.37 vs. 2.72; [ $t = -4.08, p = .01$ ]). Men with greater than a high school education had higher levels of knowledge than men with less than a high school education (4.30 vs. 3.36; [ $F = 13.83, p = .01$ ]). Married men had higher levels of knowledge than unmarried men (3.17 vs. 2.77; [ $t = -2.59, p = .05$ ]). Medical seekers had higher levels of knowledge than non information seekers 3.34 vs. 2.74; [ $F = 11.19, p = .01$ ].

Medical source seekers knew more individual prostate cancer details than their non information seeking and non medical source information seeking counterparts (Table 2).

### Factor Associated with Overall Knowledge (Multiple Regression Analysis)

The results of a regression model, in which overall level of prostate cancer knowledge was regressed on age, employment status, income, education, marital status, and information seeking category, was significant ( $F=9.32, p=.01$ ). The standardized beta coefficients for variables that were significant in this model were age ( $\beta = -.23, p=.01$ ), education ( $\beta = .22, p=.01$ ) and information seeking category ( $\beta = .17, p=.01$ ). Combined, these 3 variables accounted for a modest ( $R^2 = .20$ ) amount of the variance in overall prostate cancer knowledge.

### Multivariate Analysis for Knowledge Details (Logistic Regression Analyses)

The results of a series of logistic regression models to determine influences on specific knowledge details are listed in Table 3. The variable associated with accurate knowledge about older men being more at-risk for developing prostate cancer than younger men was level of education (model 1). Men with less than a college education were 79% less likely to correctly answer this question than college educated men (OR= 0.21, 95% CI= 0.08, 0.51).

The variables associated with accurate knowledge about African-American men being more at risk for developing prostate cancer than white men were age and information seeking category (model 2). Younger men were 4% less likely to correctly answer this question than older men (OR=0.96, 95% CI=0.93, 0.99). Non seekers of prostate cancer information were 55% less likely to correctly answer this question than medical information seekers (OR=0.45, 95% CI=0.23, 0.88).

Concerning accurate knowledge about the role of family history in the development of prostate cancer, the variables that were significant were education, age, and information seeking category (model 3). Younger men were 6% less likely to know that men without a family history of prostate cancer are still at risk for developing the disease (OR=0.94, 95% CI=0.90, 0.98). Men with less than a high school education were 82% less likely to know this information than college educated men (OR=0.19, 95% CI=0.07, 0.50). Non seekers of prostate cancer information were 77% less likely to correctly answer this question compared to medical source seekers (OR=0.23, 95% CI=0.08, 0.63).

No study variables were associated with accurate knowledge about the PSA blood test not being a tool to tell men about the type of cancer they have (aggressive vs. indolent) (model 4), DRE not being a tool to tell men about the type of cancer they have (model 5), and the growth of most prostate cancers being slow (model 6).

## Discussion

Results from two large randomized trials conducted in Europe (the European Randomized Study of Screening in Prostate Cancer [ERSPC])[18] and US (the Prostate, Lung, Colorectal, and Ovarian [PLCO] screening trial) [19] have refueled the decades long debate on the benefits of screening for prostate cancer and reinforced the need to educate men to help them make informed decisions about screening. Data from the ERSPC illustrate that 1,410 men need to be screened and 48 men need to be treated in order to prevent one prostate cancer death [18]. The potential for overdiagnosis and overtreatment is something that men who are considering screening should factor into their screening decision making process. The data for the current study were collected in 2003 while the ERSPC and PLCO screening trials were still in process. Thus, it is conceivable that men in our sample did not know that overdiagnosis and overtreatment were issues that needed to be factored into their



decision making about screening. Moving forward, cancer health educators need to ensure that educational programs and materials about prostate cancer screening also help men learn about the potential for overdiagnosis and overtreatment.

To date, little published research has described the prostate cancer prevention and control information acquisition behaviors of African-American men. Of the few studies that exist, most have been within the context of coping and treatment after the disease has been diagnosed or focused solely on active pathways of education. To the best of our knowledge, this is one of the first research studies that gives attention to the issue of passive and active information acquisition among African-American men who are believed to be cancer-free and examines how different information acquisition patterns influence knowledge.

Our results suggest that there is a fair amount of variability in the prostate cancer information acquisition behaviors of African-American men. A slight majority of men in our sample (51%) reported actively searching for prostate cancer information during their lifetime. The most common sources reported by these men in order of popularity were physicians, mass media sources, and printed sources. The least common sources men reported using were peers and the Internet. The findings that physicians are the most frequently used source of information and the Internet is one of the least frequently used sources are consistent with results from other studies that looked at different cancer sites across the continuum of care [10,20,21].

Perceptions of information quality have been shown to be a salient determinant of information source selection. Using data from NCI's 2003 Health Information National Trends Surveys (HINTS), Hesse and colleagues [22] found that trustworthiness was positively associated with the use of different cancer information sources in a nationally representative sample. When we evaluated indicators of information trustworthiness with our sample, similar relationships were found. Men included in our sample rated information that could be obtained from physicians ( $\mu = 1.50$ ) as more reliable than information that could be obtained from peers ( $\mu = 1.83$ ). Our men also rated information that could be obtained from physicians ( $\mu = 1.49$ ) as more up-to-date than information that could be obtained from peers ( $\mu = 1.70$ ).

Our study data were collected several years ago when researchers were just beginning to explore the usefulness of lay health advisors as agents of change in health promotion. Over the past decade, researchers have become more attuned to working with lay community members to deliver prostate prevention and control information. For example, Fraser and colleagues [23] developed a curriculum to train barbers as lay health advocates. Hart et al. [24] developed strategies to recruit African-American barbers and barbershops for prostate cancer education. Luque and colleagues [25] found that a barbershop administered intervention was effective in increasing prostate cancer knowledge among African-American barber clients. Future research should focus on ways to replicate programs using barbers in barbershops and extend this effective lay health model to other culturally accepted groups and venues.

Even though the majority of men in our study reported ever receiving prostate cancer information, a large proportion (49%) reported never receiving information. This finding is troubling given the high rates of prostate cancer morbidity and mortality among African-American men, the diverse professional opinions and recommendations regarding prostate cancer screening and early detection, and the centrality of informed decision making to screening and early detection [1–3]. Equally troubling was the finding that family history of prostate cancer did not influence active information acquisition. About one-fifth (17%) of men with a family history of prostate cancer in this sample reported never receiving prostate

cancer information. It is well known that African-American men with a family history of prostate cancer have one of the highest levels of risk for developing the disease [1]. However, a majority of men with a family history of prostate cancer (85%) in this sample believed their risk for developing prostate cancer was either less than (16%) or about the same (69%) as the average man. This finding suggests that risk related information should be a part of the curricula that are used in educational initiatives targeting African American men, including lay health advisors programs described above.

The second purpose of this study was to evaluate the impact that exposure to different information sources has on knowledge about prostate cancer. This study shows that information acquisition in any form contributes to increased prostate cancer control knowledge. When levels of knowledge were assessed using the adapted prostate cancer knowledge scale [15,16], we found that scores for men who were non seekers, non medical source seekers, and medical source seekers of prostate cancer information were 2.74, 2.95, and 3.34, respectively. When we evaluated the influence of study variables on specific prostate cancer knowledge details, information seeking status emerged as a significant predictor variable on 33% (2/6) of items. This finding supports the professional recommendation that men should include physicians among one of many information sources to learn about prostate cancer prevention and control [10], and suggests that community education programs delivered in any form or at any venue should encourage men to seek out additional information from physicians.

### Limitations

In addition to the study findings mentioned above, there are several limitations that must be acknowledged. First, the cross sectional research design limits our ability to determine temporal relationships between risk perceptions for developing prostate cancer and information seeking behavior. Second, family history of prostate cancer was not verified over and beyond what was reported by participants. Third, given that our results are based on self-report, issues such as social desirability and recall bias may also apply.

### Conclusion

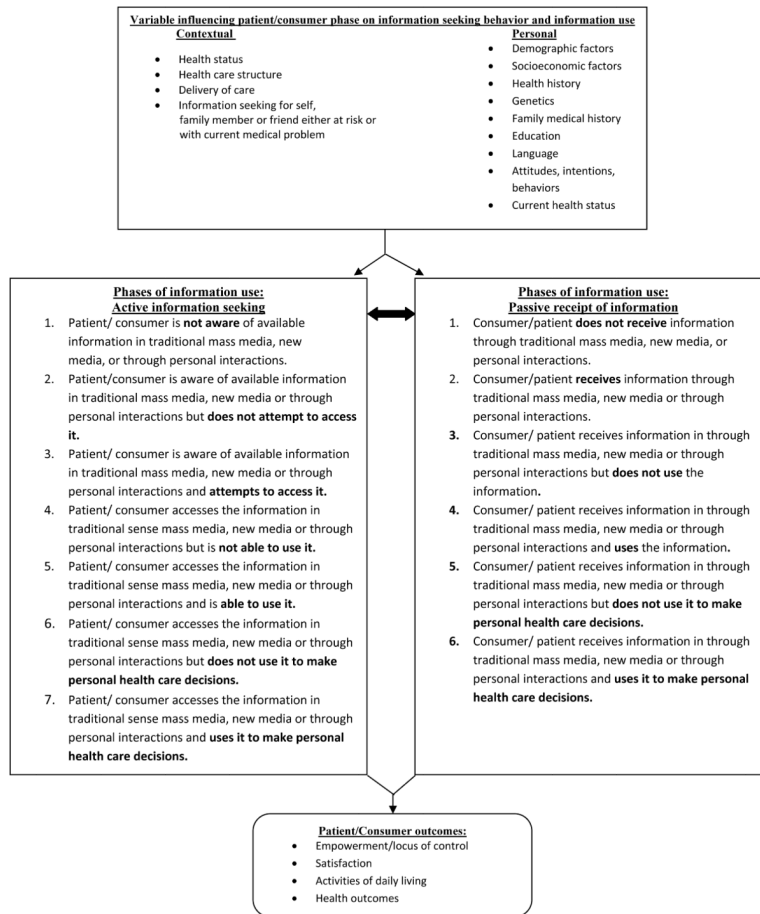
In summary, we found that African-American men with higher levels of income and education were more likely to be medical source seekers of prostate cancer prevention and control information. Medical information seekers displayed superior knowledge about prostate cancer control issues over their non information seeking and non medical source information seeking counterparts. Given these findings, cancer health educators need to devise innovative ways to get information that would be obtained during an information exchange with physicians to African-American men with lower levels of income and education. Given the barriers associated with directly accessing physicians, health educators should explore ways to use current technology to provide live and pre-recorded information from physicians to African-American men.

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**Figure 1.** Expanded conceptual model of health information seeking behaviors and the use of information for health care decisions.

**Table 1**

Sample Characteristics

<i>Characteristics</i>	Total N=268	Non Seekers N=132 (49%)	Non Medical Seekers N=19 (7%)	Medical Information Seekers N=117 (44%)	p-value
<b>Age (years)</b>					
Range	40 – 89	40 – 89	48 – 82	40 – 89	
Mean	59	57	63	59	.10
<b>Employment status</b>					
Employed	127 (48%)	62 (47%)	7 (37%)	58 (50%)	.56
Unemployed	140 (52%)	70 (53%)	12 (63%)	58 (50%)	
<b>Income (annual household)</b>					
<\$25,000	101 (44%)	60 (56%)	10 (62%)	31 (30%)	.00
\$25,000	127 (56%)	47 (44%)	6 (37%)	74 (70%)**	
<b>Education</b>					
Less than high school	40 (15%)	29 (22%)	3 (16%)	8 (7%)	.01
High school graduate	16 (6%)	8 (6%)	2 (10%)	6 (5%)	
Greater than high school	212 (79%)	95 (72%)	14 (74%)	103 (88%)*	
<b>Marital Status</b>					
Unmarried	94 (35%)	55 (42%)	7 (37%)	32 (28%)	.07
Married	171 (64%)	76 (58%)	12 (63%)	83 (72%)	
<b>Risk Perception</b>					
Less than the average man	50 (20%)	21 (17%)	2 (10%)	27 (24%)	.02
About the same as the average man	184 (73%)	96 (79%)	17 (89%)	71 (63%)	
Greater than the average man	19 (7%)	5 (4%)	0 (0%)	14 (12%)*	
<b>Prostate Cancer Family History</b>					
No	209 (81%)	105 (83%)	13 (68%)	91 (80%)	.34
Yes	50 (20%)	22 (17%)	6 (32%)	22 (19%)	

\*  $p < .05$ ,

\*\*  $p < .01$

**Table 2**

Prostate Cancer Knowledge Responses

Prostate Cancer Knowledge Questions	Percent Answered Correctly				p-value
	Total Sample	Non-Seekers	Non Medical Seekers	Medical Seekers	
Younger men are more likely to develop prostate cancer than older men	76.9%	68.2%	78.9%	86.3% **	.003
White men are more likely to develop prostate cancer than African-American men	65.7%	58.3%	63.2%	74.4% *	.028
Men without a family history do not have to worry about developing prostate cancer	83.2%	75.0%	84.2%	92.3% **	.001
The PSA test will tell men which type of prostate cancer they have	10.1%	9.1%	5.3%	12.0%	.580
The DRE will tell men which type of prostate cancer they have	24.6%	18.2%	15.8%	33.3% *	.014
Most prostate cancer usually grow fast	41.4%	45.5%	47.4%	35.9%	.268

\*  $p < .05$ ,

\*\*  $p < .01$ ,

**Table 3**

**Multiple Logistic Regression Models with Significant Predictor Variables for Prostate Cancer Knowledge Details**

	$\chi^2$	OR	95% CI
<b>Model 1:</b>			
<i>Likelihood of knowing older men are more at risk for developing prostate cancer than younger men</i>	33.28***		
<b>Education</b>			
Less than high school		0.21	0.09 – 0.51
High school graduate		0.57	0.16 – 2.02
Greater than high school		1.00 <sup>a</sup>	
<b>Model 2:</b>			
<i>Likelihood of knowing African American men are more at-risk for developing prostate cancer than white men</i>	29.73***		
<b>Age</b>			
		0.96	0.93 – 0.99
<b>Information Seeking Category</b>			
Non seeker		0.45	0.23 – 0.88
Non medical seeker		0.46	0.15 – 1.46
Medical seeker		1.00 <sup>a</sup>	
<b>Model 3:</b>			
<i>Likelihood of knowing men without a family history are at risk for developing prostate cancer</i>	55.74***		
<b>Age</b>			
		0.94	0.90 – 0.98
<b>Education</b>			
Less than high school		0.18	0.07 – 0.50
High school graduate		0.29	0.07 – 1.17
Greater than high school		1.00 <sup>a</sup>	
<b>Information Seeking Category</b>			
Non seeker		0.23	0.08 – 0.63
Non medical seeker		0.39	0.08 – 1.93
Medical seeker		1.00 <sup>a</sup>	

\* p < .05,

\*\* p < .01,

\*\*\* p < .001

<sup>a</sup> Reference group