

## Social Determinants Associated with Colorectal Cancer Screening in an Urban Community Sample of African-American Men

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### Abstract

**Background:** African-American men are disproportionately burdened with colorectal cancer (CRC). Research is scarce on the social determinants that may influence CRC screening as the primary strategy for early detection among African-American males.

**Methods:** African-American men over the age of 18 years ( $n=558$ ) were recruited from a community health fair and anonymously surveyed about their health and cancer screening behaviors. A social ecological theoretical framework was utilized to identify intrapersonal, interpersonal, organizational, and community predictors of CRC screening, which may be associated with social determinants of health and health behaviors. Analysis included correlations and logistic regression.

**Results:** The mean age of participants was 54.3 years with 85.8% of men being over 40 years of age. Regarding CRC screening: 50.5% ( $n=282$ ) of African-American male participants had received any type of CRC screening at any time. Positive predictors of CRC screening included: health insurance status, older age, having spoken with a health provider about family cancer risk, and having a regular doctor. However, employment status and poor self-rated health were negative predictors of the outcome.

**Conclusions:** Social determinants of health, such as healthcare access and interactions with health systems, along with employment play a critical role in facilitating CRC screening completion in high-risk underserved populations such as African-American men.

**Key words:** African-American; colorectal cancer; men; screening; social determinants

### Introduction

THE AMERICAN CANCER SOCIETY reports that 1 in 4 deaths in the United States of America (USA) can be attributed to cancer. Colorectal cancer (CRC) is the third most commonly diagnosed cancer in the USA as well as the third leading cause of cancer death for both men and women.<sup>1</sup> Routine cancer screening represents a critical avenue for the early detection of CRC and the detection and removal of pre-cancerous polyps or early-stage tumors is a significant protective factor against CRC mortality. With 5-year survival rates near 90% when diagnosed at early localized stages (I and II),<sup>2-4</sup> timely screening is vital to the long-term prognosis of those diagnosed with CRC.

African-American men are disproportionately burdened by cancer overall and are particularly affected by CRC. With

the highest age-adjusted rate of new CRC cases (72.9 per 100,000 compared to 61.4 per 100,000 for white males),<sup>4</sup> African-American men are also 20% less likely to be alive within 5 years of diagnosis when compared to white men. This disparity can be attributed to more advanced disease stages at diagnosis (stage III and IV) due to delayed detection of the disease via screening.<sup>2,5</sup> Previous research has identified several factors that are negatively associated with timely CRC screening among African Americans, in general, such as younger age, lower household income, lower education, being unmarried, being uninsured, and not having had a medical visit for any reason in the past 12 months.<sup>6,7</sup> Studies have also reported a number of barriers to routine screening for CRC among African-American men, specifically. These barriers include low perceived risk, lack of knowledge about risk factors and symptoms,<sup>5</sup> lack of health insurance and/or a

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regular healthcare provider, lack of social support to complete screening, fear of pain, embarrassment, or side-effects due to screening tests,<sup>2</sup> mistrust of the healthcare system, failure of physicians to recommend screening even for high-risk African-American men, and the cost of screening tests.<sup>8,9</sup> In addition, having less knowledge about CRC overall, negative perceptions about screening, low perceived risk for CRC, and fear of pain, discomfort, embarrassment, or a poor diagnosis have all been associated with decreased screening behaviors.<sup>10</sup>

Though several studies have explored the underlying reasons for underutilization of CRC screening among African Americans generally, and African-American men specifically, few studies have examined the CRC screening behaviors of African-American men from an ecological perspective to assess whether this group faces unique challenges to adhering to the recommended CRC screening guidelines. Of those studies that have explored CRC among African-American men, socioeconomic conditions and other social determinants of health are reported as the reasons for underutilization of CRC screening among African-American men. This connection between social conditions and one's ability to engage in health behaviors such as cancer screening is well supported in the literature. For example, economists have estimated the cost of CRC care to patients and the medical system to reach nearly \$11.5 billion by the year 2020, a 50% increase over associated costs in the year 2000.<sup>11</sup> Thus, health insurance coverage, which is critical to accessing expensive cancer screening tests such as colonoscopy, is highly related to social conditions such as employment status and income.

Data shows that underinsurance is prevalent upon African-American men and other minority populations.<sup>12</sup> For example, in a study of the correlates of CRC screening disparities in Virginia, researchers found that male participants with any form of health insurance were twice as likely to report having completed CRC screening (in any modality) than male participants reporting no health insurance.<sup>13</sup> Another study of over 63,000 adult participants from the National Health and Interview Survey (NHIS) found that health insurance coverage was associated with higher CRC screening rates for adults under the age of 65 across all screening modalities.<sup>12</sup> Furthermore, a study examining biological, psychological, behavioral, and social correlates of CRC screening in African Americans ( $n=492$ ) found that factors representative of the social system such as education, employment, health insurance, and health provider access significantly influenced the completion of CRC screening in the overall sample.<sup>8</sup> Despite the importance of the abovementioned studies in CRC screening among African-American males, the social determinants that directly influence African-American male CRC screening completion are yet to be elucidated, which is concerning in light of the disproportionate CRC burden of African-American males. This study aims to address this gap in the literature.

### Conceptual Model

Social ecological theory provides a framework for examining the contextualized nature of health and health behaviors in terms of how individuals, their health, and their surrounding physical and social environments interact at multiple levels of a health problem and are interdependent.<sup>14</sup> This theoretical perspective has two key propositions. First, that behavior both shapes and is shaped by multiple levels of in-

fluence, and second, that individual behavior affects and is affected by the surrounding social environment.<sup>15</sup> The multiple levels of influence that impact health-related behaviors and conditions are outlined by McLeroy *et al.*<sup>16</sup> as *intrapersonal factors* (such as individual attitudes, behaviors, knowledge, and skills); *interpersonal processes* (such as social networks made of family, friends, or colleagues that provide support); *institutional factors* (such as formal or informal organizations which may have rules or expectations which impact health behaviors); *community factors* (such as informal or formal networks and norms among individuals, families, or groups/organizations); and *public policy* (such as local, state, and federal laws or regulations which promote or inhibit certain health practices which impact disease prevention, control, or management).<sup>17,18</sup> Since individual behavior affects and is affected by the surrounding social environment, conceptual models that facilitate positive behavior changes in the individual and the environment are key. Recognizing that one can influence the other, it is apparent that social ecological approaches to addressing health challenges within a community (that is, approaches that focus on social determinants across the five levels of influence) are likely to be effective.

Literature has indicated that more proximate factors such as personal characteristics, family and peer relations, and community resources are critical elements in promoting and maintaining cancer-related preventive health behaviors such as cancer screening.<sup>19-21</sup> Therefore, the purpose of this study was to understand the influence of social determinants on the CRC screening behaviors of African-American men, and to identify predictors of screening behavior within the sample. This study uses the social ecological framework by outlining the social determinants of CRC for African-American men at different social ecological levels. The intrapersonal factors included demographics, self-reported health, and self-care, while the interpersonal factors included the role of significant others as influencers of health-related decision-making. The organizational level considered the available health insurance for African-American male respondents while community factors, which included social contextual factors such as church membership, sick-leave availability, and health system access were also considered. No public policy factors were assessed in the current study.

### Methods

#### *Sample and procedure*

This exploratory study utilized a cross-sectional, convenience sample of participants from an annual community health fair in northeast Ohio that was specifically targeted toward minority men's health needs. Health fair participants were all men, aged 18 years and older, who could read and write in English; and who self-selected to complete a paper-based self-reported survey at an annual community health fair hosted by a large medical system. The study was approved by the Institutional Review Board at the medical system. Undergraduate student volunteers were trained to solicit participation by male attendees of the health fair and participants gave oral consent following a script read by volunteers. All surveys were anonymous and collected by volunteers after completion. The 40-item survey took approximately 10 min to complete and there was no compensation for participation. Following the survey, information

## SOCIAL DETERMINANTS WITH CRC SCREENING OF AFRICAN-AMERICAN MEN

3

was made available to the participants on prostate and CRC risk along with directions for where screening and physician consultation could be obtained at the health fair. The current study included the 558 African-American male respondents from the health fair, which represented nearly 25% of the approximately 2400 total health fair attendees. This sample was chosen due to ease of access to a group that has been underrepresented in CRC screening research. The mean age of our sample was 54.4 years with 46.8% being over 55 years old. Table 1 displays the demographics of the sample.

*Measures*

**Independent variables.** Intrapersonal measures included age, education, household income, employment status, self-reported health, and ability to care for one's self. Data on respondents' age was taken from a single open-ended ques-

tion asking participants their age. Response categories for level of education ranged from 1 ("Less than or some elementary school") to 8 ("Graduate or professional degree"). For combined household income, response categories ranged from "Less than \$10,000" to "More than \$50,000." Employment status was a single multiple-choice item asking the respondent if they were currently employed for wages and to select the type of employment that categorized them. The nine response categories ranged from full-time employment to disabled/unable to work. Self-reported health was measured by a single item asking participants to rate their overall health with responses including: "Excellent," "Very good," "Good," "Fair," and "Poor." Ability to care for one's self was also measured using a single item stating: "Overall, how confident are you in your ability to take good care of your health?" The five responses ranged from "Completely confident" to "Not at all confident." See Table 2.

TABLE 1. SAMPLE DEMOGRAPHICS

	CRC screening		No CRC screening		Total	
	n	%	n	%	n	%
Age (55 years of age or older)						
Yes	186	65.9	75	27.2	261	46.8
No	96	34.1	201	72.8	297	53.2
Marital status						
Married	128	45.4	79	28.6	207	37.1
Not married	154	54.6	197	71.4	351	62.9
Education (some college or more)						
Yes	152	53.9	122	44.2	274	49.1
No	130	46.1	154	55.8	284	50.8
Employment						
Employed	110	39	153	55.4	263	47.1
Not employed	172	61	123	44.6	295	52.9
Income (\$20k or less)						
Yes	81	28.7	129	46.7	210	37.6
No	201	71.3	147	53.3	348	62.4
Self-reported health (Fair to Poor)						
Yes	60	21.3	75	27.2	135	24.2
No	222	78.7	201	72.8	423	75.8
Insurance						
Yes	203	72	107	38.8	310	55.6
No	79	28	169	61.2	248	44.4
Social support						
Yes	52	18.4	53	19.2	105	18.8
No	230	81.6	223	80.8	453	81.2
Church member						
Yes	178	63.1	137	49.6	315	56.5
No	104	36.9	139	50.4	243	43.5
Have a regular doctor						
Yes	194	68.8	98	35.5	292	52.3
No	88	31.2	178	64.5	266	47.7
Talk to doctor about family history						
Yes	174	61.7	72	26.1	246	44.1
No	108	38.8	204	73.9	312	55.9
Confidence (Very to Completely)						
Yes	184	65.2	158	57.2	342	61.3
No	98	34.8	118	42.8	216	38.7

CRC, colorectal cancer.

TABLE 2. SOCIAL ECOLOGICAL FRAMEWORK

<i>Levels of influence</i>	<i>Description</i>	<i>Application to current study</i>
<i>Intrapersonal</i>	Personal attributes such as attitudes, beliefs, and knowledge that shape health behaviors	Age, education, household income, employment status, self-reported health, and ability to care for one's self
<i>Interpersonal</i>	Relationships with family, friends, colleagues, and others which contribute social support and help to define identity	Marital status, usual source of care (regular doctor), talking with doctor about family history of cancer, and social support
<i>Organizational</i>	Groups to which one belongs and/or informal social institutions and processes which influence health behaviors	Health insurance
<i>Community</i>	Formal or informal systems with corresponding social norms among people, groups, and organizations	Church membership and paid sick-leave availability
<i>Public policy</i>	Laws and practices at the local, state, and national levels that promote or regulate health behavior	N/A

Adapted from Robinson,<sup>18</sup> p. 398.

Interpersonal measures included marital status, having a regular doctor, talking with a doctor about one's family history of cancer, and social support. For marital status, a dummy variable was created to easily identify participants who were currently married. A value of "1" was assigned to participants who reported being currently married while "0" was assigned to those who reported being single, divorced, separated, widowed, or a member of an unmarried couple. Having a regular doctor was measured with a single item asking participants "Do you have a regular doctor or health care provider?" Responses were coded as "1" (Yes) or "2" (No), and a dummy variable was created which recoded the responses as 1=yes or 0=no. Talking with the doctor about one's family history with cancer was assessed using a single item: "Have you ever talked with a doctor or health care professional about your family history of cancer (about the members of your family who have been diagnosed with cancer)?" Response values were 1=yes or 2=no. Lastly, there was a single question about social support which asked, "When you go to a doctor or health care provider for care, do you regularly take someone along with you for social support?"; responses were coded as 1=yes or 2=no.

The organizational measure included health insurance status and was assessed using a single item which asked participants "Are you covered by any of the following types of health insurance?" Response categories included: "Medicare," "Medicaid," "Employer-based insurance," "Health insurance purchased directly," and "Self-pays (no insurance coverage)." A dummy variable was created to capture participants who were insured (coded as "1") and uninsured (coded as "0"). Paid sick-leave availability and church membership represent community measures that provided social contextual data. Paid sick leave availability was measured by a single dichotomous item asking respondents whether paid sick leave was available at their current or most recent employment; coded 1=paid sick leave available and 0=no paid sick leave available. Church membership was assessed by a single item asking, "Do you belong to or regularly attend a

church?" Responses were 1=yes and 2=no. No social determinants were assessed at the public policy level of the conceptual framework.

**Dependent variable.** The outcome, completion of any form of CRC screening at any time, was assessed by asking: "Have you ever had any type of medical test to screen for colon cancer or colorectal cancer such as colonoscopy, sigmoidoscopy, stool test or fecal occult blood test?" This question was coded 1 = received any form of cancer screening and 0 = no cancer screening received.

#### *Data analysis*

Data were analyzed using SPSS version 19 (SPSS, Inc., IBM). Univariate (descriptive) analyses were performed with frequency distributions on each pertinent variable to determine a profile for the sample of African-American men. Potential relationships between demographic variables and the key outcome variable (i.e. cancer screenings) were analyzed. Bivariate analysis with cross-tabulations and chi-squared tests of significance were performed to determine if any significant differences, associations, or other relationships existed between the independent and dependent variables. Bivariate logistic regression was performed to determine which intrapersonal, interpersonal, organizational, and community variables best predicted the CRC screening outcome.

**Missing value analysis.** Data were received from 558 African-American men and screened for missing values to determine whether non-responsiveness among survey participants was associated with any essential study variables. The SPSS missing values analysis (MVA) module was utilized to determine whether or not missing values were randomly distributed across all observations. No variables were identified as having significant missing values. Imputation methods were not utilized for item non-response; instead, cases with any missing data on variables under analysis

**SOCIAL DETERMINANTS WITH CRC SCREENING OF AFRICAN-AMERICAN MEN**

were deleted (i.e. listwise deletion). Listwise deletion of cases is an appropriate statistical method if missing response values are independent of one another and missing completely at random.<sup>22</sup>

**Regression analysis.** The goal of this study was to identify a set of predictor variables (i.e. social determinants) for the binary outcome that predicts target group membership for individuals in the sample. Binary logistic regression was performed for the outcome of interest, CRC screening, in order to assess the contribution of intrapersonal, interpersonal, organizational, and community determinants in predicting the outcome variable. The outcome variable was coded as "1" or "0" with 1 indicating the receipt of CRC screening at any time and by any modality. Non-linearity was assessed for the only continuous independent variable, participant age, using the Box-Tidwell method. Age was found to be non-linear in relation to the CRC screening outcome because CRC is most often diagnosed in individuals aged 50 and over. Participant age was then dichotomized into participants aged 54 and below (coded as 0), and aged 55 and over (coded as 1) which corrected the issue of non-linearity.

Collinearity was assessed by regressing each independent variable on all other independent variables in a linear regression analysis after which a group of multicollinearity diagnostic statistics were evaluated. These diagnostic statistics include the *r*-squared (*r*<sup>2</sup>) value, tolerance, and variance inflation factor (VIF). No issues with collinearity were detected. An examination of the influence of each case on the estimated model was conducted. Results indicated that on the mean, influential cases did not significantly influence regression coefficients and individual observations with absolute values above the Dfbeta cutoff were not omitted from the subsequent analyses. An examination of leverage values indicated that any outlying cases did not unduly influence regression coefficients.

During the model building process, independent predictor variables were selected based on significant associations in the correlation matrix and information from the literature on potential predictive factors with the goal of building the strongest and most informative model. Independent predictor variables were entered simultaneously, as opposed to stepwise, because there was no clear theoretical knowledge concerning which predictors were more important.

**Results**

*Bivariate analysis*

Bivariate analyses were conducted to evaluate the linear relationships between intrapersonal, interpersonal, organizational, and community factors and CRC screening. Table 3 details the bivariate correlations from this analysis. Of note, having completed any form of CRC screening was positively associated with having a regular healthcare provider (*r*=0.333, *p*<0.001), having any form of health insurance (*r*=0.334, *p*<0.001), being married (*r*=0.174, *p*<0.001), being 55 years of age or older (*r*=0.389, *p*<0.001), church membership (*r*=0.136, *p*<0.01), having spoken to a doctor about one's family history of cancer (*r*=0.359, *p*<0.001), and the availability of paid sick leave at the current or most recent employment (*r*=0.152, *p*<0.001). Having an annual

TABLE 3. BIVARIATE CORRELATIONS<sup>†</sup>

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. 55 years of age or older	—													
2. Married	0.128**	—												
3. Some college or more	-0.001	0.047	—											
4. Employed	-0.252***	0.026	0.107*	—										
5. \$20k or less income	-0.143**	-0.352***	-0.164***	-0.178***	—									
6. Fair to poor health	0.049	0.008	-0.078	-0.106*	0.140**	—								
7. Insurance	0.296***	0.306***	0.114**	-0.022	-0.400***	-0.034	—							
8. Social support	0.017	0.048	-0.198***	-0.087*	0.080	0.060	-0.031	—						
9. Church member	0.077	0.121**	0.089*	0.040	-0.116**	-0.052	0.138**	-0.003	—					
10. Have a regular doctor	0.276***	0.176***	0.098*	-0.120**	-0.133**	-0.014	0.446***	0.000	0.095*	—				
11. Talk to doctor re family cancer history	0.180***	0.200***	0.081	-0.079	-0.176***	0.013	0.264***	0.007	0.081	0.363***	—			
12. Paid sick leave	0.057	0.194***	0.202***	0.187***	-0.304***	-0.071	0.376***	-0.062	0.101*	0.256***	0.115**	—		
13. Very to completely confident	-0.088*	0.077	0.111**	0.043	-0.081	-0.238***	0.148***	-0.032	0.089*	0.162***	0.105*	0.056	—	
14. CRC screening	0.389***	0.174***	0.097*	-0.165	-0.186***	-0.069	0.334***	-0.010	0.136**	0.333***	.359***	0.152***	0.082	—

<sup>†</sup>Expressed as Pearson correlations. \**p*<0.05; \*\**p*<0.01; \*\*\**p*<0.001.

TABLE 4. LOGISTIC REGRESSION

Predictor variable	B	SE (B)	Wald	Odds ratio	95% CI for EXP(B)	
					Lower	Upper
Over age 55	1.304***	0.214	37.136	3.684	2.422	5.603
Employed	-0.456*	0.209	4.762	0.634	0.421	0.955
Insured	0.698**	0.223	9.830	2.010	1.299	3.109
Regular doctor	0.472*	0.224	4.430	1.603	1.033	2.488
Talk to doctor re family cancer history	1.169***	0.212	30.341	3.219	2.124	4.880
Poor SRH	-0.506*	0.245	4.284	0.603	0.376	0.973
Self care	0.129	0.221	0.343	1.138	0.738	1.745
Church member	0.368	0.206	3.209	1.445	0.966	2.12
Constant	-1.657	0.279	35.306	0.191		
$\chi^2 = 181.124^{***}$		$df = 8$				

\* $p < 0.05$ ; \*\* $p < 0.01$ ; \*\*\* $p < 0.001$ .

household income below \$20,000 was negatively associated with CRC screening ( $r = -0.186$ ,  $p < 0.001$ ). Results from the correlation analysis along with available theoretical knowledge were examined and used as a foundation for decision-making regarding which factors to include in subsequent logistic regression analyses.

A binary logistic regression analysis was conducted to predict the completion of any type of CRC screening at any time for African-American male participants. The outcome variable was coded as "0" for no CRC screening and "1" for any form of CRC screening. Eight predictor variables were entered simultaneously into the model; these were the responses to the survey questions about current age (over age 55), employment status, health insurance status, having a usual doctor, having spoken to a doctor about family history of cancer, self-rated health (fair to poor), the ability to care for oneself, and church membership. Data from 558 cases were included in this analysis. A test of the full model (with the aforementioned variables) compared to the null model was statistically significant,  $\chi^2 = 181.12$ ,  $p = 0.000$ . Table 4 summarizes the raw score binary logistic regression coefficients and the estimated change in odds for complete CRC screening on the basis of the six significant predictors. The error ratio was 0.94, which can be interpreted as a 94% reduction in error for the full model over the constant model. The strength of association between the eight predictor variables and the completion of CRC screening was moderately strong with Cox and Snell's  $R^2 = 0.277$  and Nagelkerke's  $R^2 = 0.37$ . Hosmer Lemeshow test for model fit was insignificant ( $p = 0.526$ ) indicating an appropriate model fit.

## Discussion

The purpose of this study was to examine the social determinants of CRC screening in African-American men using a social ecological framework. Results suggest that the African-American men in this study who were over the age of 55, had a regular doctor, had ever had a conversation with a health professional about their cancer family history, and who had any form of health insurance had increased odds of ever completing a CRC screening test of any type. Having a regular doctor is a particularly salient predictor of screening; likely, because the most frequently recommended screening test is colonoscopy, which is invasive and requires at least 24 h of an

altered diet to prepare the bowel for endoscopic examination. Prior research has indicated that patients without the sufficient support of a healthcare provider are significantly less likely to properly prepare for colonoscopy and subsequently do not complete the procedure.<sup>23</sup>

Health insurance has been confirmed as a significant predictor of colonoscopy among men of all racial/ethnic groups due to the high cost of this procedure.<sup>12</sup> Over half of the men in this sample had some form of health insurance, but it is not known if any of these men had high deductible insurance plans with expensive out-of-pocket costs for preventive care. Insurance plans that require co-payments could make screening unaffordable and belie health insurance status as a predictor of screening. Family history of cancer has been identified as a significant correlate of all forms of CRC screening among African-American and white men.<sup>24</sup> The present study examined whether men in the sample had ever discussed their family history of cancer with a health provider because knowledge of one's hereditary cancer risk has been shown to influence colorectal screening decisions.<sup>5,23</sup> Discussion about familial cancer risk with a health professional was predictive of screening completion in the current sample.

The findings of this study underscore the need to examine the relationship between African-American men and their health care provider as a significant pathway to CRC screening completion. In particular, men in this study who reported having a doctor for routine health care were more than twice as likely to have completed some form of CRC screening as men who did not have a regular doctor. Furthermore, men who had spoken with a doctor or health provider about their family history of cancer were more than three times as likely to have been screened for CRC when compared to men who had not. Men who lack access to a physician for primary and preventive care are at higher risk for unmanaged chronic disease and delayed detection of cancers.<sup>25</sup> In contrast, a recent study reported that older African-American men with a regular doctor were over five times more likely to schedule a routine physical exam than men who did not report having a regular healthcare provider or physician.<sup>26</sup> Increased efforts to improve not only access to, but also continuity of care for African-American men could increase the likelihood that this group completes timely preventive CRC screenings.

*Strengths and limitations*

As this study did not employ random sampling, selection bias is a potential threat to the validity of the data. In addition, the convenience sampling strategy limits the generalizability of the findings, although replication in future years or in other studies could improve upon the reliability of the findings. The associational and correlational nature of this research along with the cross-sectional research design severely limits the ability to establish causality or make predictions beyond a limited scope of time. This sample is also potentially unique from the general population of adult African-American men in that these men were particularly motivated in some way to seek out health information or health services, and may be demographically more similar due to the geographic location of the health fair. Also, this study did not examine other significant predictors of CRC screening in the literature such as physician recommendation for screening and the impact of fear of the invasive nature of colonoscopy on screening completion; factors that may better account for the variance in CRC screening among men in this study. Despite these limitations, this study fills an important gap in the health disparities literature by applying a social ecological framework to understanding social determinants, which hinder and promote completion of CRC screening among African-American men. Furthermore, the conceptualization of multiple influences on cancer screening behaviors among African-American men introduced in this study provides a schema that can be easily translated into interventions to increase cancer prevention practices in this underserved group of men.

**Conclusions**

African-American men as an underserved group at high risk for undetected cancers face significant barriers to accessing information on cancer prevention and engaging in preventive health behaviors, particularly cancer screening tests. Public health practitioners and clinicians play a key role in carrying the message of cancer prevention to high risk communities as well as partnering with individuals, families, and communities to manage their risk of disease by altering behavior, accessing resources, and appropriately utilizing the health care system. Knowing the critical link between routine primary care and referral to – and completion of – cancer screenings in this group should spur intervention researchers to develop and evaluate culturally relevant pathways by which African-American men, particularly those in underserved areas, receive greater information about, and access to, primary care resources.

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