Social Ecological Factors Influencing Cancer-Related Preventive Health Behaviors in African American Men

DISSERTATION

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Problem Statement: African American men are disproportionately burdened by cancer and mortality rates among African American men for prostate and colorectal cancer are particularly high compared to other racial/ethnic groups. Poor health behaviors are known contributors to cancer risk yet little is known about the cancer-related preventive health behaviors undertaken by African American men. Health behaviors occur in the context of social and ecological conditions which are hypothesized to influence health-related decision-making. Little research has been done to evaluate the contribution of social and ecological conditions to cancer-related preventive health behaviors among black men. Methods: The purpose of this study was to identify social and ecological predictors of cancer-related preventive health behaviors in African American men. African American men over the age of 18 (N=229) were recruited from a community health fair in East Cleveland, Ohio and anonymously surveyed about their demographic characteristics, health practices, health histories, and several conditions of their social environment. Analysis included correlations and logistic regression. Findings: Most participants were over the age of 40 (88.6%), unmarried (59.8%), and had at least a high school diploma (91%); while 48.5% reported being unemployed. With regard to the cancer-preventive health behavior outcomes under study; 35.4% (N=81) of black male participants had received any type of colorectal cancer screening (e.g. colonoscopy or sigmoidoscopy) while half of respondents (N=116) reported having received a form of
prostate cancer screening (i.e. prostate specific antigen testing or digital rectal examination). When asked about the frequency and intensity of physical activity, 43% (N=99) of participants reported engaging in moderate intensity physical activity for 120 minutes or more per week. Lastly, 63% of men reported consuming any fruit in the previous 24 hours and 81% reported consuming any vegetable in the previous 24 hours (N=224). Older age, having a usual healthcare provider, and higher levels of education were the best predictors of prostate cancer screening. Older age and having a usual healthcare provider were the best predictors of colorectal cancer screening receipt. Having a family history of cancer and fruit and vegetable consumption positively predicted physical activity while increased delays in medical care were a negative predictor. Engaging in physical activity was the only predictor of fruit and vegetable consumption. **Conclusions:** This research underscores the influence of social determinants on health behaviors. Further research into the relationships between social contextual factors and preventive health behaviors are needed to identify additional pathways by which social conditions constrain or promote personal health decision-making. Public policy and practice interventions should be directed at reducing barriers to engaging in cancer-related preventive health behaviors for underserved populations such as African American men.
This document is dedicated to my husband Jeremy Mitchell, whose good humor and unconditional support has been my most valuable resource during this undertaking.
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Chapter 1: Introduction and Statement of the Problem

*African American Men’s Health: an Epidemiological Picture*

The overall health profile of African American men (AAM) in the United States is dismal when compared to other population groups in the U.S. African American men are disproportionately burdened by cancer, heart disease, HIV/AIDS, diabetes, hypertension and a host of other chronic diseases and disabilities (Adler & Rehkopf, 2008; CDC, 2005; Gadson, 2006). Further, black men have an average life expectancy of 68.8 which is six years less than white men and 11 years less than white women (Casares et al, 2006; Gadson. 2006). To illustrate such disparate disease burdens, take for example the American Cancer Society report in 2008 specifying that “for all cancer sites combined, African American men have a 19% higher incidence rate and a 37% higher death rate than White men”; that incidence rate is 4 % higher than in 2007 (Jemal et al, 2008, p. 81; Jemal et al, 2007). Further, the CDC (2005) reported that Black men are infected with AIDS at a rate eight times that of White men and are significantly less likely to survive nine years after diagnosis. Research also indicates that African American men routinely experience higher incidence and mortality rates from chronic and infectious disease, are more likely to be hypertensive, and less likely have health insurance (Casares et al, 2006; Cheatham, Barksdale, and Rodgers, 2008; Virnig et al, 2009).
Extant research is quite clear that Black men and men of lower socio-economic status are disproportionately affected by coronary heart disease, stroke, and diabetes (Casares et al, 2006), and the rate of death among African American men for prostate, colon and lung cancer is higher than any other group in the United States (Jemal et al, 2007; Toles, 2008).

**Barriers to healthcare and cancer prevention**

Despite the obvious health inequities facing Black men, their health needs are grossly understudied. Studies have shown that generally African American men either do not seek primary care or do not have access to it, thus missing out on opportunities to receive preventative services (Toles, 2008; Cheatham, Barksdale, and Rodgers, 2008). In addition, difficulty navigating the healthcare system, accessing needed prescription medications, paying for health services (Casares et al, 2006) low socioeconomic status, lack of social support to seek medical care, mistrust of the healthcare system (Thorpe, Brandon, and LaVeist, 2008; Rivers et al, 2007) have all been proposed as potential contributing factors to these disparities. Many of these proposed barriers to timely detection and treatment of prostate and other cancers can also be observed of men of any ethnic group who lack the economic and social resources to access and utilize quality health care. However, studies have identified certain issues that are particularly relevant to the health needs of many African American men such as psychosocial and cultural
issues. Specifically, issues identified include the threat prostate and colorectal cancer exams and diagnoses pose to masculinity and the role of spirituality in help-seeking behaviors (Plowden, 2006; Matthews et al, 2002; Hekler et al, 2008).

Prostate Cancer, Colorectal Cancer, and Black Men

What is known is that African American men are disproportionately burdened by cancer. They are often diagnosed with more advanced stages of disease due to delayed medical care and subsequently have poor survival rates (Jemal et al, 2008; Jones et al, 2007). Rates and outcomes of prostate cancer are particularly illustrative of the disparate health that black men experience. Prostate cancer (PCa) is the most common cancer diagnosis among men in the U.S. (Jemal et al, 2007). It is estimated that 1 in 7 American men aged 60 to 79 will develop the disease and overall 1 in 6 men will develop PCa in their lifetime (Jemal et al, 2007; Jones, Underwood, and Rivers, 2007). The exact causes of prostate cancer are ill-defined however certain factors have been found to increase the risk of prostate cancer such as being over the age of 50 years, nationality, race, diet, and family history of cancer (Jones, Underwood, and Rivers, 2007). Family history is a significant risk factor for developing PCa as studies have reported a twofold to threefold increased risk in older men with a first-degree relative (i.e. father or brother) with the disease, along with an earlier average age at disease onset than men without a family history of PCa (Jones, Underwood, and Rivers, 2007).
Although men of every racial and ethnic background are susceptible to prostate cancer, African American men, more so than men of any other ethnic background, experience the differential burden of earlier age at onset, higher incidence and mortality rates, and more advanced stages of disease when diagnosed (Jemal et al, 2007). Additionally, the rate of death among African American men for prostate, colon and lung cancer is higher than any other group in the United States (Jemal et al, 2007). For example, according to the Surveillance Epidemiology and End Results program (SEER) conducted by the National Cancer Institute, African American men’s mortality rate for prostate cancer between the years of 2000 and 2004 was 62.3 per 100,000 compared to 25.6 and 21.2 per 100,000 for White men and Latino men respectively (Ries et al, 2007). Further, research into why African American men are dying of PCa much more than other racial/ethnic groups has indicated that such a disparity may be caused by delayed cancer screening (which can lead to delayed cancer diagnosis and treatment and poorer prognosis) or limited access to preventive and routine medical care (Toles, 2008).

African American men, historically and currently represent a lower proportion of men who report awareness of the risks of prostate cancer and participate in prostate cancer early detection activities such as screening (Toles, 2008). Recent data also indicates that African American men are significantly less likely than Caucasian men to accurately identify early symptoms of PCa, or report knowledge of what happens during a prostate exam (Ward-Smith, 2006). Investigations into the root causes of PCa
disparities specifically in Black men have revealed that these men may lack access to healthcare, knowledge about risks and symptoms of prostate cancer, social support to complete screening, or may fear invasive early detection procedures or sexual dysfunction resulting from aggressive treatment post diagnosis (Oliver, 2007; Oliver, 2009).

Unlike prostate cancer which presents few opportunities for primary prevention (in the form of reducing individual risk through health behaviors), the incidence of colorectal cancer (CRC) can be reduced or prevented with proper health behaviors, routine screening, and early treatment if diagnosed (Sharma & O’Keefe, 2007). However, prostate and colorectal cancers are similar in that both have 5-year survival rates near 90% when diagnosed at early localized stages (I and II) (Alexander et al, 2007; Henry, Sherman, & Roche, 2009; Sharma & O’Keefe, 2007). Unfortunately, few cases of CRC in the general population are diagnosed early when the options for successful treatment are most promising; only around 37% to 39% (Alexander et al, 2007). One can imagine that the rates of early diagnosis and successful treatment are even less among Black men. Also like prostate cancer, CRC is fairly common, being the third most common cancer among men and women (Alexander et al, 2007). Black men are differentially burdened by CRC as evidenced by Black men having the highest age-adjusted rate of new CRC cases (72.9 per 100,000 compared to 61.4 per 100,000 for Caucasian males) (Sharma & O’Keefe, 2007). In terms of prognosis and survival, Black men are 20% less likely to be
alive within five years after diagnosis (compared to Caucasian men) with this disparity being attributed in great part to more advanced stage at diagnosis (stage III and IV) due to delayed detection of the disease via screening (Alexander et al., 2007; Fyffe et al., 2008).

Screening for CRC constitutes a critical avenue for CRC prevention due to the potential identification and removal of pre-cancerous polyps which often develop over several years (Robillard & Larkey, 2009). Screening also represents a modifiable risk factor for CRC late detection and mortality (Gotay, 2005). Nonetheless, the prevalence of CRC screening among African American men remains low (Percac-Lima et al., 2008). There are several non-modifiable risk factors for developing CRC such as being over the age of 50 (after which chances of developing CRC increase), having a family history of CRC or colorectal polyps, or being of lower socioeconomic status (which has been repeatedly associated with reduced healthcare access, preventative practices, and cancer screening) (Robillard & Larkey, 2009; Coughlin et al., 2006). Conversely, there are more than a few actions that individuals can take to reduce the risk of developing CRC. For example, regular moderate to vigorous physical activity has been directly linked by over 50 studies to a reduced risk for CRC, as well as a reduced risk for obesity which is a separate risk factor for developing CRC (Baxter & Guillem, 2009). Proposed biologic mechanisms for how exercise is linked to CRC includes evidence that increased physical activity alters insulin sensitivity; and insulin has been associated with colorectal tumor development (Baxter & Guillem, 2009). Another mechanisms under study linking
exercise to CRC is the effect that exercise may have on immune defenses in the body which fight tumor development (Gotay, 2005; Kemeny & Schedlowski, 2007).

Diet is yet another modifiable risk factor for CRC. Research supports the existence of a negative interaction between diet (particularly those high in saturated fat from animal sources) and the internal bacterial environment of the colon which increases the risk of colon cancer (Robillard & Larkey, 2009; Baxter & Guillem, 2009). Some studies suggest that diets high in plant fiber such as legumes are protective against CRC in African Americans but those findings are not yet universally accepted (Divisi et al, 2006). Other co-morbidities can also influence the risk of CRC development. For instance, smoking, heavy alcohol consumption, metabolic syndrome, and diabetes have all been found to have a role in CRC tumor initiation or progression (Griffith et al, 2007; Lloyd et al, 2006).

Receiving routine screening to detect and remove pre-cancerous polyps or early-stage tumors is a significant protective factor against CRC mortality. The American Cancer Society recommends for people at average risk of developing CRC: a fecal occult blood test (FOBT) every year, flexible sigmoidoscopy every 5 years, double-contrast barium enema every 5 years, or a colonoscopy every 10 years (or when another screening method indicates abnormalities) (Percac-Lima et al, 2008; Robillard & Larkey, 2009). The reasons underlying the underutilization of CRC screening among African American are not fully understood, however extant research indicates that several barriers exist to
receiving appropriate and timely screening. Some factors that have been negatively associated with CRC screening include 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 (Gotay, 2005; Coughlin et al, 2006). Additionally, 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 (Robillard & Larkey, 2009). The stark inequities in CRC incidence, late diagnosis, and survival among African American men, along with the paucity of community-based CRC screening initiatives for Black men, constitute the rationale behind why CRC was chosen as an outcome of interest for this dissertation.

Despite increased opportunities for prevention of CRC, significant barriers exist for black men to access and utilize routine preventive screening. Several studies have indicated that the following factors are to varying degrees, barriers to black men receiving the recommended screening for CRC; low perceived risk, lack of knowledge about risk factors and symptoms of CRC (Fyffe et al, 2008), lack of health insurance and/or a regular healthcare provider, lack of social support to complete screening, fear of pain, embarrassment, or side-effects due to screening tests (Alexander et al, 2007), mistrust of the healthcare system, failure of physicians to recommend screening even for high-risk black men, and the cost of screening tests (Griffith et al 2007; Lloyd et al,
2006). The disparate cancer health of African American men is a complex issue which merits etiological study into the psychosocial, environmental, cultural, and health care system factors which promote or inhibit cancer preventive action.

**The Purpose, Scope, and Significance of this Study**

The purpose of this study is to investigate the influence of various social and ecological factors on the cancer-related preventive health behaviors of African American men. Specifically, this study seeks to examine social ecological factors as an explanatory framework for black men’s access to and engagement in cancer preventive health behaviors. This study is limited in scope due to the anonymous cross-sectional nature of the data however the study does seek to identify self-reported health behaviors of African American men and to describe any patterns of barriers to cancer preventive health behaviors which emerge. Additionally, this study aims to define groups of social ecological factors which are predictive of specific cancer preventive health behaviors in African American men.

Literature supports respective connections between many health behaviors and stimuli in the social environment. For example, several studies have documented an increase in physical activity among residents of communities which built well-lit walking and biking paths (Anderson et al, 2003). Ball, Timperio, and Crawford (2009) found that obesity rates among community residents are significantly affected by the access to and affordability of local grocery stores versus fast food restaurants. In light of this
increasing body of knowledge on how social and ecological conditions affect health and
health behaviors, more studies are needed to understand how such interactions operate for
medically and socially underserved populations like African American men. This study is
significant to both health-related social work and public health research and practice as it
has the potential to advance the understanding of how social contextual factors in the
daily lives of black facilitate or inhibit their ability to take actions known to prevent
cancer. Knowledge on how black perceive their cancer risk and make cancer-related
preventive health decisions (i.e. avoiding smoking, eating adequate amounts of fruits and
vegetables, receiving routine preventive screenings, and maintaining a healthy weight) in
the context of their social environment can aid researchers and health care professionals
in deconstructing and demystifying the contribution of social and ecological factors to
long-standing cancer health disparities.

This study benefits the field of social work by integrating a multi-disciplinary
approach to examining an individual issue based within a social context. Every aspect of
the cancer experience, including prevention, impacts, and is deeply impacted by the
social environment. At the core of social work practice is a focus on the person-in-
environment interaction. Thus this type of research on African American men and their
opportunities for or barriers to cancer prevention-in-environment is well suited to the
field. Additionally, social work as a profession is concerned with social justice, equity,
and the empowerment of underrepresented groups; which aptly describes the needs of
African American men as a population inequitably burdened by disparate health and poorer access to health care information and resources.

**Social Ecological Theoretical Framework**

The social ecological perspective on health emphasizes 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 (McLaren & Hawe, 2005). This type of multi-systems framework is grounded in the work of human ecology and development pioneers such as Urie Brofenbrenner (Novilla et al, 2006; Reifsnider et al, 2005). The ecological perspective has essentially two key propositions being, 1. Behavior both shapes and is shaped by multiple levels of influence and 2. Individual behavior affects and is affected by the surrounding social environment (Novilla et al, 2006).

Those multiple levels of influence which impact health related behaviors and conditions are outlined by McLeroy and colleagues (1988) as: 1. Intrapersonal factors such as individual attitudes, behaviors, knowledge, and skills; 2. Interpersonal processes such as social networks made of family, friends, or colleagues that provide support; 3. Institutional factors such as formal or informal organizations which may have rules or expectations which impact health behaviors; 4. Community factors such as informal or formal networks and norms among individuals, families, or groups/organizations; 5. 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 (Gregson et al, 2001; Robinson, 2008). Applying these ecological levels of influence to an analysis of disparities in Black men’s cancer health can provoke further inquiry into why and where these disparities occur and which levels of influence should be targeted for intervention.

**Research Questions**

1. What individual background characteristics, practices, and beliefs are related to black men receiving prostate and colorectal cancer screening tests?

2. What social and ecological factors are related to the receipt of prostate and colorectal cancer screening test for black men?

3. Which groupings of individual and social ecological variables are predictive of each cancer preventive heath behavior outcome (i.e. prostate and colorectal cancer screenings, physical activity frequency, and fruit/vegetable consumption)?

**Definition of Terms**

1. Black and African Americans- these two terms are used interchangeably to refer to Americans of African descent.
2. Preventive health behaviors (PHB) - this term refers to actions or activities undertaken by an individual (but which interact with other social, environmental, and institutional systems) for the purpose of preventing or detecting the onset of a preventable illness; in this study, a cancer diagnosis.
Chapter 2: Literature and Theory Review

The first chapter of this dissertation provided an overview of the disparate health profile of AAM along with an introduction to the proposed social ecological factors (guided by the social ecological framework) that influence AAM’s cancer related preventive health behaviors. The current chapter will provide an introduction to the concept and practice of cancer prevention and related health behaviors along with a detailed overview of social ecological theory and its applications for health research. This chapter will also examine empirical studies which document the interplay between social ecological (SE) factors and cancer-related preventive health behaviors (PHB) among African American men. Lastly, the conceptual framework developed to guide this study will be introduced.

The Science and Practice of Cancer Prevention

Scholars and practitioners alike agree that the ultimate aim of cancer prevention is to “reduce the incidence, morbidity, and mortality due to cancer through the identification and elimination of precancerous lesions and/or the early detection of minimally invasive cancers (Alberts & Hess, 2008, p. 1). Cancer prevention strategies can be grouped into three categories; primary, secondary, and tertiary prevention. The goal of primary
prevention is to preclude cancer from ever developing by undertaking activities that will reduce individual risk (Alberts & Hess, 2008). Secondary prevention is concerned with detecting and treating cancers in the early stages (i.e. mammography, colonoscopy, etc.) and tertiary prevention focuses on preventing and or treating any complications that arise from a cancer that is already well developed along with preventing secondary cancers (Alberts & Hess, 2008; Lippman & Hawk, 2009). This dissertation will focus on the primary prevention behaviors of fruit and vegetable consumption and routine physical activity and the secondary prevention strategies of prostate and colorectal cancer screening; literature on these preventive health behaviors will be detailed in the following sections.

*Diet as a primary cancer preventive strategy*

The literature on cancer prevention and control has outlined clear relationships between dietary habits and tumor development as a result of gene modulation (i.e. altering gene expression). Numerous studies have linked specific nutritional habits (such as high consumption of dairy, red meat and other animal products, and fatty foods) to the initiation and progression of certain cancers such as prostate, colorectal, breast and stomach malignancies (Key et al, 2004; Wu et al, 2006; Wolk, 2005; Sharma & O’Keele, 2007). This link is the result of interactions between chemical compounds and nutrients we consume through food, and the body’s physiological environment. Over time, consumption of specific foods containing certain
dietary components can influence the risk of developing cancerous tumors and/or the behavior of existing tumors by influencing the cellular processes and pathways involved in cancer growth (Davis & Milner, 2007).

Several studies have proposed mechanisms by which meat consumption may increase both prostate and colorectal cancer risk. For example, studies have found that processed meats, salted meats, red meat, and meat cooked at high temperatures (charcoaling has been shown to produce carcinogens in the cooking process) were associated with an increased risk of colorectal cancer and metastatic prostate cancer (Key et al, 2004; Ma & Chapman, 2009). Additionally, diets that include high-meat consumption in general (excluding poultry or fish) have been linked to increased risk for prostate and colorectal cancer in epidemiological cohort studies (Bingham, 1999; Key et al, 2004). A meta-analysis of case-control and prospective studies including over one million participants and nearly 8,000 cases of CRC found that increasing red meat intake by 120 grams per day increased the relative risk of CRC by 1.28 times compared to those with the lowest red meat intake (Larsson & Wolk, 2006). The same study concluded that an additional 30 grams of processed meat per day resulted in increased CRC risk of 1.09 times greater than those with the lowest processed meat intake (Larsson & Wolk, 2006).

In a prospective study of 3,892 adult male residents of Washington county, Maryland, Rohrmann and colleagues (2007) observed that men who more frequently ate processed meats, sausage, pork, lunch meats, bacon, and hot dogs has a significantly
higher incidence of high-stage prostate cancer and total prostate cancer (Rohrmann et al, 2007). This link between high-stage PC and intake of certain meats can be explained by understanding how bacteria in the colon can change the preservatives added to processed meats (particularly smoked meats) into cancer causing agents (Bogen et al, 2007; Rohrmann et al, 2007). An analysis of nearly 65,000 men from 21 states who participated in a prospective cohort study initiated by the American Cancer Society in 1982 (where nearly 700 were AAM) found that African American men self-reported a higher median intake of processed meats compared to white men with the difference in consumption consisting of mostly sausage and bacon (Rodriguez et al, 2006).

This study also found that men of all races who consumed more processed meat were more likely to be younger, less educated, have a higher BMI, have a higher daily caloric intake, and also have diabetes (Rodriguez et al, 2006). Most importantly, this study revealed that AAM who consumed the highest quantity of processed meats also had the highest risk for PC with a relative risk 2.4 times that of participants with the lowest level of consumption. Authors concluded that this two-fold increased risk for PC due to red and processed meats among AAM did not hold true for white men, which is consistent with other large cohort studies (Bogen et al, 2007; Rodriguez et al, 2006). Research has clearly determined that consumption of red and processed meats represents a potential modifiable risk factor for prostate cancer and perhaps for colorectal cancer as well.
While it has been estimated that nearly 30-70\% of all cancer incidence is in some way related to poor dietary habits (Bovell-Benjamin et al, 2009; Davis & Milner, 2007), research has demonstrated that specific dietary compounds can also protect one against cancer by “preventing carcinogens from modifying DNA and inducing mutations” (Reszka et al, 2006, p.610). Ma and Chapman (2009) conducted a systematic review of foods shown to have a preventive role in prostate cancer and found that foods containing antioxidants (substances which protect cells against free radical damage which can cause cancer) inhibit cancer-cell development and growth. Carotenoids are types of antioxidants found in brightly colored fruits and vegetables (i.e. tomatoes, yellow/orange fruits and vegetables, watermelon etc…) which are shown to prevent prostate cancer growth (Ma & Chapman, 2009). A growing body of research indicates that both green tea and soy also contain compounds which stop prostate cancer cells from growing (Ma & Chapman, 2009).

Recent case control and cohort studies have demonstrated that other dietary minerals with antioxidant capabilities such as vitamins C and E may have a critical role in the regulation of gene expression related to cancer development (Divisi et al, 2006; Reszka et al, 2006). Of particular interest to the health of AAM, is the role of vitamin D in cancer prevention. A large body of evidence has shown that vitamin D deficiency may be related to increased risk for several types of cancer such as colon, breast, prostate, and ovarian tumors; and that African Americans as a population are at high risk for vitamin D
deficiency (Garland et al, 2006; Giovannucci, Liu, & Willett, 2006; Lappe et al, 2007). In particular, studies have shown that African Americans consume fewer foods fortified with vitamin D (e.g. dairy) and are less likely to take vitamin D nutritional supplements (Egan et al, 2008; Giovannucci, Liu, & Willett, 2006). A prospective study of nearly 17,000 adult participants from the National Health and Nutrition Examination Study (NHANES) reported a 72% reduction in risk for colorectal cancer mortality among participants with the highest level of dietary vitamin D consumption at baseline (Freedman et al, 2007).

Equally important, sun exposure (ultraviolet sunlight B or UVB) is necessary to produce vitamin D in the body and studies have demonstrated that individuals with high levels of melanin in the skin (i.e. darker pigmentation) are less receptive to the sun wavelengths which covert a type of cholesterol in the skin to vitamin D (Egan et al, 2008; Garland et al, 2006). Additionally, those who live in the northeastern U.S. (which have characteristically long winter seasons) are also at high risk of vitamin D deficiency due to lack of UVB exposure from November through March (Garland et al, 2006). In a study of residents of southeastern U.S. states, Holt (2008) found through analysis of blood samples and dietary recall that 45% of the African Americans sampled were deficient in vitamin D compared to 11% of whites; and that even among African Americans who met or exceeded the recommended dietary intake of vitamin D, 32% were vitamin D deficient (Holt, 2008). Accordingly, there is strong evidence to suggest that vitamin D deficiency
should be examined as a modifiable environmental risk factor for cancer prevention efforts targeting AAM.

Additionally, studies have linked compounds found in fish-oils (DEA and DHA), lycopene (present in tomatoes and tomato-based products), and selenium to be associated with a reduction in prostate cancer risk (Wolk, 2005; Reszka et al, 2006; Key et al, 2004). Clinical trials on the effectiveness of selenium in reducing PC risk have been particularly promising, with some studies reporting a 50% to 65% reduction in PC incidence for participants using high versus low levels of the trace mineral (Key et al, 2004; Ma & Chapman, 2009). Likewise, cruciferous vegetables (e.g. broccoli, cabbage, cauliflower; collard, mustard, kale and turnip greens among several others) have long been proven to have cancer preventive properties as they are rich in carotenoids (antioxidants), fiber, and other nutrients (Park et al, 2007).

In a review of clinical trials studying cruciferous vegetable intake and cancer risk, Higdon et al (2007) reported on evidence showing that certain dosage levels of broccoli and Brussels sprouts caused research participants to substantially excrete (via urine) cancer-causing agents found in charcoaled meat that they had consumed. This finding demonstrates that one mechanism by which high intake of cruciferous vegetables mediate cancer risk is by ridding the body of carcinogenic elements found in the foods we eat (Higdon et al, 2007). Prospective studies have reported an inverse relationship between cruciferous vegetable intake and colorectal cancer incidence in adults; although
researchers caution that individual inherited differences most likely influence the protective benefits reported (Higdon et al, 2007; Koushik et al, 2007).

In a pooled analysis of 14 cohort studies, Koushik et al, 2007 found that diets high in fruits and vegetables were associated with a decreased risk for distal colon cancer independent of other risk factors for the disease (Koushik et al, 2007). In an study of nearly 490,000 adult participants between 50 and 71 years of age, researchers examining the effect of fruit/vegetable intake on colorectal cancer found that male participants reporting the lowest level of fruit/vegetable consumption were 1.5 times more likely to develop colorectal cancer; while those with high consumption rates for green leafy vegetables had the lowest colorectal cancer risk (Park et al, 2007). In a study examining the dietary habits of nearly 800 African American men and women in Florida, researchers found that African American men reported consuming significantly low frequencies of whole grains, vegetables, and low-fat dairy products although over 60% rated the quality of their diet as either good or excellent (James, 2009). Although more studies are needed to identify and characterize the general dietary patterns of AAM, current evidence suggests that AAM may not be consuming sufficiently high levels of fruits and vegetables or dietary supplements proven to have anti-carcinogenic properties. Dietary habits represent a critical modifiable behavior for AAM as a population with high cancer burden.

*Physical Activity as a primary cancer preventive strategy*
Regular physical activity has consistently been shown to reduce the risk of several chronic diseases (e.g. heart disease, type 2 diabetes), all-cause mortality, and certain cancers such as colon, prostate, lung, endometrial and breast cancer (in post-menopausal women) (Kruk, 2007; Campbell & McTiernan, 2007). Statistics indicate that 71% of men and 62% of women in the United States are overweight or obese, placing a large portion of the American population at substantial risk for certain cancers and other chronic illnesses (Renhan et al, 2008). Studies have shown that just 30 minutes of moderate intensity physical activity five or more days a week can reduce the risk of colon cancer by 40% to 50% and can reduce the risk of prostate and breast cancer by 30% to 40% (aside from familial cancer risk) (Kruk, 2007). Various measures exist to evaluate physical activity level and it is considered a reliable indicator of health status. The impact of physical activity on chronic disease and cancer risk has been assessed in a wide variety of populations using multiple study designs.

Some of the strongest evidence exists for the inverse relationship between physical activity and colon cancer risk. The Harvard Alumni Health Study included over 17,000 adult male participants who were followed for up to 26 years; findings showed that participants who engaged in at least 30 minutes of moderate-intensity physical activity for five days a week had half the colon cancer incidence rates of those who were less physically active (Lee, 2003). Case control studies have shown that even separate episodes of physical activity within the same day and greater than ten minutes in duration
may have accumulative effects that decrease colon cancer risk (Courneya & Friedenreich, 2007; Westerlind, 2003). In a review of several epidemiologic studies, Lee (2003) concluded that 30 to 60 minutes of moderate physical activity daily resulted in decreased colon cancer risk for both men and women (Lee, 2003).

Wolin et al (2009) conducted a meta-analysis of over 50 studies on the reduction in risk for colon cancer associated with physical activity. This meta-analysis revealed an inverse relationship between exercise and colon cancer risk with relative risk estimates of 0.76 for men, 0.74 for women, and 0.69 for case control studies (all with 95% confidence intervals) (Wolin et al, 2009). Relative risk represents a ratio of the likelihood of a disease occurring in a group of persons exposed to an event or agent compared to a group of persons not exposed (Zhang & Yu, 1998); for the aforementioned meta-analysis, exercise was the exposure being studied and colon cancer was the disease. Ample studies have identified a dose-response relationship between moderate to vigorous physical activity and decreased risk for colon cancer (i.e. increased frequency and duration of activity correlates to increased protective effects against colon cancer) (Coups et al, 2007; Hardman, 2001).

Physical activity has also been convincingly shown to impact prostate cancer risk. One of the many roles of the p53 gene is to protect the DNA sequence from defects which could result in cancer or to repair the DNA if mutations occur (Barnard et al, 2007). One of the most critical functions of this gene (and its corresponding protein) is to
inhibit tumor cells from growing; thus cancer is often the result when this gene is altered or disturbed, as is the case with prostate cancer (Barnard et al, 2007; McTiernan, 2008). Bernard et al (2007) conducted an experimental study on the effects of exercise training on p53 gene function and found that regular physical activity increased the p53 protein in the body and thus the ability of the p53 gene to kill abnormal tumor cells in sedentary men; subsequently reducing the risk for prostate cancer in the exercise treatment group (Barnard et al, 2007). A longitudinal study of nearly 48,000 men followed over eight years in the Health Professionals’ Follow-Up Study concluded that participants regularly engaged in the most vigorous levels of physical activity experienced a 54% lower prostate cancer rate than the participants engaged at the least active levels; routine vigorous exercise was also predictive of lower rates of metastatic prostate cancer (Lee, 2003).

Studies have documented several mechanisms which explain the link between physical activity and decreased cancer risk. Specifically in males, the sex hormone androgen has a role in promoting prostate tumor growth however; regular physical activity has been shown to suppress this hormone thus decreasing cancer risk (McTiernan, 2008; Westerlind, 2003). Physical activity has also been shown to positively impact immune function and reduce stress (Wolk, 2005; Campbell & McTiernan, 2007; Hardman, 2001). There is established evidence to suggest that routine moderate exercise bolsters the body’s immune response which in turn helps the body to
fight the development of cancerous tumors (Warburton, Nicol, & Bredin, 2006; Westerlind, 2003). Consistent exercise and a healthful diet have been shown to decrease obesity, which is a risk factor for several types of cancer including colorectal cancer (Renehan et al, 2008). Obesity is closely associated with insulin resistance (whereby the body has difficulty delivering glucose to the cells); the result is an excess of insulin circulating in the body, which feeds cells and tissues, including potentially undeveloped prostate and colon cancer cells (Kruk, 2007; McTiernan, 2003; Renehan et al, 2008). Exercise intervention studies leading to the reduction of body fat have been effective in decreasing insulin and improving insulin sensitivity; however physical activity can alter insulin sensitivity and decrease cancer risk even without weight loss (Campbell & McTiernan, 2007). The evidence for physical activity as a modifiable risk factor for colon cancer is incontrovertible, and several studies support the probable role of exercise in reducing prostate cancer risk.

**PC and CRC screening as secondary cancer preventive strategies**

Obtaining the appropriate screening tests and personalized education on cancer risk (based on family history of disease, individual lifestyle factors, and the recommendations of a physician) is associated with lower cancer incidence and lower mortality rates for certain cancers (Plowden, 2006). Cancer screening is a type of health-seeking behavior that is influenced by several factors. Studies have demonstrated that health insurance coverage is critical to accessing routine cancer screening such as
mammograms, pap tests, PSA tests, and colonoscopies; and that underinsurance is prevalent upon AAM and other minority populations (Robinson & Shavers, 2008). A study of over 63,000 adult participants randomly drawn from the National Health and Interview Survey (NHIS) concluded that “having health insurance coverage was associated with a higher receipt of cancer screening among individuals under age 65 for all five screening tests studied” (Robinson & Shavers, 2008, p. 853). In a study of the correlates of colorectal cancer 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 (Bosset et al, 2008).

Receiving the recommendation of a physician or health care provider is also highly associated with cancer screening among patients of all ethnic groups (Davis et al, 2010; Robinson & Shavers, 2008; Ross et al, 2008; Smith, Cokkinides, & Brawley, 2009). Results from a national survey of over 1200 primary care physicians for the year 2008 indicated that 95% of respondents recommended some form of CRC screening for their average-risk adult patients but that several barriers existed for patients to follow-up and receive the cancer screening (Klabunde et al, 2009). Some studies suggest that socio-economic status (SES) can affect physician recommendation for cancer screening. In a national sample of 528 physicians randomized to one of four vignettes about CRC screening scenarios, Pollack, Mallya, and Polsky (2008) reported that physicians assigned
11.4% of low SES patients with high-deductable health insurance plans to inappropriate types of CRC screening compared to just 3.2% of high SES patients with low-deductable health plans (Pollack, Mallya & Polsky (2008).

Pollack and colleagues (2008) also reported that high SES patients were ten times more likely to be referred (hypothetically) for colonoscopy than low SES patients (Pollack, Mallya & Polsky, 2008). A study of over 11,000 respondents from the National Health and Interview Survey found that patients who were non-White and less educated were less likely to be counseled and referred by their physician for colon cancer screening (Wee et al, 2004). Additional barriers to physician recommendation for cancer screening include whether or not the patient fully understands the risks and benefits of screening, patient preferences (Ross et al, 2008); patient comorbidities, lack of time, lack of reminder and cancer screening tracking systems, prior patient refusal for screening, physician forgetfulness (Guerra et al, 2007); and the physician’s knowledge of and attitudes toward screening (Pendleton et al., 2008). Facilitators of physician recommendation for routine cancer screening include having patient visits dedicated to preventive health services, a system of reminders and incentives for physician recommendations, when the patient requests the screening test, and a positive physician attitude that prioritizes cancer screening (Guerra et al, 2007).

Although PC is the most commonly diagnosed cancer in U.S. men, screening may lead to earlier detection of the disease in men who are asymptomatic (Davis et al, 2010;
List, Sinner & Chodak, 1999; Odedina et al, 2008). Recent data indicates that 60% to 70% of American men may develop PC in their lifetime yet only 1 in 30 men will die as a direct cause of PC (Brawley, Ankerst, & Thompson, 2009). However, mortality rates among AAM are 2.4 times higher than those for White men and AAM are diagnosed with PC at younger ages and have significantly poorer 5-year survival rates (Davis et al, 2010). The American Cancer Society (2007) recommends that beginning at age 50, a digital rectal exam (DRE) and a blood test to detect prostate-specific antigen (PSA) which is a protein produced by the prostate gland- be offered to men of “average risk” (i.e. men with no symptoms or family history of prostate cancer) while men at higher risk (African Americans and those with a family history) should be offered screening at age 45. Screening for PC has been somewhat controversial because the disease is so common, prevalent mostly in elderly men and complications of treatment for PC (i.e. surgery and/or radiation) such as sexual and urinary dysfunction, can severely impact quality of life for those diagnosed (Brawley, Ankerst, & Thompson, 2009).

The uncertainty about PC screening among health professionals has centered around whether the benefit of detecting and treating PC at earlier stages of the disease outweighs the cost of screening the entire population; the cost to quality of life from complications of treatment; and the potential unnecessary treatment given to men with prostatic tumors that are asymptomatic or benign (Brawley, Ankerst, & Thompson, 2009; Davis et al, 2010; Jones et al, 2009). Despite this controversy surrounding screening
guidelines (which slightly differ between the American Urological Association, the National Cancer Institute, and the American Cancer Society), more than 90% of men diagnosed with PC decide to undergo some mode of treatment as opposed to only monitoring the disease for tumor growth (Brawley, Ankerst, & Thompson, 2009).

The proportion of African American men who report awareness of the risks of prostate cancer and participate in prostate cancer early detection activities such as screening is small, yet this population carries the heaviest burden of disease incidence and has the poorest survival rates (Weinrich et al, 1998). Older African American men may experience even greater risk for late diagnosis of PC which contributes to poor prognosis (chances of survival). Gilligan and colleagues (2004) conducted a randomized study of over 65,000 elderly men with no previous prostate cancer diagnosis (with data extracted from a Medicare and Medicaid database) who underwent prostate-specific antigen (PSA) testing; after controlling for socioeconomic status, comorbid conditions (other medical conditions), age, and use of healthcare services, researchers concluded that “elderly blacks are substantially less likely to undergo PSA screening than elderly whites” (Gilligan et al, 2004, pg. 1858). Potential reasons for lower screening rates amongst elderly black men include mistrust of white health care providers (Odedina et al, 2008), misperceptions about the nature of prostate exams and about the potential for impotence as a result of treatment (Jones et al, 2009), and the inconvenience and
discomfort associated with the more invasive forms of screening such as DRE (Sanchez et al, 2007).

African American male’s knowledge and perceptions of PC screening have been studied extensively. Studies indicated that cultural factors play a significant role in health-related decision-making for AAM and PC screening is no exception. A qualitative study focused on designing educational interventions to promote PC screening in AAM found that AAM preferred interventions delivered in community settings in contrast to health care provider offices; that health care providers approach screening decision-making in a manner that takes into account the cultural sensitivity surrounding invasive screening tests; and that health care providers attempt to build trust with AAM patients who may be reluctant to undergo screening due to historical abuses of AAM by the medical and scientific communities (Allen et al, 2007). Powe et al (2009) found that AAM were more likely to get cancer-related and other health information from media sources such as television or radio than from health care providers and concluded that media may be a culturally appropriate and effective method of reaching AAM with messages about cancer screening (Powe et al, 2009).

A qualitative study by Jones, Steeves, and Williams (2009) discusses the supportive role that family and friends play in assisting AAM with PC screening decision making. This study reported that AAM participants discussed friends and family members in the context of trusted informal sources of health information; and saw these
significant others as sources of encouragement to pursue healthy lifestyles and stay up-to-date with health screenings (Jones, Steeves, and Williams, 2009). Other factors associated with undergoing PC screening among AAM are perceived risk of developing PC, awareness and knowledge of the disease, higher levels of income and education, having private health insurance, being married, and having a family history of any cancer (Ross et al, 2009; Winterich et al, 2009). A large multi-year study of over 14,000 AAM over age 40 reported that AAM aged 50 to 64 were more likely to have undergone a PSA test along with AAM who were overweight or obese, had health insurance coverage, and had a personal health care provider or doctor (Ross et al, 2009). Authors hypothesized that overweight and obese men may have been more likely to obtain screening because they were more likely to have had co-morbidities that brought them into contact with the health care system (Ross et al, 2009). Winterich et al (2009) found in a study that conducted nearly 70 in-depth interview with AAM and white men that education and not race was strongly associated with prostate cancer screening misinformation, knowledge and behavior (Winterich et al, 2009). These and other related findings indicate that the decision to undergo prostate cancer screening is complex and influenced by personal, social, and health system factors. More study is indicated to examine the interplay of these factors and to characterize their role in promoting or inhibiting PC screening in African American men.
As of 2009, colorectal cancer was the third leading cause of new cancer cases and cancer-related deaths for both men and women in the United States (American Cancer Society, 2009). CRC is considered to be largely preventable with modifiable risk factors such as diet, exercise, obesity, smoking, and alcohol consumption accounting for 40% to 70% of increased risk among people without a family history of cancer (Roy & Bianchi, 2008). Colorectal cancer screening, and particularly colonoscopy has been shown in numerous studies to be effective at detecting cancerous (adenomatous) and pre-cancerous polyps; however most forms of CRC including endoscopic screening is underutilized by AAM (Ward et al, 2008). A study examining CRC screening use among Medicare recipients found that AAM utilized colonoscopy 25% less than white men and use of flexible sigmoidoscopy was 50% less than white men (Richards & Reker, 2002).

Currently, the American Cancer Society recommends for people at average risk of developing CRC: a fecal occult blood test (FOBT) every year, or flexible sigmoidoscopy every 5 years, or double-contrast barium enema every 5 years, or a colonoscopy every 10 years (or anytime another screening method indicates abnormalities) (Robillard & Larkey, 2009). Black men are diagnosed approximately 6 years earlier with CRC than White men and consistently lag behind their White male counterparts in meeting cancer screening guidelines (Roy & Bianchi, 2008).

The National Cancer Institute reports that CRC incidence rates among AAM are 19% higher than white men and that AAM lead all racial/ethnic groups for both the
number of diagnoses before age 50 and the number of advanced-stage tumors at diagnosis (Ward et al, 2008). Even after controlling for individual factors at diagnosis, population-based studies indicate that AAM are 20%-40% more likely to die of CRC compared to white men (Polite, Dignam, & Olopade, 2006). Data pooled from the National Health Interview Survey (NHIS) for the years 1987 through 2003 indicated that only 43% of AAM over the age of 50 were up to date with CRC screening guidelines (Jerant, Fenton & Franks, 2008). Satia and Galanko (2007) found in a representative sample of AAM in North Carolina (n=405) that rates of CRC screening were 48.2%. This same study found that more years of education, older age, being married, and non-smoking were significantly associated with CRC screening.

Recent research also indicates that social isolation and lacking the social support system of family and friends to discuss health issues was associated with lower levels of CRC screening in AAM (Ye, Williams, & Xu, 2009). In a review of barriers to CRC screening for African Americans, Ward et al (2008) identified lack of knowledge about CRC; poor understanding about the link between cancer screening and cancer prevention; low perceived risk of developing CRC and of low perceived need for screening; and fear related to the embarrassment and pain associated with screening or a cancer detection as significant obstacles to screening (Ward et al, 2008). Factors such as fatalism (unbelief in the possibility of cure for CRC), misconceptions about CRC treatment, out-of-pocket
costs for screening/lack of insurance, and inconvenience in time and location have been cited by studies as barriers to CRC screening (Wee, McCarthy, & Phillips, 2005).

Physician recommendation for CRC screening has also been associated with AAM being up-to-date on CRC screening guidelines (Wolf et al, 2006). Roy and Bianchi (2008) highlight the multiple aspects of CRC screening affected by physician counseling and recommendation; type of screening, the frequency of screening, and the age at which a patient is first screened. Physicians and health care providers are advocates in facilitating CRC screening among high risk patients such as AAM; however, individual lifestyle also plays a key role in screening decision-making. In a national study of over 11,000 participants examining the relationship between health behavior risk factors and CRC screening status, Coups et al (2007) reported that participants of all racial/ethnic groups who reported low levels of physical activity, fruit/vegetable consumption, and multivitamin use were also less likely to have undergone CRC screening (Coups et al, 2007).

Community-level factors also play a key role in promoting access to CRC screening and several studies have examined CRC screening interventions in the context of community resources and support. For example, a CRC screening intervention study targeting low-income African American women in subsidized housing provided community education classes, radio and community newspaper advertisements, and outreach in community health clinics. After randomly surveying 2,283 community
residents, researchers determined that CRC screening had increased by 1.27 times compared to baseline levels prior to the intervention (Katz et al, 2007). A randomized CRC screening trial which targeted nearly 500 urban-dwelling African American residents provided the intervention group with telephone-based education and counseling for screening and provided the control group with printed brochures about CRC screening. Researchers verified through medical records that 27% of the randomized intervention group received CRC screening within six months of the intervention compared with 6% of the control group, making the intervention group 4.4 times more likely to get CRC screening than the control group (Basch et al, 2006).

These and other similar studies provide evidence that the correlates of screening as a secondary cancer prevention behavior are multi-domain. More research is needed to elucidate the barriers and facilitators of CRC and PC screening for underserved high risk populations like African American men. This dissertation intends to address gaps in the literature which do not account for how cancer-related health behaviors such as diet, physical activity, and screening are influenced by factors in the social environment. The following section will present literature on aspects of the social environment shown to influence cancer prevention efforts with particular emphasis on how these ecological factors impact AAM and their high cancer burden.
Social, Cultural, and Environmental Correlates of Health and Cancer Prevention for African-American Men

Racial Discrimination and Residential Segregation

Multiple streams of evidence point to the fact that proximal social, cultural, and environmental conditions have a considerable impact on individual and population health. For example, socioeconomic status has been repeatedly shown to contribute to the differential health status observed between individuals and population groups. For the purpose of this discussion, socioeconomic status (SES) describes a combination of factors such as income, education, occupation, and place of residence. In a study of the impact of socioeconomic status (SES) on cancer incidence and stage at diagnosis, Clegg et al (2009) found that men and women with less than a high school education had 2 to 3 times the lung cancer rates of college educated participants and that those with the lowest level of family annual incomes (less than $12,500) had 1.7 times the incidence rate for lung cancer than those with the highest income levels ($50,000 or more). The same study found that a late stage cancer diagnosis (consistent across all cancer sites) was associated with participants of lower socioeconomic status (Clegg et al, 2009).

Perceived discriminatory experiences are yet another social exposure which can significantly impact health outcomes by posing a barrier to an individual or group’s trust of the healthcare system, the communication and relationship between patient and
provider, and the availability and access to health promoting resources such as preventive care and health knowledge (Paradies, 2006). Studies on the association between perceived racism, discrimination, and negative health outcomes have increased significantly in recent years. Researchers have described the experience of perceived racism as a barrier to African American men seeking healthcare and as reason African American men tend to distrust the medical establishment (Cheatham, Barksdale & Rodgers, 2008; Oliver and Muntaner, 2005; Brondolo, Gallo, & Meyers, 2009; Copeland, 2005).

The experience of overt and/or covert racism has been shown to be directly linked to health outcomes. In a 1990 study, Krieger found a positive association between the experiences of racial discrimination in African American women and subsequent hypertension (Anderson et al, 1995). The experience of racial discrimination can also “determine the degree of exposure to risk factors and health-enhancing resources” according to Anderson and colleagues (1995, pg. 602). The specific pathways through which racial discrimination affects health are complex. Recent studies have found associations between exposure to racial discrimination and physiologic outcomes. For example, associations have been found between the experience of racial discrimination and increased blood pressure and heart rate responses (which could lead to hypertension and cardiovascular disease); racial discrimination has also been linked to risky health
behaviors such as smoking, substance use, and a reduction in the use of preventive health services (Brondolo, Gallo, and Myers, 2008).

Likewise, a 2006 national study found that “57% of Blacks reported that discrimination occurs “often” or “very often” in Blacks’ interactions with White physicians” (Penner et al, 2009, pg. 183). Studies have also shown that African Americans who perceive discrimination in any medical encounters are less likely to receive cancer screenings, less likely to engage in health-related behaviors such as receiving vaccinations and cholesterol testing, and are less likely to adhere to specific medical recommendations (Penner et al, 2009). Negative patient-provider relationships with healthcare personnel can discourage health promotion efforts when African American men seek out medical care. Copeland (2005) found that patient satisfaction, outcomes, and compliance were linked to perceptions of the quality of the patient-provider relationship and that some health providers may not be culturally competent and responsive to the needs of African American patients resulting in a reluctance of Black patients to return for care and a discontinuity in health services. It has also been reported that African American patients may feel that the quality of the healthcare services they receive is contingent upon the type of insurance they have; insinuating that publicly insured, underinsured, or uninsured patients receive less optimal care (Copeland, 2005; Cheatham, Barksdale, & Rodgers, 2008; Hiatt & Breen, 2008). Brondolo and colleagues (2009) found that racial disparities in healthcare and in patient-provider relationships
were well documented and that “there is evidence that some physicians make differential estimates of risk for diseases, and spend less time planning and collaborating with individuals from some ethnic/racial groups” (pg. 5). Such research opens the door to questions about the relationship between experienced and perceived discrimination and African American men’s ability to receive health information, cancer screening, and timely diagnosis and treatment of prostate, colorectal, and other cancers from which they are disparately burdened.

Research has demonstrated that geographical segregation of minority communities is also associated with poorer access to health resources and subsequent poorer health outcomes. Census data indicates that nearly sixty percent of African Americans in the U.S. live in racially segregated census tracts and that the different social environments and access to resources between ethnic minorities (Blacks and Latinos) and non-Hispanic Whites does contribute to differential health outcomes (Thorpe, Brandon, and LaVeist, 2008). Residential segregation caused by discriminatory policies (House, 2001; Oliver & Muntaner, 2005) often leads to social exclusion and living conditions which bear heavily upon health outcomes (Thorpe, Brandon and LaVeist, 2008; Copeland, 2005). The consequences of such conditions include unaffordable housing, overcrowding, high crime rates (Copeland, 2005) suboptimal neighborhood conditions such as pollution, traffic, excess fast-food retail (Casagrande et al, 2009), lack of grocery markets with fresh affordable foods (Ball, Timperio, and Crawford, 2009),
lack of public space for exercise and recreation, and lack of available public health and social services (Castro, Shaibi, and Boehm-Smith, 2009; Lohan, 2007; Gehlert et al, 2008).

To illustrate the impact of racial geographical segregation on health, a study of 96 primary care clinics in New York which served at least 30% minority patients (compared to clinics serving less than 30%) had less access to medical supplies, medical referral specialists, and examination rooms per physician. Additionally, the patients at these minority clinics were significantly more likely to be covered by Medicaid, demonstrate lower health literacy, and be more medically and psychosocially complex (Varkey et al, 2009). Other evidence in favor of the role of geography as a determinant of racial disparities in health reveals that African Americans experience a greater likelihood of in-hospital death (compared to Whites) for certain health conditions because of critical differences in the hospitals where the two groups receive care; such as hospitals with fewer beds, fewer physicians, lower rates of evidence-based treatments, and higher admittance rates for all patients in predominately minority communities (Chandra, 2009).

Community context and social environmental resources

Yet another well-established social influence on health and cancer prevention is the community context in which individuals and populations live. The social and material environment in which one lives has a profound impact on the ability to engage in physical activity, eat healthfully, and access information and resources for making
informed health-related choices. For the purposes of this discussion, the social and material environment consists of the various stable social and built structures and conditions such as; housing, public spaces, crowdedness, crime, neighbor relations, public transit systems, local services, the availability and affordability of local food, the socioeconomic resources available in the community and surrounding areas, the social support available through networks of family members, peers and community organizations, along with the influence of the marketing and media (Casagrande et al, 2009; Glass & McAtee, 2005).

Social and material environmental context plays a critical role in the availability of resources for health, both for individuals and communities. With regard to cancer prevention and control, neighborhood-level social and material resources can either facilitate or hinder access to healthcare for secondary cancer prevention (i.e. screening). For example, Schootman et al (2005) found that area poverty rate was independently associated with never having been screened for breast or colorectal cancer among local residents. Additionally, several studies have concluded that both individual and community-level socioeconomic disadvantages are significantly associated with risk for obesity, and obesity is a risk factor for the development of certain tumors (Divisi et al, 2006).

Further, features of one’s neighborhood of residence, with neighborhood socioeconomic status being used predominately as a proxy for neighborhood resources,
have been reliably associated with various negative health outcomes. For example, Shishehbor et al (2006) found in a study of 2,500 individuals undergoing symptom-limited exercise stress testing that individuals from disadvantaged neighborhoods (using census tract data to estimate neighborhood SES) were nearly two times more likely to demonstrate impaired physical fitness (the lowest metabolic scores) even after adjusting for individual socio-demographic and clinical factors (Shishehbor et al, 2006). Likewise, neighborhood socioeconomic disadvantage has been associated with chronic stress and clinical depression (Matheson et al, 2006), increased allostatic load scores among African Americans (Merkin et al, 2009), preterm birth (Messer et al, 2008; Pickett et al, 2002), and poor self rated health (which has been a reliable predictor of future mortality) (Franzini et al, 2005).

Community level socioeconomic resources are required to make most substantive behavioral changes; and lacking the resources to adequately modify diet and physical activity levels or to receive preventive health screenings and education could certainly impair one’s ability to take action to detect cancers in the earlier stages when the options for treatment are more abundant or prevent them entirely. African American men, particularly those residing in disadvantaged communities, may face greater difficulty locating health promoting resources; thus it is imperative that health promotion efforts target communities as the level of intervention because communities serve as mediating structures between the individual and the larger social/societal environment, and as
important influences on individual norms, values, beliefs, attitudes, and health-related behaviors (McLeroy et al, 1988).

African American men may face barriers to accessing cancer preventive health resources due to conditions in the neighborhood environment such as; safety, availability of public transportation, the presence of public recreational spaces, and the distance to supermarkets which offer affordable high quality foods (Hiatt & Breen, 2008). The association between diet and the development of cancer has been well outlined by epidemiologic data. Groups such as the American Cancer Society (ACS), the World Cancer Research Fund and the American Institute for Cancer Research have reached consensus based on scientifically affirmed data that certain dietary behaviors can reduce one’s risk of developing organ-specific tumors as well as hormone-related cancers (such as breast and prostate cancers) and also cancers associated with the gastrointestinal tract (such as colorectal cancer) (Alberts & Hess, 2008). These suggested behaviors include: eating mostly plant based foods, limiting consumption of red meat and avoiding intake of processed meats, limiting the consumption of salt, alcoholic drinks, and refined sugars, and avoiding energy-dense processed or “fast” foods (Alberts & Hess, 2008; Key, 2004).

Evidence suggests that there is a paucity of supermarkets as opposed to the abundance of convenience stores (lacking fresh foods) in lower income neighborhood with larger numbers of minority residents (Oliver & Muntaner, 2005). Researchers have examined the density of fast food restaurants per square mile in various locations and
found that state-wide obesity levels were positively associated with the number of fast food restaurants per square mile (Papas et al, 2007). Obesity (as a result of excessive intake of animal meat and fat products) is a significant risk factor for certain cancers affecting African American men, particularly colorectal cancer (Key et al, 2007).

Epidemiologic studies have found that regardless of race or ethnicity, individuals who consume high and frequent quantities of vegetables demonstrate a 20-50% reduced risk for colorectal cancer (Sharma & O’Keefe, 2007); thus neighborhood environments which provide minimal availability of fresh produce might place residents at increased risk for certain types of cancers. In a multi-domain study of over 2,500 residents of Los Angeles, Brown and colleagues (2008) found that self-rated health status and body mass index (or BMI which is calculated by weight in kilograms divided by height in meters squared and used as an assessment of overweight and obesity) was significantly associated with the local food environment; specifically the number of chain supermarkets per roadway mile.

Studies such as these suggest that the number and type of food resources or stores in a neighborhood can impact the health behaviors and health outcomes of local residents. Additionally, the social context of food environments such as crime and violence in a neighborhood (which might deter supermarket chains from such areas) impact the accessibility of healthful dietary choices by local residents (Odoms-Young, Zenk & Mason, 2009). Regular physical activity is a primary preventive behavior proven to reduce the overall risk of developing various types of cancer (Alberts & Hess, 2008).
Numerous studies have found a relationship between regular moderate to vigorous physical activity (MVPA) and the reduction of risk for obesity, chronic health conditions, the development of specific cancers (i.e. colorectal, breast, prostate, lung, ovarian, and bladder cancers), and an overall improvement in quality of life and functional capacity (Albert & Hess, 2008; Sharma & O’Keefe, 2007; Wilson, Eyles, Elliot, & Keller-Olaman, 2009). A growing body of literature indicates the significant impact of social and material conditions on the physical activity behaviors of individuals. For example, factors such as the availability of lighted walking paths, publicly maintained recreational parks and facilities, neighborhood crime (Casagrande et al, 2009), traffic, and the presence of sidewalks can significantly impact an individual’s ability to engage in regular physical activity (Thorpe, Brandon, & LeVeist, 2008; Wilson et al, 2009).

Stress

Much like living in disadvantaged community environments, prolonged psychosocial stress caused by a range of social and material conditions has been documented as a contributor to negative health outcomes. Stress has been defined as a state where the resources available to a person to aid in coping or adjusting are not adequate to meet the demands of the condition or situation (Madhere, Harrell, & Royal, 2009). Allostatic load or Allostasis is a prominent theory of how exposure to stress results in adverse physiologic outcomes. Weathering is a complementary hypothesis which proposes that “Blacks experience early health deterioration as a consequence of the
cumulative impact of repeated experience with social or economic adversity and political marginalization” (Geronimus et al, 2006, p. 826). The concept of allostatic load describes the cumulative negative effects of chronic stress responses on the body due to repeated psychosocial and environmental challenges; it has also been used to understand the social and ecological antecedents of hypertension, cardiac disease, stroke, preterm delivery, and premature mortality among people of lower socioeconomic status (Cox, 2009; Miller, Chen and Cole, 2009; Szanton, Gill and Allen, 2005). According to SEF, allostatic load could result from unremitting social and environmental adversity (i.e. unemployment, material deprivation, or discrimination) on multiple levels (i.e. interpersonal, intrapersonal, community, policy) leading to chronic stress responses and consequent poor health behaviors and health outcomes. Allostatic Load and Weathering are proposed in literature as potential pathways by which social and environmental stress contribute to lower engagement in health-promoting behaviors and excess morbidity and mortality in marginalized populations such as AAM.

Cultural Context

The evidence is profuse on the influence of cultural norms and expectations on health decision-making, the adoption of health behaviors, dietary patterns, and the utilization of health services in various population groups (Mansyur et al, 2009). The strong social force of cultural heritage, identity, and cultural context overall is particularly salient in the African American community. Culture has been defined by
many, but for the purpose of this discussion culture as it relates to the cancer-health trajectories of Black men is defined as “a system of values and symbols shared by persons within a given society that tend to give meaning to everyday experiences and to influence behavioral patterns” (Mansyur et al, 2009, p. 87). A qualitative study on African Americans and hypertension prevention described how participants viewed health behaviors as being passed down through generations and the authors of the study concluded that collective cultural identity in the African American community informs and shapes health-related behaviors over the life-course (Peters et al, 2006).

Recent research has demonstrated associations between socio-cultural beliefs and attitudes, and cancer screening behaviors, cancer stage at diagnosis, and cancer treatment outcomes (Deshpande et al, 2009). Cultural factors which inform beliefs, attitudes, and behaviors around cancer prevention and screening, patient-provider relationships, and adherence to medical advice are particularly salient to the discussion on cancer-related health disparities and to the development of effective cancer prevention interventions (Deshpande et al, 2009). A mixed-method longitudinal study of nearly 300 African American men studying prostate cancer (PCa) screening behaviors demonstrates this point with a finding that a lack of culturally appropriate communication on the part of health providers increased the likelihood on nonparticipation by Black men in screening activities (Woods et al, 2004). Cultural context is definitely a social determinant of health
that can be internalized and expressed as health behaviors which influence health outcomes.

More work is needed to clearly elucidate and establish associations between social and ecological exposures and the opportunities and barriers to cancer preventive health behaviors among AAM. Although individual health behavior is most often a mediator between social exposures and health outcomes, those health behaviors and the associated risks are socially patterned and being influenced by culture, discrimination, and socioeconomic resources and other conditions with potentially additive effects over the life course. An examination of such social and ecological factors correctly redirects the attention from individual Black men with individual cases of CRC and PC to persistent disparities in CRC and PC morbidity and mortality for the entire population of African American men. This shift in focus is essential to developing effective and appropriate interventions. The following section will introduce social ecological theoretical framework as a guide for placing the cancer prevention health behaviors of AAM in the context of the social and ecological conditions which may promote or inhibit them.

Social Ecological Theoretical Framework

Communities are often the context in which health behaviors take place and one of the primary settings for health promotion resources, making them a strategic entry
point for collaboration and intervention. The practices of both social work and health promotion have roots in ecological theory which emphasizes the interaction between individuals and their physical and social environments and posits that there are various levels of influence on individual behavior (McLeroy et al, 1988). Research supports the notion that health promotion interventions should also be multi-domain, multidisciplinary, and be grounded in a social ecological framework in order to have the maximum reach, impact, and potential for sustainability (Gottlieb, 2009; Navarro et al, 2007; Woods, 2009). Social work practice centers around the person-in-environment perspective with an emphasis on helping individuals and families to address needs using the resources and support available in their social environment when possible (Woody, 2006).

This dissertation utilizes social ecological theoretical framework (SEF) as the unifying framework to understand how multi-domain personal, social, and community level factors correlate to or predict diet, physical activity, and cancer screening behaviors (i.e. cancer-related preventive health behaviors) in African American men. SEF emanates from the field of social ecology which is the study of “the set of opportunities, constraints, and risks generated through sociocultural organization” (Madhere, Harrell, & Royal, 2009, p. 155). Specifically, social ecology focuses on the relationship between people and the environments in which they live, with an emphasis on the multiple environmental influences on behavior. Social ecological theory seeks to illuminate the
impact of social, cultural, and institutional contexts on human behaviors and relationships (Woods et al, 2006). The social ecological perspective incorporates concepts germane to systems theory such as interdependence and homeostasis (Stokols, 1992) and focuses on analyzing health and health promotion in the context of how individuals, their health, and their surrounding physical and social environments interact at multiple levels of a health problem and are interdependent (McLaren & Hawe, 2005).

This type of multi-systems framework is grounded in the work of human ecology and development pioneers such as Urie Bronfenbrenner (Novilla et al, 2006; Reifsnider et al, 2005) who proposed two key propositions being, 1. Behavior both shapes and is shaped by multiple levels of influence and 2. Individual behavior affects and is affected by the surrounding social environment (Novilla et al, 2006). Kenneth McLeroy (1988) and Daniel Stokols (1992) were amongst the first scholars to acknowledge the interconnections between the fields of social ecology and health behavior/health promotion by placing individual health behaviors in the context of multi-domain social and environmental subsystems which interact to promote and/or constrain opportunities for health action.

Dr. Daniel Stokols has been a leading pioneer in developing social ecological theory and advancing its use in the field of public health and health promotion. His work has consistently brought attention to need to examine the dynamic interplay between individuals’ personal health behaviors and the environmental resources available to
support health behavior change alongside personal and collective well-being (Stokols, 1992; Stokols, 1996; Stokols et al, 2003). Dr. Kenneth McLeroy’s work with SEF focused on building community capacity for health and teaching others to utilize environmental resources for health behavior change (McLeroy et al, 1988). McLeroy postulates that many health problems are socially produced and thus finding solutions in the social context is a natural and requisite process (Black & Laflin, 2009). Further, McLeroy emphasizes the need for theories about health and health behavior to be grounded in real practical issues, and to result in interventions which address known underlying causes of targeted problems (Black & Laflin, 2009).

Emile Durkheim is also credited as an early theoretical contributor to social ecological perspectives by way of his renowned work on the structural influence of society on suicide incidence (Allan, 2006; Almgren, 2007). Traditional models and theories in public health (including health behavior/health promotion) have focused primarily on the individual’s ability and motivation to choose healthy actions (e.g. agency) and relegated social and environmental influencers to a lesser role in disease causality (Cockerham, 2007; Krieger, 2005). However, Durkheim’s theory on the ability of social and environmental structures and processes to contribute to illness undergirds the essential suppositions of SEF, and reinforces the need to return to the study of interactions between people and their social environments for answers about disparate
patterns of risky health behaviors which lead to disease among entire populations (Cockerham, 2007; Almgren, 2007).

SEF overcomes the limitations of other health behavior models by incorporating a focus on individual-level health behavior change with an understanding of the reciprocal relationship between personal choices, biology, and determinants of health and health behaviors at the level of social networks, communities, and policies that impact health (Novilla et al, 2006). SEF proposes that social and environmental interactions can combine to affect health or each level of influence can be a factor in supporting or inhibiting health actions and outcomes (Stokols, 1995). For example, individuals themselves have agency and responsibility in avoiding known behavioral risk factors for cancer such as tobacco, excess alcohol consumption, sedentary lifestyles, and diets high in fat and low in essential nutrients (Hiatt & Breen, 2008). There are also interpersonal level factors that are beyond one’s control such as family history of disease.

However, for many African American men (along with many other ethnic minorities or socially disadvantaged groups), the ability to exercise agency in engaging in salubrious health behaviors is often constrained by limited social and material resources in the surrounding environment such as access to affordable healthy foods, overrepresentation of liquor and fast food retail in low income areas, lack of safe public recreational spaces, and public health services to promote lifestyle change (Casagrande et al, 2009). There are factors which interface with multiple system levels in the social and
ecological surroundings of an African American man which might support a lower PC and/or CRC cancer risk and burden such as: healthcare access and social support to seek screening and health information; knowledge of symptoms or warning signs of common cancers; positive and satisfying relationships with a healthcare provider; and coping resources to overcome psychosocial barriers to cancer screening (Plowden, 2006; Rivers, Underwood, and Jones, 2007; Casares et al, 2006). The levels which comprise SEF are not intended to be all-inclusive, but instead they provide for researchers and practitioners several points of interface for further analysis, intervention, and evaluation (Burke et al, 2009).

Table 1. Social Ecological Theoretical Framework: Levels of Influence

<table>
<thead>
<tr>
<th>Levels of Influence</th>
<th>Description</th>
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<tbody>
<tr>
<td>Intrapersonal</td>
<td>Personal attributes such as attitudes, beliefs, and knowledge that shape health behaviors</td>
</tr>
<tr>
<td>Interpersonal</td>
<td>Relationships with family, friends, colleagues, and others which contribute social support and help to define identity</td>
</tr>
<tr>
<td>Organizational</td>
<td>Groups to which one belongs and/or informal social institutions and processes which influence health behaviors</td>
</tr>
<tr>
<td>Community</td>
<td>Formal or informal systems with corresponding social norms among people, groups, and organizations</td>
</tr>
<tr>
<td>Public Policy</td>
<td>Laws and practices at the local, state, and national levels that promote or regulate health behavior</td>
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(Adapted from Robinson, 2008, p. 398)
The essence of this framework is a multisystem perspective focused on identifying links and interactions between various levels of influence on health and health behavior. Those multiple levels of influence which impact health related behaviors and conditions are outlined by McLeroy et al (1988) as: 1. **Intrapersonal factors** such as individual attitudes, behaviors, knowledge, and skills; 2. **Interpersonal processes** such as social networks made of family, friends, or colleagues that provide support; 3. **Institutional factors** such as formal or informal organizations which may have rules or expectations which impact health behaviors; 4. **Community factors** such as informal or formal networks and norms among individuals, families, or groups/organizations; 5. **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 (Gregson et al, 2001; Robinson, 2008). The following section will discuss applications of SEF in the literature.

**Applications of Social Ecological Framework and Concepts**

Several authors have drawn upon SEF in whole or part to inform their research on the connections between social and environmental experiences, exposures, and resources and the modifiable health behaviors which impact preventable disease. For example, SEF has been utilized in several studies to examine the factors which influence physical activity, particularly among individuals and communities with limited resources. Griffin et al (2008) conducted a series of focus groups with African American residents living in...
low-income high-crime neighborhoods as a part of a qualitative study on the impact of environmental and safety concerns on regular exercise among residents. This study used SEF as the basis for examining multi-domain social and environmental factors which shape physical activity behaviors in one neighborhood. Authors found that most residents did not venture outside of their homes to exercise due to safety issues such as fear of being mugged, traffic-related accidents, and homicide; other barriers to outdoor activity included lack of lighted paths, and lack of community facilities, parks, and programs for recreation (Griffin et al, 2008). This study concluded that residents were influenced by factors at multiple levels such as community safety, aesthetics, and community resources which influenced residents perceived ability to engage in physical activity outside their homes (Griffin et al, 2008).

SEF was also utilized in a study to determine how social and environmental support was related to physical activity in persons with diabetes (Gleeson-Kreig, 2008). This study examined the relationships between several types of routine physical activity such as household care, leisure activities, and occupational activities and several measures of support resources from family, friends, health care systems, neighborhood/community, media, workplace, and personal coping resources (Gleeson-Kreig, 2008). The findings indicated that informational support from media sources (i.e. TV, radio, internet, newspaper etc.) to change lifestyle behaviors was significantly associated with physical activity; additionally, support from health care providers to
engage in physical activity as a part of diabetes-management was also significant. The author concluded that social-environmental sources of support for physical activity extend beyond family and community support and interventions should continue to focus on the influence of patient-provider relationships and targeted health promotion efforts utilizing media (Gleeson-Kreig, 2008).

Similar physical activity studies have focused on contextual correlates of physical activity in underserved and minority populations. Fleury and Lee (2006) conducted a review of such studies specifically targeting African American women (AAW) and found that 55% of African American women reported engaging in absolutely no leisurely physical activity and that 51% of African American women aged 40 to 56 were obese according the National Health and Interview Survey. Using McLeroy’s five-level model of SEF (1988), Fleury and Lee (2006) found that interpersonal resources such as self-reported health status, health concerns related to chronic illness, socioeconomic status and personal motivation were associated with physical activity levels in AAW. Interpersonal resources linked to physical activity levels in AAW included social networks and social support, having examples of successful engagement in physical activity, and raised awareness about the benefits of physical activity through formal organizations such as churches (Fleury & Lee, 2006). Community and environmental resources which support exercise in AAW included safe lighted walking paths in their neighborhoods, and culturally specific and convenient facilities for physical activity.
Organizational or institutional factors and policy level factors were not included in the review.

McNeill et al (2006) conducted a study on the relationship between social and physical environmental factors and physical activity in a community based sample of 910 African American and white adults. Authors of this study used SEF and structural equation modeling to analyze the nested influences of personal motivation, social support, self-efficacy, and surrounding physical environment on physical activity levels. Results indicated that perceptions of the physical environment were directly associated with physical activity levels and that self-efficacy was the strongest correlate of all types of physical activity (McNeill et al, 2006). A study using SEF to understand the effectiveness of a randomized neighborhood walking intervention reported that self-efficacy was a mediator of intervention effects and that perceived problems in the neighborhood such as safety issues suppressed the effects of the walking intervention in the older adults studied (Michael & Carlson, 2009).

A systematic review of studies utilizing SEF to examine fruit and vegetable intake among African Americans (Robinson, 2008) reported that over 60% of studies recommended interventions directed at the interpersonal level of influence while over 80% of studies researched interventions directed at two or more levels of influence to increase fruit and vegetable consumption among African Americans. While reducing individual risk of disease is primary, more health educators and health professionals are
broadening treatment and service strategies to include at least one other social or environmental intervention; recognizing that various factors influence health behavior change and multi-domain interventions are warranted. Social ecological framework diversifies the settings and strategies available for health interventions. In the aforementioned review, Robinson (2008) highlighted intervention settings chosen in social-ecological health promotion studies such as churches, neighborhoods, summer camps, grocery stores and restaurants, community health centers, and civic organizations which have shown promise for improving the nutritional habits and health status of African Americans (Robinson, 2008).

Other studies have examined nutritional interventions grounded in SEF. For example, Stang (2009) proposed the use of a social ecological model to elucidate barriers to healthful eating among American Indians and Alaskan native populations. Gregson et al (2001) analyzed food security issues for low-income families using the Food Stamp Program administered through public/private partnerships from a social ecological perspective. One of the few studies to apply SEF specifically to AAM and cancer prevention investigated the ability of personal, social, cultural, and policy factors to predict prostate cancer screening in AAM (Woods et al, 2006). This study concluded that physician communication with the patient about PC screening was a significant predictor of actual screening behavior which is consistent with previous studies in populations of other ethnic groups (Woods et al, 2008).
**SEF applied to various health-related behavioral studies**

Buffardi and colleagues (2008) analyzed the National Longitudinal Study of Adolescent Health comprised of over 14,000 respondents for an association between psychosocial factors, social environmental factors, sexual risk-taking behaviors, and subsequent sexually transmitted infections (STI). The authors found that sexually transmitted infections among the adolescents studied were strongly associated with housing insecurity, exposure to crime, and a history of arrest. The authors further concluded that multi-domain contextual conditions such as those purported by SEF enhance STI risk by increasing the likelihood of STI exposure and sexual risk-taking behaviors (Buffardi et al, 2008)…

Social ecological framework is widely applicable for examining multi-domain correlates of health behavior and has been applied to research involving HIV/AIDS risk behaviors (Lewis, 2005); repeat adolescent pregnancy (Raneri & Wiemann, 2007); alcohol consumption among college students (Vantamay, 2009); the prevention of elder abuse and elder falls (Richard et al, 2008); health promotion at the family and household level (Novilla et al, 2006); smoking cessation and tobacco control (Kothari et al, 2007); promoting prevention science in social work practice (Woody, 2006); and expanding community based health interventions (McLeroy et al, 2003). The following section will
introduce the social ecological model being utilized for this dissertation along with an explanation of components of the model.

*A conceptual model of factors influencing cancer-related health behaviors in AAM*

Social ecological framework is an extensive multidisciplinary perspective which emphasizes how health behaviors occur in multiple settings and are influenced by various levels of social influence. SEF considers the direct impact that social and physical environments can have on health and health behaviors and proposes measurement of these health outcomes on more than one level. The focus on individual behavior is not diminished in SEF, but rather the focus is amplified to include social and environmental processes that may support or inhibit health behaviors and behavior change (McLeroy et al, 1988). An SEF-guided model was operationalized for the current study (see figure 1) to investigate the personal, social, and environmental correlates of cancer-related health behaviors among AAM.
Figure 1. Proposed conceptual model of SE influences on cancer preventive behaviors in AAM
The present study will investigate factors which influence cancer-related preventive health behaviors at the *intrapersonal, interpersonal* and *community* levels of social ecological framework. The choice to focus on these more proximate levels resulted from literature which has established personal characteristics, family and peer relations, and community resources as critical elements in promoting and maintaining cancer-related preventive health behaviors (Abernathy et al, 2005; Blumenthal et al, 2005; Fort, 2005). For example, there are several studies which have found that age, socioeconomic status (which includes income and employment status), and health insurance status were predictors of health behaviors such as physical activity and dietary intake (Herd et al, 2007; Kirby & Kaneda, 2005; Pearce et al, 2007; Robinson & Shavers, 2008). These levels also represent actionable targets for intervention to increase physical activity, healthful nutritional habits, and cancer screening among African American men.

The conceptual model in figure one proposes a bi-directional relationship between individual (intrapersonal) and social (interpersonal) level variables with neighborhood conditions (community level) variables playing a potentially moderating role between them. This study tests individual, social, and neighborhood/community variables to determine which variables acting alone or in combinations best predict each cancer-related preventive health behavior outcome in a sample of adult African American men. This theoretical orientation compels researchers and practitioners to probe more deeply into why African American men are dying of cancers that a majority of other men are
surviving. For example, five year survival rates for prostate and colorectal cancers are near 90% for non-Hispanic White men (Jemal et al, 2008). Approaching the issue of cancer-related health disparities among African American men from a SEF perspective shines a light on the limitations of the prevalent lifestyle risk factor model where individual behavioral risk factors overshadow the analysis of health in the context of social and environmental risks and conditions. In the context of a SEF analysis, researchers are challenged to move beyond describing how sick African American men are, to investigating multi-domain potential root causes, and interventions which target the social environment, in addition to the individual.

For this reason, one of SEF’s primary strengths is the attention paid to contextual multi-domain analyses of health issues. Likewise, another consistent strength of SEF is the flexibility it allows to incorporate extant public health, psychosocial or biomedical theories (e.g. Allostatic load) into each level of influence on health and health behavior. Not only can other theories easily compliment the levels of SEF, but this type of multi-domain analysis can be widely applied to any population or health behavior of interest. An equally important strength of SEF is that it promotes multi-disciplinary collaboration by advancing the premise that there is more than one way to approach and develop solutions for changing health behaviors and indeed there is more than one source of influence for health behaviors that can be targeted for intervention. The primary limitation of SEF is that it seems less practical to attempt to change the social
environmental influencers of individual health behavior than it is to work solely at the intrapersonal level when designing and implementing interventions.

This framework has been labeled as broad and unrealistic for use in health promotion practice. However, SEF does not insinuate that each level of the social ecological system be targeted for direct action, but rather that practitioners identify potential causative factors at more than one level (beyond intrapersonal) and investigate the interaction of those factors with individual-level ability, motivation, and knowledge. By doing so, practitioner and researchers will often find hidden barriers and opportunities that are amenable to change in the social environment. Research demonstrates that multi-domain interventions (even those only incorporating the intrapersonal and interpersonal levels) are effective at bringing about sustainable behavior change (McLeroy et al, 2003; Reifsnider, Gallagher, & Forgione, 2005; Stokols, 1996). The following chapter will detail the methodology for this study including an operationalization of variables and review of data analysis procedures.
Chapter 3: Methods

Thus far, the preceding chapters have discussed the disparate state of African American men’s health and the need for further research into the root causes of their cancer burden; along with introducing the concept of cancer prevention through, diet, physical activity, and screening. Additionally, a wide range of social ecological conditions such as racial discrimination, cultural expectations, stress, and community resources were discussed as potential correlates of cancer-related preventive health behaviors among African American men. This chapter will describe the research design and methodology employed in this study. This study aimed to examine the influence of individual, social, and environmental factors on cancer-related preventive health behaviors (i.e. diet, physical activity, and screening) among African American men. Data was drawn from a cross-sectional community-based sample of black who completed self-reported questionnaires as participants in the Minority Men’s Health Study (MMHS) in Cleveland, Ohio.

Conceptual Model Summary

A social ecological framework was utilized to develop a conceptual model for understanding social, behavioral, and environmental factors impacting black men’s preventive health behaviors. Individual factors potentially associated with black men’s health behaviors include age, income, employment status, self-rated health status, and
health insurance status. The conceptual model posits that these individual factors directly or indirectly influence engagement in preventive health behaviors among black men.

Social factors in the model include paid sick-leave availability, family history of cancer, health decision influences, material conditions, and delayed medical care. This conceptual model suggests some relationship between individual factors and social factors which together exert an influence on black men’s participation in select preventive health behaviors. Further, environmental factors consisting of neighborhood conditions are also proposed as a probable independent predictor of the physical activity and fruit/vegetable consumption outcomes. The proposed relationships are supported by social ecological framework’s focus on multi-domain influences on health behaviors.

Study Research Questions and Hypotheses

Research Question 1

What are the individual, social, and ecological factors associated with African American men receiving any form of prostate cancer screening?

Hypothesis 1: African American men who are older, with higher incomes, and who have health insurance coverage are more likely to have undergone any form of prostate cancer screening.

Hypothesis 2: African American men with higher levels of self-reported health and who report no delays in medical care are more likely to have undergone any form of prostate cancer screening.
Research Question 2

What are the individual, social, and ecological factors associated with the receipt of any form of colorectal cancer screening among African American men?

Hypothesis 3: African American men with health insurance, a regular health care provider, and a family history of cancer will be more likely to have undergone any form of colorectal cancer screening.

Hypothesis 4: African American men who have help making health-related decisions and report no delays in medical care will be more likely to have undergone any form of colorectal cancer screening.

Research Question 3

What are the individual, social, and ecological factors predictive of physical activity frequency among African American men?

Hypothesis 5: African American men with higher incomes, higher self-rated health status, and who have help making health-related decisions will report higher frequencies of physical activity.

Hypothesis 6: African American men who rate their neighborhood conditions more favorably will report higher frequencies of physical activity.

Research Question 4

What are the individual, social, and ecological factors predictive of fruit and vegetable consumption among African American men?
Hypothesis 7: African American men who are older, with higher incomes, with higher self-rated health levels, and who report less difficulty meeting material needs will have higher consumption of fruits and vegetables.

The Data Source, Study Design, and Data Collection Procedures

The strategy of inquiry for this study was a secondary analysis of the Minority Men’s Health Survey (MMHS) for the year 2009. The MMHS is an annual paper-based self-report survey conducted by the Cleveland Clinic in Cleveland, Ohio and administered by Dr. Charles Modlin, the director of the Cleveland Clinic’s Minority Men’s Health Center. The MMHS utilized a cross-sectional convenience sample of African American men who attended the annual minority men’s health fair located at the Cleveland Clinic. The MMHS was used to identify the health behaviors, health status, and health needs of local African American men so that targeted community outreach programs could be developed or improved to enhance black men’s health and well-being. Permission to use the MMHS data set was granted by the principle investigator of the study and director of the Minority Men’s Health Center, Dr. Charles Modlin. The use of this data for secondary analysis was approved by both the Institutional Review Board at the Ohio State University and the Institutional Review Board at the Cleveland Clinic Foundation.

The Survey
The anonymous MMHS consisted of 102 questions covering demographic items, participant perceptions of their neighborhood conditions, individual-level material conditions, healthcare access, health habits, practices, and healthcare utilization, family disease history, personal disease history, relationship to the Cleveland Clinic, perceived risk of cancer and cancer worry, organ, blood, and bone marrow donation, spirituality, motivations for attending the health fair, prostate cancer knowledge, and childhood medical care history. The MMHS questionnaire was comprised of a combination of likert-type scale items along with open ended questions and multiple choice items. Questions were developed for the MMHS by using a combination of questions from MMHS in previous years, validated items from national health surveys where applicable, and items tailored to the informational needs of researchers. Each MMHS measure analyzed for this study will be described later in this chapter. The questionnaire was written at a fourth grade reading level and pilot-tested on a small group of research colleagues and volunteers for grammar and clarity.

Participants

Participants were recruited to attend the health fair via print ads in the local newspapers, television commercials and news coverage, and radio advertisements. Participants could pre-register for the event online as well as in person on the day of the health fair. Trained volunteers solicited African American men over the age of 18 to complete the self-administered MMHS questionnaire during the event day registration.
process. There were 229 surveys from African American men and this study is based on those responses (N=229). The MMHS questionnaire was voluntary and consent was assumed when individuals chose to participate. Following the survey, information was made available to the participants on prostate cancer risk and where screening and physician consultation could be obtained if desired. The anonymous MMHS questionnaire took approximately ten minutes to complete, and no formal incentive was offered to participants although several trinkets (i.e. key chains, stress balls, pens etc.) and services (i.e. chair massages, health screenings) were available at the health fair free of charge. Completed surveys were locked in a conference room adjacent to the health fair; due to the anonymous nature of the questionnaire no follow up with participants was possible. The following is a description of study variables.

Specific Measures

Independent Individual Variables

Participants were asked to report demographic information including gender, age, race/ethnicity, marital/relationship status, highest level of education, employment status, annual household income, and household size. 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”. For marital status, a dummy variable was created to easily identify participants who are 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. Employment status was a single multiple-choice item asking the respondent if they are currently employed for wages and to select the type of employment that categorizes them. The nine response categories ranged from full-time employment to disabled/unable to work.

Self-rated health was considered an individual variable for this study; self-rated health was a single item likert-type question asking respondents to rate their perceived health status. The five response categories range from “excellent” to “poor”. This item has been consistently used in the National Health Interview Survey and has been found to be an excellent predictor of future health with a test-retest reliability of 0.91 (Lorig et al, 1996).

Independent Social Variables

Social variables of interest included paid sick-leave availability, family history of cancer, health decision influence, material conditions, and delayed medical care. Paid sick-leave availability- was a single dichotomous item asking respondents if paid sick leave was available at their current or most recent employment. Family history of cancer- was measured by three questions which ask the respondent if any types of cancer seem to run in their family, and if so, to indicate from a list of choices, which type of cancer (other is also an option), and lastly, to indicate which relative(s) had cancer. A single
dummy variable was created to capture those with a family history of cancer by assigning a “1” to those with any family history of cancer and “0” to those without a family history.

Health decision influence was measured by one multiple choice question asking the respondent to indicate who has the most influence on them when making health-related decisions. Response categories included self only, spouse or significant other, pastor or spiritual leader, celebrity or television personality, and other was also an option. Material conditions was a variable developed by the research team to identify challenges to meeting basic needs which might pose barriers to engagement in the outcome behaviors of interest among respondents. This variable was measured by three items on a seven-point likert-type scale (with responses ranging from 1=“not very easy” to 7= “very easy”) soliciting participant’s reports of how easy it is to get enough food daily, pay monthly utility bills, and pay monthly rent or mortgage payments. A composite score on material needs was calculated by averaging the three responses. Delays in medical care was measured by a single multiple-choice item which asks respondents to select any reasons they may have delayed obtaining necessary medical care in the past 12 months. A composite score was created by summing all delays in medical care with values ranging from “0” when a participant did not indicate any delays in care to “3” when a participant indicated 3 delays in care. No participant indicated more than three delays in care.

Independent Ecological Variables
Participant’s perceptions of their neighborhood conditions were measured by a five-point Likert-type scale with responses ranging from “5”=excellent to “1”=poor. Respondents were asked to rate their neighborhood conditions with respect to the social characteristics of overall safety of the neighborhood; and local service characteristics of quality of local hospitals, and quality of grocery stores. A composite score was created by averaging the responses to these three questions.

Control Variables

Health insurance status 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”). Usual source of care was a single item asking participants “Do you have a regular doctor or health care provider?” Responses were coded as follows: 1=yes and 2=no and a dummy variable was created so that 1=yes and 0=no. Healthcare access was a single item asking respondents to indicate if during the previous 12 months, they have ever had any of the following medical needs (i.e. prescription medicine, mental health care/counseling, dental care, eyeglasses, flu shot, or physical exam) but did not get them because of cost. There was also a response category for participants to indicate that this
item did not apply to them. A dummy variable was created to identify participants with any unmet health needs (coded as “1”) and no unmet health needs (coded as “0”).

Personal disease history was a single item asking participants to indicate if they have ever been told by a doctor or health care professional that they have any health conditions on a list. Response options included heart disease, hypertension, diabetes, kidney disease, high cholesterol, and cancer (with a subsequent list of types of cancer to choose from). A dummy variable was created to identify participants with any personal history of disease (coded as “1”) and no personal history of disease (coded as “0”).

**Dependent Health Behavior Variables**

Fruit and vegetable consumption was measured by two dichotomous (yes/no) items asking respondents to recall if they had consumed any fruits and any vegetables in the previous day. Physical activity frequency was measured by a single item asking participants “How often do you exercise or participate in physical activity for one hour or more?” The six response categories included; never, less than once a month, once a month, once a week, 2 to 3 days a week, and more than 3 days a week. Prostate cancer screening was measured by two dichotomous (yes/no) items asking participants if they have ever had a digital rectal exam (DRE) or prostate specific antigen test (PSA). Colorectal cancer screening was measured by a single dichotomous (yes/no) item asking participants “Have you ever had any type of screening test for colon cancer or colorectal cancer (such as colonoscopy, sigmoidoscopy, or barium enema)?”
Analysis Plan

Missing Value Analysis

Data was processed using SPSS 17 (SPSS Inc., IBM). Data was screened for missing values to determine if 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. Two variables, sick leave and neighborhood perceptions were identified as having missing values. Only 8.7% of responses were missing for the variable which measured availability of sick leave and 7.4% of responses were missing for the composite variable on neighborhood perceptions. The missing value analysis procedure in SPSS indicated that no other variables had missing responses. Imputation methods were not utilized for item non-response; instead, cases with any missing data on variables under analysis were deleted (i.e. listwise deletion). Listwise deletion of cases is an acceptable statistical method if missing response values are independent of one another and missing completely at random (van der Ark & Vermunt, 2010).

Descriptive Analysis

Univariate (descriptive) analysis was performed with frequency distributions on each pertinent variable to determine a profile on the sample population of African American men. Bivariate analysis with cross-tabulations and chi-squared tests of
significance was performed to determine if any significant differences, associations or other relationships exist between the independent individual and social variables and the demographic and health behavior outcome variables.

Potential relationships between demographic variables and key outcome variables (i.e. fruit/vegetable intake, physical activity, and cancer screenings) were also analyzed. Bivariate logistic regressions was performed to determine which individual and social variables best predict each health behavior outcome variable while controlling for any demographic and environmental variables significantly associated with key outcome variables. All tests will were two-tailed and conducted at a significance level of $\alpha=0.05$. 
Chapter 4: Results

This chapter will present the results of analyses conducted to determine the social and ecological factors which influence African American men’s engagement in specific health behaviors known to prevent cancer. Results from the descriptive analysis will be presented first followed by bivariate results. Lastly, results of the logistic regression analysis will be described.

Descriptive Analyses

Descriptive analyses were performed to ascertain demographic characteristics of the sample as well as to determine the percentage of participants who reported currently engaging in cancer related preventive health behaviors. For all variables, N=229 unless otherwise indicated. The vast majority (88.6%) of African American male participants were over 40 years of age and the mean participant age was 52 years ($sd=11.5$). Current screening guidelines recommend that African American men of average risk begin screening for both prostate and colorectal cancer at age 50, making the current sample of black men an appropriate fit for examining adherence to screening guidelines. Nearly 60% of participants were unmarried (n=137) and 48.5% (n=111) reported being unemployed. This finding was expected given where the sample was drawn and suggests that the high national unemployment rate due to an economic downturn may have particularly negatively affected black men.
Only 29% (n=61) of participants reported having paid sick-leave available at their current or most recent place of employment, and 58% (n=120) reported having one or more unmet health needs in the past 12 months (e.g. prescription medication, eye glasses, dental care etc…). When asked to recount the number of delays in acquiring medical care due to the cost of care, 43% of respondents reported at least one delay in care (n=99) with 0.75 being the mean number of delays (sd=0.81). With regard to self-rated health status, participants described their overall health as excellent (5%), very good (28.4%), good (41.9%), fair (20.5%), and poor (2.2%). Additionally, 60% of participants reported having been previously diagnosed with at least one health condition (e.g. hypertension, heart disease, diabetes etc…). In addition, when asked who has the most influence on participants when making health related decisions, 76% of black men reported relying only on themselves, while only 20% reported being influenced by a spouse or significant other, and less than 1% reported looking to a spiritual leader for help with health decisions. This finding is somewhat unexpected as several studies have indicated that spouses and significant others play a significant role in health-related decision making among men in general (Jernigan, 2001; Matthews et al, 2002). However, this finding may also be a function of the sample as only 40% of the sample is married, and of the married participants, only 28.3% (n=26) report that others have influence over their health-related decisions.
Concerning highest level of education obtained, the majority of the African American male participants had at least a high school diploma (91%, n=209) including 34% of those participants with some college credit or an associate degree and 21% with a baccalaureate degree or higher. Over 55% (n=127) of participants reported having some type of health insurance via employer-based insurance or self-pay while only 48% (n=110) of participants reported having a regular healthcare provider for routine care outside of an emergency department. With respect to household income, 47% of participants reported a yearly household income of less than $25,000.

With regard to the cancer-preventive health behavior outcomes under study; 35.4% (n=81) of black male participants had received any type of colorectal cancer screening (e.g. colonoscopy or sigmoidoscopy) while half of respondents (n=116) reported having received a form of prostate cancer screening (i.e. prostate specific antigen testing or digital rectal examination). The high percentage of prostate cancer screening among participants could be attributed to periodic community health fairs where free screening is available. Additionally, the prostate specific antigen test is minimally invasive and relatively convenient in contrast to many methods of colorectal cancer screening tests which require intensive dietary preparation for the test and often sedation.

When asked about the frequency and intensity of physical activity, 43% (n=99) of participants reported engaging in moderate intensity physical activity for 120 minutes or
more per week. The Centers for Disease Control and Prevention (CDC) report that at least 40% of African Americans do not meet recommendations for the frequency and intensity of physical activity (Bopp et al, 2006); the findings of this study reflect a slightly lower than average percentage of physical activity for this population. Physical activity guidelines published by the U.S. Department of Health and Human Services recommend adults attempt to do 150 minutes of moderate intensity physical activity (e.g. brisk walking) or more per week to reap the significant health benefits that routine physical activity provides (Bopp et al, 2006).

When asked about fruit and vegetable consumption in the previous 24 hours, 63% of men reported consuming any fruit in the previous 24 hours and 81% reported consuming any vegetable in the previous 24 hours. This finding is somewhat higher than expected because literature indicates that African Americans consume fewer servings of fruits and vegetables per day than other racial or ethnic groups (Moser et al, 2005). It is also important to note that this study examines the consumption of at least one serving of fruits and vegetables in the previous day but does not examine whether men consume the recommended five to nine servings per day; thus the current findings cannot accurately reflect whether African American men in the sample are meeting the daily recommended servings for fruits and vegetables. Table 2 below presents a summary of sample characteristics while table 3 compares black men in this study to a nationally representative sample of nearly 12,000 black men from the 2008 Current Population
Survey; a monthly survey of households conducted by the Bureau of Census (U.S. Census Bureau, 2008). It is interesting to note in table 3, that while the majority of this study population is over the age of 40 (88.6%), less than half of the nationally representative sample of black men is over the age of 40. There were marked similarities in marital status and education between the study population and national sample of black men. However, the study population had a significantly higher unemployment and uninsured rates than the national sample and lower income levels; an unexpected finding which indicates that older black men in the communities surrounding the health fair may be more disadvantaged than the average black man.
### Table 2. Sample Demographics

<table>
<thead>
<tr>
<th>Variable Name</th>
<th>% (N=229)</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age</strong> 21-39 years</td>
<td>11%</td>
<td>52.2 years</td>
</tr>
<tr>
<td>40-59 years</td>
<td>63.6%</td>
<td></td>
</tr>
<tr>
<td>60-85 years</td>
<td>25.4%</td>
<td></td>
</tr>
<tr>
<td><strong>Marital status</strong> Unmarried</td>
<td>59.8%</td>
<td></td>
</tr>
<tr>
<td>Married</td>
<td>40.2%</td>
<td></td>
</tr>
<tr>
<td><strong>Level of Education</strong> Less than or some high school</td>
<td>4.4%</td>
<td></td>
</tr>
<tr>
<td>High school diploma/GED</td>
<td>38.4%</td>
<td></td>
</tr>
<tr>
<td>Some college/associate degree</td>
<td>32.8%</td>
<td></td>
</tr>
<tr>
<td>Undergraduate degree</td>
<td>10.9%</td>
<td></td>
</tr>
<tr>
<td>Graduate or professional degree</td>
<td>9.2%</td>
<td></td>
</tr>
<tr>
<td><strong>Household Income</strong> Less than $25,000</td>
<td>44.6%</td>
<td></td>
</tr>
<tr>
<td>$25,001-$50,000</td>
<td>27.5%</td>
<td></td>
</tr>
<tr>
<td>More than $50,000</td>
<td>22.3%</td>
<td></td>
</tr>
<tr>
<td><strong>Employment Status</strong> Employed</td>
<td>51.5%</td>
<td></td>
</tr>
<tr>
<td>Unemployed</td>
<td>39.3%</td>
<td></td>
</tr>
<tr>
<td><strong>Health Insurance Status</strong> Insured</td>
<td>55.5%</td>
<td></td>
</tr>
<tr>
<td>Uninsured</td>
<td>39.3%</td>
<td></td>
</tr>
<tr>
<td><strong>Family History of Cancer</strong> Has family history of cancer</td>
<td>37.1%</td>
<td></td>
</tr>
<tr>
<td>Has no family history of cancer</td>
<td>62.9%</td>
<td></td>
</tr>
<tr>
<td><strong>Personal Disease History</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>History of 1 or more diseases</td>
<td>59.4%</td>
<td></td>
</tr>
<tr>
<td>No history of diseases</td>
<td>40.6%</td>
<td></td>
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</tbody>
</table>
Table 3. Demographic Comparison between African American Men in the 2008 Current Population Survey and African American Men in the Current Study

<table>
<thead>
<tr>
<th>Demographic Profile</th>
<th>African American Men in the Study</th>
<th>2008 Census Current Population Survey; African American Men</th>
</tr>
</thead>
<tbody>
<tr>
<td>Over age 40</td>
<td>88.6%</td>
<td>42.2%</td>
</tr>
<tr>
<td>Unmarried</td>
<td>60%</td>
<td>63.3%</td>
</tr>
<tr>
<td>High school graduate or more</td>
<td>91%</td>
<td>81.8%</td>
</tr>
<tr>
<td>Bachelors degree or higher</td>
<td>21%</td>
<td>18.7%</td>
</tr>
<tr>
<td>Unemployed</td>
<td>48.5%</td>
<td>11%</td>
</tr>
<tr>
<td>Household income below $25,000</td>
<td>44.6%</td>
<td>30.4%</td>
</tr>
<tr>
<td>Lacks health insurance (age 18 and over)</td>
<td>55.5%</td>
<td>31.6%</td>
</tr>
</tbody>
</table>

Correlational Analyses

Bivariate analyses were conducted to evaluate the linear relationships between social and ecological factors and fruit and vegetable consumption, prostate and colorectal cancer screening, and physical activity frequency. A pearson product-moment correlation
coefficient was computed to assess the relationship between all variables. The results of the bivariate analyses are summarized in table 3. Results of bivariate analysis suggests that getting a prostate cancer screening (PSA or DRE) test is positively related to age ($r = .39$, $p < .001$), having any form of health insurance ($r = .21$, $p < .01$), having a regular healthcare provider ($r = .48$, $p < .001$), level of education ($r = .20$, $p < .01$), household income ($r = .15$, $p < .05$), material conditions ($r = .18$, $p = .01$), and neighborhood conditions ($r = .17$, $p < .05$).

Age represents a moderately strong relationship with prostate cancer screening while having a regular health care provider represents a strong positive relationship with the prostate cancer screening outcome. Having any form of insurance and level of education have weak positive relationships with the outcome of interest while the associations for household income, material conditions, and neighborhood conditions represent negligible relationships. The sum of the number of delays in medical care was negatively associated with receiving prostate cancer screening ($r = -.16$, $p < .05$); an expected finding which indicates that increased delays in accessing medical care translate to decreased engagement in prostate cancer screening.

Receiving any form of colorectal cancer screening test was positively associated with having a regular healthcare provider ($r = .35$, $p < .001$), having any form of health insurance ($r = .17$, $p < .05$), marital status ($r = .18$, $p < .01$), and age ($r = .27$, $p < .001$). Having a regular health care provider and age represents moderately strong positive
relationships with the colorectal cancer screening outcome while marital status and health insurance reflect negligible relationships. Factors negatively associated with colorectal cancer screening include being employed ($r = -.14, p < .05$) and sum of delays in medical care ($r = -.13, p = .05$).

Engaging in moderate intensity physical activity for 120 minutes or more per week was only positively associated with reporting a family history of cancer ($r = .15, p < .05$) which is considered negligible in terms of magnitude of association. Consuming any fruits or vegetables in the previous 24 hours was only significantly related to the availability of paid sick-leave at work ($r = .14, p < .05$) which is also considered negligible in magnitude. Additional bivariate analyses suggest that fruit and vegetable consumption is significantly but weakly related to receiving any kind of prostate cancer screening test ($r = .14, p < .05$), and engaging in moderate intensity physical activity for 120 minutes or more per week ($r = .23, p < .001$) which represents a weak positive relationship.

Also, receiving any kind of prostate screening test was significantly positively associated with receiving any kind of colorectal screening test ($r = .49, p < .001$); a strong finding that suggests that if African American men have access to one screening test, they may also have increased access to the other, potentially as a result of physicians referring African American men for both screening tests. Sum of delays in medical care was significantly negatively associated with the composite score of neighborhood conditions.
(r = -.21, p < .01); a weak negative relationship indicating that increased delays in medical care are associated with lower scores on a scale of reported neighborhood conditions.

Results from the correlational analysis along with available theoretical knowledge were examined and used as a foundation for decision-making regarding which social and ecological factors to include in subsequent logistic regression analyses. Due to the significant correlation between health insurance and employment status (r = .34, p < .001), employment status was dropped from subsequent regression analyses to avoid issues with multicollinearity. Having a usual healthcare provider and insurance status was also significantly correlated (r = .51, p < .001). This finding confirms what current literature indicates, which is that having health insurance increases access to primary health care providers and specialists outside of care received in an emergency department (Card, Dobkin, & Maestas, 2008). Multicollinearity was not an issue for usual source of care and insurance status because these two predictors were not included together in any of the logistic regression models.
Table 4. Correlation Between Individual, Social, and Ecological Factors and Cancer-Related Preventive Health Outcomes

<table>
<thead>
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<th>14</th>
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</thead>
<tbody>
<tr>
<td>1. Prostate cancer screen</td>
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<tr>
<td>2. Colorectal cancer screen</td>
<td>.493***</td>
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<tr>
<td>3. Fruit/vegetable consumption</td>
<td>.142*</td>
<td>0.07</td>
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<tr>
<td>4. Physical activity frequency</td>
<td>0.086</td>
<td>0.992</td>
<td>.233**</td>
<td></td>
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<tr>
<td>5. Neighborhood conditions</td>
<td>.168*</td>
<td>0.032</td>
<td>0.098</td>
<td>0.056</td>
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<tr>
<td>6. Material conditions</td>
<td>.182**</td>
<td>0.13</td>
<td>0.096</td>
<td>0.051</td>
<td>.524**</td>
<td></td>
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<tr>
<td>7. Marital status</td>
<td>0.114</td>
<td>.176**</td>
<td>-0.019</td>
<td>-0.014</td>
<td>.141*</td>
<td>0.150*</td>
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<tr>
<td>8. Employment status</td>
<td>-0.014</td>
<td>-0.141*</td>
<td>0.05</td>
<td>-0.053</td>
<td>.183**</td>
<td>.340**</td>
<td>0.064</td>
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<tr>
<td>9. Insurance status</td>
<td>.205**</td>
<td>.167*</td>
<td>-0.017</td>
<td>0.055</td>
<td>0.118</td>
<td>.312**</td>
<td>.394**</td>
<td>.344**</td>
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</tr>
<tr>
<td>10. Usual source of care</td>
<td>.477**</td>
<td>.349**</td>
<td>0.096</td>
<td>-0.027</td>
<td>.150*</td>
<td>.281**</td>
<td>.246**</td>
<td>.145*</td>
<td>.510**</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>11. Family history of cancer</td>
<td>-0.055</td>
<td>0.018</td>
<td>0.066</td>
<td>.151*</td>
<td>0.015</td>
<td>-0.102</td>
<td>-0.04</td>
<td>0.112</td>
<td>0.034</td>
<td>-0.105</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>12. Education level</td>
<td>.205**</td>
<td>0.04</td>
<td>0.061</td>
<td>-0.005</td>
<td>0.122</td>
<td>.270**</td>
<td>-0.118</td>
<td>.239**</td>
<td>.157*</td>
<td>.208**</td>
<td>0.056</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13. Household income</td>
<td>.153*</td>
<td>0.122</td>
<td>0.044</td>
<td>-0.076</td>
<td>.248**</td>
<td>.409**</td>
<td>.290**</td>
<td>.328**</td>
<td>.556**</td>
<td>.360**</td>
<td>-0.071</td>
<td>.261**</td>
<td></td>
<td></td>
</tr>
<tr>
<td>14. Sum of delays in medical care</td>
<td>.157*</td>
<td>-0.129</td>
<td>0.005</td>
<td>-0.118</td>
<td>.207**</td>
<td>.297**</td>
<td>-0.117</td>
<td>-0.023</td>
<td>.268**</td>
<td>.260**</td>
<td>0.128</td>
<td>-0.015</td>
<td>-0.310**</td>
<td>1</td>
</tr>
</tbody>
</table>

*p<.05, **p<.01
Assessing Non-linearity

The purpose of diagnostic testing in logistic regression analyses is to ensure that the regression model fits the data well, is correctly specified, and does not violate any basic assumptions of the regression analysis (Warner, 2008). Non-linearity in continuous independent variables can be tested by creating an interaction term between the continuous independent variable (x) and the natural log of (x), creating the new term of [(X)*ln(X)] before re-running the regression analysis using this term. This method is called a Box-Tidwell test and a significant coefficient for the new term in the regression analysis indicates a non-linear relationship between the original (x) variable and the dependent variable (Menard, 2002).

The Box-Tidwell test is only appropriate for assessing continuous variables. For the current analysis, a Box-Tidwell test was performed for the only continuous independent variable, participant age. This variable was assumed to be non-linear in relation to the prostate and colorectal cancer screening outcomes because these cancers are most often diagnosed in individuals aged 40 and over. The new term [(age)*ln(age)] was significant for non-linearity for the outcomes of prostate and colorectal cancer screening. This finding of non-linearity of age was expected and considered clinically normal because the “risk” of getting a prostate and colorectal cancer screening test increases significantly after the age of 40. In response, the independent variable of participant age was dichotomized into participants aged 39 and below (0), and age 40 and
over (1). The regression analysis which included the dichotomized variable for participant age was not significant for the Box-Tidwell test indicating that the issue with non-linearity had been corrected. There were no other independent variables suspected of non-linearity.

Assessing Collinearity

Yet another consequence of poorly specified models is multicollinearity (collinearity), which occurs when independent variables are highly inter-correlated (Warner, 2008). Higher levels of multicollinearity create large standard errors and unrealistically large regression coefficients which in turn makes it difficult to reliably interpret indicators of the strength and effect of independent predictor variables (beta weights and R-square values) (Warner, 2008). There is not a direct statistical test for multicollinearity in the SPSS package, so for this study each independent variable was regressed 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 ($r^2$) value, tolerance, and variance inflation factor (VIF).

Literature indicates that r-squared values (which is a measure of the variance explained by the independent variable) of greater than 0.8 are considered high and signal potential problems with collinearity (Warner, 2008). For the multicollinearity tests for this study, there were no $r^2$ values greater than 0.5. Tolerance examines each independent
variable in relation to all other independent variables including interactions and simple correlations among them while VIF is the reciprocal of tolerance. Literature on collinearity diagnostics with smaller sample sizes uses tolerance values at or below 0.20 and VIF levels greater than 2.5 as indicators of issues with multicollinearity (Menard, 2002). For this study, there were no tolerance values below 0.20 or VIF values greater than 2.1. Initial bivariate correlations were also examined and the employment variable was excluded from logistic regression models due to high correlation with the insurance status variable.

**Assessing Influence**

An examination of the influence of each case on the estimated models was conducted; Dfbeta is a type of residual analysis which measures the change in logistic regression coefficients when a case is removed from the model; and values greater than $2/\sqrt{n}$ are considered very influential (Warner, 2008). For the prostate cancer, colorectal cancer, and physical activity outcomes, 0.132 represents the cutoff value for Dfbeta using the formula described above ($2/\sqrt{229}$ and $2/\sqrt{228}$). For the models predicting both prostate and colorectal cancer as the outcome, the mean Dfbeta values for each regression coefficient (with the predictors: age, usual source of care, and education for PC; age and usual source of care for CRC) were well below the cutoff value. For the model predicting frequency of physical activity, ($n=229$), the mean Dfbeta values for
each regression coefficient (with the predictors: sum of delays in care, family history of cancer, and fruit and vegetable consumption) were below the the cutoff value. Lastly, for the fruit and vegetable consumption outcome, the mean Dfbeta value for each regression coefficient (with physical activity as the only predictor) was less than the cutoff value. These results indicate that on the mean, influential cases did not significantly influence regression coefficients; individual observations with absolute values above the Dfbeta cutoff were not omitted from the subsequent analyses.

Examining the leverage statistic is yet another method for identifying outlying cases that disproportionately influence regression coefficients (Warner, 2008). Leverage statistic values range from 0 to 1; values greater than 0.5 indicate that a particular case exerts a great amount of influence on the regression coefficient estimates (Warner, 2008). For logistic regression models across all four outcomes, there were no mean leverage values above 0.03 indicating that any outlying cases did not unduly influence regression coefficients.

**Interaction Effects**

Conceptually, it seemed plausible that an interaction between both age and usual source of care and age and insurance would yield an increased likelihood for both prostate and colorectal cancer screening outcomes. An interaction term was created for
age and insurance and a second term was created for age and usual source of care. Each of these interaction terms was tested using logistic regression for both prostate and colorectal cancer screening outcomes.

The interaction term for age and insurance was significantly predictive of prostate cancer screening ($\chi^2 = 14.31$, $p = .000$), ($\beta = 1.02$, $p = .000$) and colorectal cancer screening ($\chi^2 = 11.61$, $p < .05$), ($\beta = .965$, $p < .05$), however the Hosmer Lemeshow test for model fit was significant ($p < .001$) indicating a poor model fit for the age-insurance interaction term with both screening outcomes. The interaction term for age and usual source of care was significantly predictive of prostate cancer screening ($\chi^2 = 56.9$, $p = .000$), ($\beta = 2.15$, $p = .000$) and colorectal cancer screening ($\chi^2 = 34.2$, $p = .000$), ($\beta = 1.69$, $p = .000$), however, once again the Hosmer Lemeshow test for model fit indicated an inappropriate model fit ($p < .001$); thus neither of these interaction terms were included in the final models for both cancer screening outcomes.

**Final Model**

The goal of this study was to identify a set of predictor variables for each binary outcome that predict target group membership for most individuals in the sample. Binary logistic regression was performed for each of the four cancer-related preventive health
outcome variables (prostate and colorectal cancer screening, fruit/vegetable consumption, and physical activity frequency) in order to assess the contribution of individual, social, and ecological predictor variables to each outcome. Each outcome variable was coded 1 or 0 with 1 indicating the receipt of prostate and colorectal cancer screening, the consumption of a serving of fruit or vegetable in the previous 24 hours, and having engaged in 120 minutes or more moderate intensity physical activity in the previous week.

During the model building process, independent predictor variables were selected based on significant associations in the correlation matrix and information from literature on potential predictive factors. Factors that were significant bivariate correlates but were not significant predictors in each model were excluded with the goal of building the strongest and most informative model for each outcome. For all models, independent predictor variables were entered simultaneously as opposed to stepwise because there was no clear theoretical knowledge concerning which predictors were more important. Tables 5, 6, 7, and 8 display the logistic regression results for each outcome.

Research Question 1

What are the individual social and ecological factors associated with African American men receiving any form of prostate cancer screening?

A binary logistic regression analysis was conducted to predict the receipt of any type of prostate cancer screening for African American male participants. The outcome
variable was coded 0=no PC screening and 1=PSA, DRE or both screening tests. Three predictor variables were entered simultaneously into the model; these were the responses to the survey questions about current age, highest level of education, and having a usual doctor or source of health care. Data from 229 cases was included in this analysis. A test of the full model (with age, education, usual source of care, insurance, and sum of delays in care as predictor variables) compared to null model was statistically significant, \( \chi^2 = 76.58, p<.001 \). Age (\( \beta = 2.61, p<.001 \)), usual source of care (\( \beta = 2.06, p<.001 \)), and level of education (\( \beta = 0.74, p<.05 \)) significantly predicted receipt of prostate cancer screening while insurance and sum of delays in care did not significantly predict the outcome. Increased age, having a usual source of care, and increased level of education were all positively associated with the receipt of prostate cancer screening.

This finding indicates that the full predictive model predicts the odds of prostate cancer screening significantly better than null model that includes no predictors. The ratio of errors for the models was calculated using the formula (errors without the model-errors with the model)/errors with the model; the error ratio was 0.915 which can be interpreted as a 91.5% reduction in error for the full model over the constant model. The strength of association between the three predictor variables and receipt of prostate cancer screening was moderately strong with Cox and Snell’s \( R^2 = .280 \) and Nagelkerke’s \( R^2 = .38 \). The predicted probabilities for receiving prostate cancer screening are reported below for each predictor variable.
Table 5. Logistic Regression Predicting Prostate Cancer Screening

<table>
<thead>
<tr>
<th>Predictor Variable</th>
<th>B</th>
<th>S.E.(B)</th>
<th>Wald</th>
<th>Odds Ratio</th>
<th>95% C.I.for EXP(B)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>2.609***</td>
<td>.793</td>
<td>10.840</td>
<td>13.589</td>
<td>2.875 – 64.233</td>
</tr>
<tr>
<td>Usual Source of Care</td>
<td>2.063***</td>
<td>.382</td>
<td>29.136</td>
<td>7.867</td>
<td>3.720 – 16.637</td>
</tr>
<tr>
<td>Education Level</td>
<td>.737*</td>
<td>.320</td>
<td>5.315</td>
<td>2.091</td>
<td>1.117 – 3.914</td>
</tr>
<tr>
<td>Insurance</td>
<td>-.440</td>
<td>.384</td>
<td>1.312</td>
<td>.644</td>
<td>.303 – 1.368</td>
</tr>
<tr>
<td>Sum of delays in Care</td>
<td>-.090</td>
<td>.203</td>
<td>.196</td>
<td>.914</td>
<td>.613 – 1.362</td>
</tr>
<tr>
<td>Constant</td>
<td>-3.432</td>
<td>.858</td>
<td>15.983</td>
<td>.032</td>
<td></td>
</tr>
</tbody>
</table>

*p<.05, **p<.01, ***p<.001

Research Question 2

What are the individual social and ecological factors associated with the receipt of any form of colorectal cancer screening among African American men?

A binary logistic regression analysis was conducted to predict the receipt of any type of colorectal cancer screening for African American male participants. The outcome variable was coded 0=no CRC screening and 1=any form of CRC screening tests. Two predictor variables were entered simultaneously into the model; these were the responses to the survey questions about current age, and having a usual doctor or source of health care. Data from 228 cases was included in this analysis. A test of the full model (with age, usual source of care, insurance, and marital status as predictor variables) compared
to null model was statistically significant, $\chi^2 = 72.02$, $p = .000$. Both age ($\beta = 0.02$, $p < .01$) and usual source of care ($\beta = 1.48$, $p < .01$) were significant predictors of colorectal cancer screening while insurance and marital status were not significant predictors. Increased age and access to a regular health care provider were both positively associated with the receipt of colorectal cancer screening.

The error ratio was 0.528 which can be interpreted as a 58.8% reduction in error for the full model over the constant model. The strength of association between the two predictor variables and receipt of colorectal cancer screening was moderately strong with Cox and Snell’s $R^2 = .271$ and Nagelkerke’s $R^2 = .372$. The predicted probabilities for receiving colorectal cancer screening are reported below for both significant predictor variables.

Table 6. Logistic Regression Predicting Colorectal Cancer Screening
Research Question 3

What are the individual, social, and ecological factors predictive of physical activity frequency among African American men?

A binary logistic regression analysis was conducted to predict physical activity frequency for African American male participants. The outcome variable was coded 0=did not exercise for 120 minutes or more in the previous week and 1=did exercise for 120 minutes or more in the previous week. Three predictor variables were entered simultaneously into the model; these were the responses to the survey questions about having a family history of cancer, the summed number of delays in meeting health care needs, and having consumed at least one serving of fruit or vegetables in the previous 24 hours.
Data from 229 cases was included in this analysis. A test of the full model (with summed delays in health care needs, family history of cancer, and fruit or vegetable consumption as predictor variables) compared to null model was statistically significant, $\chi^2 = 23.93, p = .000$. Sum of delays in medical care negatively predicted physical activity ($\beta = -.039, p < .05$) while family history of cancer ($\beta = 0.76, p < .01$) and fruit/vegetable consumption ($\beta = 1.68, p < .001$) positively predicted physical activity. Thus, increased delays in medical care were negatively associated with engaging in at least 120 minutes or more of physical activity per week; while having a family history of cancer and increased fruit and vegetable consumption were positively associated with physical activity frequency. The error ratio was 0.10 which can be interpreted as a 10% reduction in error for the full model over the constant model. The strength of association between the three predictor variables and receipt of colorectal cancer screening was relatively weak with Cox and Snell’s $R^2 = .099$ and Nagelkerke’s $R^2 = .133$. The predicted probabilities for engaging in 120 minutes or more of physical activity are reported below for each predictor variable.
Table 7. Logistic Regression Predicting Physical Activity Frequency

<table>
<thead>
<tr>
<th>Predictor Variable</th>
<th>B</th>
<th>S.E.(B)</th>
<th>Wald</th>
<th>Odds Ratio</th>
<th>95% C.I.for EXP(B)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sum of delays in care</td>
<td>-.389*</td>
<td>.183</td>
<td>4.519</td>
<td>.678</td>
<td>.473</td>
</tr>
<tr>
<td>Family history of cancer</td>
<td>.757**</td>
<td>.294</td>
<td>6.607</td>
<td>2.132</td>
<td>1.197</td>
</tr>
<tr>
<td>Fruit/vegetable consumption</td>
<td>1.684***</td>
<td>.513</td>
<td>10.796</td>
<td>5.388</td>
<td>1.973</td>
</tr>
<tr>
<td>Constant</td>
<td>-1.763</td>
<td>.517</td>
<td>11.636</td>
<td>.172</td>
<td></td>
</tr>
</tbody>
</table>

*p<.05, **p<.01, ***p<.001

Research Question 4

What are the individual, social, and ecological factors predictive of fruit and vegetable consumption among African American men?

A binary logistic regression analysis was conducted to predict the consumption of at least one serving of fruit or vegetables in the past 24 hours for African American male participants. The outcome variable was coded 0=did not consume a fruit or vegetable in the previous 24 hours and 1=did consume a fruit or vegetable in the previous 24 hours. One predictor variable was included in the model; which was the response to the survey question concerning whether or not the participant had engaged in moderate intensity physical activity for 120 minutes or more in the previous week.
Data from 229 cases was included in this analysis. A test of the full model (with physical activity frequency, household income, and material conditions as the predictor variables) compared to null model was statistically significant, $\chi^2 = 13.73, p<.01$. An increase in physical activity was positively associated with consuming at least one serving of fruit or vegetables in the previous day ($\beta=1.67, p<.01$) while household income and material conditions were not significant predictors of the outcome. The error ratio was 0.00 which can be interpreted as no reduction in error for the full model over the constant model. The strength of association between the sole predictor variable and consumption of at least one serving of fruit or vegetable in the previous 24 hours was relatively weak with Cox and Snell’s $R^2 = .062$ and Nagelkerke’s $R^2 = .117$. The predicted probability for fruit/vegetable consumption is reported below for the only significant predictor variable.

Table 8. Logistic Regression Predicting Fruit and Vegetable Consumption
Table 9. Predicted Probability of Prostate Cancer Screening

<table>
<thead>
<tr>
<th>Predictor</th>
<th>Probability of Screening</th>
</tr>
</thead>
<tbody>
<tr>
<td>No usual source of care</td>
<td>0.277</td>
</tr>
<tr>
<td>Usual source of care</td>
<td>0.755</td>
</tr>
<tr>
<td>Under the age of 40</td>
<td>0.077</td>
</tr>
<tr>
<td>Over the age of 40</td>
<td>0.562</td>
</tr>
<tr>
<td>High school diploma or less</td>
<td>0.398</td>
</tr>
<tr>
<td>Some college or more</td>
<td>0.603</td>
</tr>
</tbody>
</table>

Table 10. Predicted Probability of Colorectal Cancer Screening

<table>
<thead>
<tr>
<th>Predictor</th>
<th>Probability of Screening</th>
</tr>
</thead>
<tbody>
<tr>
<td>No usual source of care</td>
<td>0.193</td>
</tr>
<tr>
<td>Usual source of care</td>
<td>0.527</td>
</tr>
<tr>
<td>Under the age of 40</td>
<td>0.0</td>
</tr>
<tr>
<td>Over the age of 40</td>
<td>0.399</td>
</tr>
</tbody>
</table>
The results of the analyses indicate that both individual social and broader ecological factors influence cancer-related preventive health behaviors among African American men. Regarding the receipt of prostate cancer screenings, age and having a
usual source of health care were the most significant positive correlates. While health insurance and increased delays in care were theoretically significant to prostate screening, surprisingly, they were not statistically predictive. However, in this model, having a usual source of care may serve as a proxy for health insurance and more generally, the health access needed to acquire screening.

For the colorectal cancer screening outcome, both level of education and usual source of care emerged as significant positive correlates while insurance and marital status were not significant. Again, in this model, usual source of care may serve as a proxy for the health access that health insurance provides to acquire screening. For fruit and vegetable consumption, physical activity was the only significant positive predictor and income or difficulty meeting material needs did not predict consumption; possibly indicating that access to at least some fruits and vegetables may not be a barrier in this population.

Lastly, for the physical activity frequency outcome, family history of cancer and fruit and vegetable consumption were significant positive correlates while sum of delays in medical care was a significant negative predictor. The following chapter will place these results in the context of a greater discussion of how the factors identified in this study related to what is known in the literature about cancer-related preventive health behaviors among African American men. Furthermore, implications for social work
practice and additional research will be discussed before detailing the strengths and limitations of this study.

Assessing Model Fit

Hosmer-Lemeshow tests were used to assess overall model fit for models predicting each of the four outcomes; this test indicates goodness of fit where a significant statistic (>0.05) signals a poor match between predicted and actual group memberships (Hosmer et al, 1997). The Hosmer-Lemeshow test was utilized for this study because literature indicates that other goodness of fit tests lack sufficient power to detect modest departures from linearity in small sample sizes (<500) such as the sample used for the current study (n=229) (Hosmer et al, 1997). Each of the final fitted models for prostate and colorectal cancer screening, fruit and vegetable consumption, and physical activity frequency had insignificant Hosmer-Lemeshow statistics indicating an appropriate model fit.
Chapter 5: Discussion of Findings and Implications

African American men experience disproportionately high rates of prostate and colorectal cancer along with several other cancers. This study sought to identify social ecological factors which influence some of the preventive health behaviors known to reduce cancer risk. Studies on cancer preventive health behaviors among African American men are lacking but it is well established that individual health behaviors contribute significantly to the risk associated with developing certain cancers (Sridhar et al, 2010). A deeper understanding of these contextual factors is particularly important because altering health decision-making and health behaviors are critical in addressing and eliminating many of the health disparities negatively affecting black men.

Social ecological theoretical framework asserts that health behaviors do not occur in a vacuum but are influenced and constrained by systemic conditions of the social environment on multiple levels; many times being circumstances outside of the individual’s control limiting personal choice (Xanthos, Treadwell, and Braithwaite-Holden, 2010). In this study of 229 black men at a community health fair in East Cleveland, Ohio, data were collected on demographic characteristics, health behaviors, health history, and health care access and utilization. The principle research questions sought to identify the social ecological factors predictive of each preventive health
outcome; prostate and colorectal cancer screening, fruit and vegetable consumption, and physical activity frequency.

**Summary of Findings**

**Prostate Cancer Screening**

Findings indicated that several factors were significantly correlated with each health outcome but when considered together, few reliably predicted each outcome. For example, while household income, material conditions, and neighborhood conditions were all significantly positively correlated to the receipt of prostate cancer screening, none were predictive of this behavior in the logistic regression model. One interesting finding was that having a family history of cancer and the influence of a significant other in health-related decision-making were both unrelated to the receipt of prostate cancer screening. Having a family history of cancer was close to being significantly negatively correlated (p= -0.055) to prostate cancer screening, suggesting that having a family history of cancer made men less likely to undergo prostate cancer screening.

This insignificant finding was also found in a recent nationally representative study of over 1000 black and white middle aged men examining the influence of family support on prostate cancer screening (Thomas et al, 2010). This study found that although family members and significant others are often a source of support for engaging in healthful behaviors and managing and monitoring health and disease, family support in
this study did not predict PSA screening and further, having a family history of cancer was associated with decreased PSA screening (Thomas et al, 2010). This negative correlation between family history of cancer and PSA screening among black men has been interpreted in some studies as a rejection of prostate cancer testing due to fear of a cancer diagnosis among black men who understand their increased risk for cancer due to having a family history (Sridhar et al, 2010). However, in a study of racial differences in prostate cancer screening by family history of cancer, Drake et al (2008) found that among over 1700 black and white men, white men with a family history of cancer were nearly two times more likely to receive prostate cancer screening than white men without a family history of cancer. The same study reported that black men with a family history were no more likely to get screened than black men without a family cancer history (Drake et al, 2008). The knowledge of hereditary cancer risk should prompt additional information-seeking and health action, so interventions are needed which target black men with a family history of cancer for initiation of cancer screening and health education around risk.

The multivariate model predicting the receipt of prostate cancer screening indicated that for every one year increase in age, additional year of education, and access to a usual healthcare provider, the odds of having received any form of prostate cancer screening also increased. These predictors suggest that the action of receiving a prostate cancer screening test is associated with both individual factors that cannot be modified
such as age and factors that can be altered such as level of education. Further, community-level and systemic factors interact at the level of access to primary care physicians to also influence this health action. For example, recent decreases in Medicaid and Medicare reimbursements to physicians has resulted in fewer physicians accepting Medicare and Medicaid patients; this reduces critical access to primary and preventive care for lower-income urban communities (Chou et al, 2007).

The first hypothesis for research question one asserted that older age, higher income, and having health insurance coverage would significantly predict the receipt of prostate cancer screening. This hypothesis was only partially confirmed with age being the only significant predictor. The second hypothesis for research question one asserted that African American men with higher levels of self-reported health and who report no delays in medical care would be more likely to have undergone any form of prostate cancer screening. This hypothesis was not supported because none of these factors proved to be significant predictors. These findings are mostly consistent with literature on predictors of prostate cancer screening in black men which have found that older age and having health insurance are significant predictors of screening (Fyffe et al, 2008; Jones, Steeves, & Williams, 2009), while household income and self-rated health were not found to be significant predictors in the literature. The availability and convenience of free or reduced cost prostate cancer screening may negate the need for health insurance to access screening for men in this study.
Colorectal Cancer Screening

For every one year increase in age and general increased access to a usual source of care or regular health care provider, the odds of receiving a colorectal cancer screening test of any type increased among the black men in this study. Having a usual source of care is a particularly salient predictor of screening because the most frequently recommended screening test is colonoscopy, which is invasive; requiring sedation and at least 24 hours of an altered diet to prepare the bowel for endoscopic examination. Studies have indicated that patients without sufficient support of a healthcare provider are significantly less likely to properly prepare for colonoscopy and subsequently do not complete the procedure (Sifiri et al, 2010).

The third hypothesis for research question two stated that African American men with health insurance, a regular health care provider, and a family history of cancer would be more likely to have undergone any form of colorectal cancer screening. This hypothesis was partially supported with having a regular health care provider being a significant predictor. The fourth hypothesis under research question two stated that African American men who have help making health-related decisions and report no delays in medical care would be more likely to have undergone any form of colorectal cancer screening. This hypothesis was not supported as neither of these factors were significant predictors.
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 (Robin & Shavers, 2008), while family history of cancer and social support from significant others have been identified as significant correlates of all forms of colorectal cancer screening among black and white men (Ye, Williams, and Xu, 2009). Men in the current study did not identify social support from a spouse or significant other as important to making health-related decisions, which could explain why social support from others was not a predictor of colorectal cancer screening. 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 high out-of-pocket costs for preventive care. Insurance plans that require expensive co-payments could make screening unaffordable and belie health insurance status as a predictor of screening. Also, this study did not examine other significant predictors of colorectal cancer screening in the literature such as physician recommendation and fear of the invasive nature of colonoscopy; factors that might better account for the variance in colorectal cancer screening among men in this study.

*Physical Activity Frequency*

For each additional individual delay in medical care (i.e. cost, transportation etc.), black men in this study were less likely to engage in 120 minutes or more of physical activity per week. In contrast, for each additional family member with a history of cancer and for each increase in combined fruit and vegetable consumption, black men were more
likely to engage in 120 minutes or more of physical activity per week. The fifth hypothesis for research question three stated that African American men with higher incomes, higher self-rated health status, and who had help making health-related decisions would report higher frequencies of physical activity. This hypothesis was not supported because these factors were not significant predictors. The sixth hypothesis for research question three asserted that African American men who rate their neighborhood conditions more favorably will report higher frequencies of physical activity. Neighborhood conditions were not a significant correlate or predictor of physical activity frequency so this hypothesis was not supported.

Studies have reported that higher self-rated health, higher income, and fruit and vegetable intake significantly predict physical activity in black men (Bopp et al, 2006). The literature is still developing on the effect of neighborhood conditions on physical activity among black men specifically. Black men in this study indicated that significant others did not play a major role in health-related decision making which could explain why social support did not influence physical activity in this study. The findings of this study are consistent with the literature in that black men who engage in other health promoting behaviors such as fruit and vegetable consumption are more likely to engage in physical activity.

Fruit and Vegetable Consumption
Engaging in 120 minutes or more of physical activity per week was the only significant predictor of consuming at least one serving of fruit or vegetables in the previous day. This finding indicates that black men in this sample who engaged in more physical activity were also predicted to consume more fruits and vegetables. This could be interpreted in multiple ways. For example, it can be interpreted as men who are more health-conscious as being more likely to engage in multiple health behaviors; or, as men with the material means to engage in more healthful behaviors doing so. It is important to note that the black men in this sample should be considered somewhat health-seeking to begin with as they were recruited for this study at a community health fair.

Hypothesis seven for research question four stated that African American men who were older, with higher incomes, with higher self-rated health levels, and who reported less difficulty meeting material needs would report higher consumption of fruits and vegetables. This hypothesis was not supported as none of these factors proved to be significant predictors. In this study, over 60% of black men reported fruit consumption while just over 80% reported vegetable consumption in the previous 24 hours. This finding could suggest that among this sample of black men, access and affordability did not pose barriers to fruit and vegetable consumption. It is important to note that this study did not capture the total number of servings or types of fruits and vegetables participants consumed each day or over a period of time. Studies indicate that African American men are not on average consuming five to nine daily servings of fruits and vegetable
recommended for disease prevention; thus more in-depth measures are needed to understand consumption habits in this population and the relationship between these habits and other preventive health behaviors.

In summary, this study identified individual and social ecological predictors of cancer-related preventive health behaviors among African American men. Having a usual source of care did emerge as a predictor of receiving both prostate and colorectal cancer screening tests. In the implications for practice and policy that follow, strategies for improving access to primary health care for black men will be discussed. Likewise, this study discovered that having a family history of cancer increased the odds of black men engaging in regular physical activity. The following section will address the need to promote awareness of and action on hereditary cancer risk among black males. Opportunities to address barriers to cancer preventive care through policy change and health care reform along with directions for future theory development and research will also be addressed in the following discussion.

Implications for practice

Patient navigation and case management

Findings from this study highlight social and ecological conditions at and beyond the individual level which predict cancer-related preventive health behaviors that are amenable to change to reduce cancer risk. Social work practitioners and clinicians from
other health-promoting fields 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. This study identified delays in medical care as a negative predictor of physical activity and a negative correlate of fruit and vegetable consumption. Professionals in a position to link patients or clients to resources should advocate for and provide when able, targeted case management or patient navigation services so that unmet health needs such as prescription medicine, routine physical exams, and eye and dental care do not hinder communities with a high cancer risk profile from receiving preventive care or engaging in other healthful behaviors. Nearly 60% of men in this study reported having one or more unmet health needs and only 48% reported having a regular health care provider. These findings signal a critical need for both increased health access and assistance with health care utilization among black men.

In this study of black men, 60% reported having been diagnosed with at least one health condition such as diabetes, heart disease, or hypertension; meaning that the majority of these men may encounter more than one health professional or specialist to treat their conditions. Studies targeting lower income urban populations have shown that professional facilitation for navigating the health care and health insurance systems in the form of case management or patient navigation significantly increases patient compliance
with medical orders and completion of cancer screening tests (Jandorf et al, 2005), while also reducing the follow-up time to biopsy for patients whose initial cancer screening yielded suspicious results (Freeman, Muth, and Kerner, 1995).

African American men as an underserved population 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. Studies indicate that patient navigators are uniquely trained to assist clients in overcoming barriers to accessing education and care while being well informed of community resources to assist disadvantaged patients (Dohan & Schrag, 2005). Cost has been identified as a substantial barrier to cancer screening among the uninsured leading to later cancer diagnoses and poorer prognoses (Freeman, 2006). Social workers and other practitioners in community health settings have an opportunity to include in their scope of services; outreach, education, and assistance accessing financial resources for preventive health to populations facing economic barriers to preventive cancer care. Additionally, patient or client navigators can assist with accessing transportation to health services, providing written or phone reminders for medical appointments, mobilizing social support, and act as a bridge between health providers to ensure continuity of care (Dohan & Schrag, 2005; Gottlieb, 2009). This type of intensive intervention is necessary for underserved populations such as black men who face several barriers to quality consistent health care.
Promoting awareness of hereditary cancer risk

In this study, black men with a family history of cancer were more than twice as likely to engage in 120 minutes or more of physical activity each week; a promising finding considering what is known about how regular moderate to vigorous exercise can reduce cancer risk (Barnard et al, 2007; Courneya & Friedenreich, 2007; Kruk, 2007). However, having a family history of cancer was not associated with the receipt of either prostate or colorectal cancer screening, and nearly 21% (n=42) of black men in this study reported having no knowledge of their cancer-related family history. Studies have confirmed that many black men with a first-degree relative who has been diagnosed with prostate cancer do not perceive their own risk of prostate cancer to be higher than average (Bloom et al, 2006; Ward et al, 2008). This indicates a critical need to increase awareness among black men about genetic cancer risk and the heightened importance of engaging in preventive health behaviors.

Physicians play a critical role in patient education and their recommendations have been shown to be a deciding factor in cancer screening compliance among black men (Ross et al, 2008; Wee, McCarthy, & Phillips, 2004). However, physicians also face barriers to recommending cancer screening tests such as lack of time devoted to preventive health visits, forgetfulness, lack of requests for screening on the part of the patient, and few tracking systems and incentives for follow-up to recommendations (Guerra et al, 2007; Pendleton et al, 2008). Physicians and health care professionals
should receive continuing education on the social and cultural barriers to cancer screening among underserved population groups; and training on how to discuss screening decisions in light of family disease history with African American men. Greater support should be offered to physicians for counseling high risk patients about routine cancer screening and preventive health behaviors. Additionally, resources should be expanded in primary care to allow for sufficient patient follow up before and after screening recommendations.

Further, if black men rarely or never encounter the health care system, the influence of physician counseling around family disease history, individualized cancer risk, and referrals for screening have no effect. Statistics demonstrate that in general, black men underutilize the health care system for a variety of reasons and face multi-domain barriers to quality health care (Cheatham, Barksdale, & Rodgers, 2008). Additionally, black families may be reluctant to openly discuss the disease history of relatives, making it difficult to make health decisions based on that knowledge (Bloom et al, 2006).

Efforts targeting black men must be focused on creating multiple points of intervention outside of the medical setting to educate and promote awareness of the importance of knowing your family history of disease, and speaking with a health care professional about how to lower cancer risk based on this information. For example, in a randomized study of five lower income communities comprised of half African American
respondents, Kelly et al (2009) found that the internet was the most common primary source of information on hereditary cancer risk, and that most households in the sample had internet access at home with no differences in internet access being observed between racial/ethnic groups (Kelly et al, 2009).

Information from this study was used to develop promotional materials and content for a website targeting lower income underserved communities; a resource for helping individuals discuss health histories with their families, and relay those histories accurately to their health providers (Kelly et al, 2009). Targeted websites and promotional materials are but one innovative approach to increasing awareness of hereditary cancer risk and preventive health strategies among black men. However, if the goal is to engage black men in the assessment of their hereditary cancer risk and promote the use of that information to inform health decision-making; practitioners will need to change the point of intervention from the medical setting to the community and use culturally relevant messages that are highly specific to the needs of black men (Gottlieb, 2009).

*Increased access, acceptability, and continuity of primary care*

In the current study, nearly 50% of black men reported that they did not have a regular doctor or health care provider while 20% said they usually went to an emergency department for care when sick; and 10% of black men in this study reported that they had absolutely no place to seek care when ill. These findings indicate a need to examine black
men’s access to and utilization of primary health care. For example, Copeland (2005) reported that “compared to White Americans, they [African Americans] are less likely to have private or employment-based health insurance, more likely to be covered by Medicaid or other publicly funded insurance, and twice as likely to be uninsured, even though eight of ten are in working families” (265). Several studies have documented other barriers to routine health care or primary care for black men such as previous negative encounters with a health provider, and social and cultural norms around masculinity which discourage self-care by viewing illness as a form of weakness (Lohan, 2007; Wade, 2009).

Men who lack access to a physician for primary and preventive care due to geographic location, cost, loss of employment, inability to pay for health insurance or other reasons are at higher risk for unmanaged chronic disease and delayed detection of cancers (Jandorf et al, 2006). Social work practitioners and other health professionals have an opportunity to link underserved clients such as black men to resources which can improve their access to primary care. For example, depending on the setting, clinicians can assist black men by locating and promoting free or reduced cost community-based health centers and clinics; advocating for the expansion of charity care programs in hospitals with the resources to do so; directing clients to community health fairs and public health departments for free screenings; and assisting unemployed, uninsured, and
underinsured patients with enrollment in state and federal health programs such as Medicare/Medicaid.

Access to primary care is but one side of the issue of minimal health care utilization among black men. Nearly 60% of men in this sample reported having one or more unmet health needs in the past year while 43% reported at least one delay to seeking out medical care. Low acceptability could pose a barrier to receiving invasive screening tests for cancer and chronic disease. Acceptability refers to how satisfactory the health care experience is to black men and this has considerable influence on decisions to seek out or return for care (Jernigan, 2001). For example, if the method of cancer screening or preparation for the screening test is unreasonably uncomfortable, embarrassing, or costly in other ways, black men may be reluctant to follow through with a physician’s recommendation for screening. In the same manner, if the healthcare provider is both attentive and responsive to patient questions or concerns, culturally competent, and the clinical setting and staff is welcoming, patients may be more likely to trust and comply with medical orders (Musa et al, 2009).

Moreover, clinicians should work closely with patients and clients to tailor preventive health strategies to the resources and support available to the client. Often, patients are instructed to make sweeping changes in exercise and dietary habits to improve their health but without thought to resources necessary to alter health behaviors such as access to nutritionists, fitness memberships, or even the quality grocery stores
and safe neighborhoods which support informed and sustainable changes. Because much of social work practice and health promotion practice involves partnering with individuals and families to improve wellbeing in the context of the client’s community and social environment, efforts must be focused on eliminating barriers to cancer prevention for black men by making preventive health measures more relevant and acceptable to underserved clients outside of the medical setting.

The majority of black men (60%) in this study reported having at least one chronic health condition such as diabetes, hypertension, or heart disease. When black men encounter the health care system for chronic disease care, there is also an opportunity for them to receive education and referral for cancer-related preventive care and screenings. However, a lack of continuity of care is a barrier to black men receiving preventive health screenings, education, and interventions to promote positive health behaviors in primary care settings. Continuity of care refers to a patient-centered approach in health care that prioritizes the coordination of a patient’s health needs and services and encourages primary care physicians, specialists, and community providers to work together to manage a patient’s care (O’Malley & Cunningham, 2008). A recent nationally representative study of nearly 3,000 older adults which oversampled for African Americans found that continuity of care provided through a primary care physician was significantly associated with reduced mortality over the long-term (Wolinsky et al, 2010). Specific to African American men, a study by Powell-Hammond
et al (2010) found that older black men with a usual source of care were over five times more likely to schedule a routine physical exam than men who did not report having a regular healthcare provider of physician. Increased efforts to improve not only access to, but continuity of care for African American men could increase the likelihood that black men would receive routine preventive health information and screenings.

**Implications for public policy**

**Patient-centered medical homes**

With health care reform high on the national legislative agenda, there is an opportunity to address some of the systemic conditions which contribute to disparities in health status and healthcare access, quality, and coverage affecting African American men. One potential approach gaining recognition is the development of the patient-centered medical home model which clusters health care provider systems based on geographical location to improve efficiency and promotes interdisciplinary collaboration among health care providers and community-based resources involved in a patient’s care (Konstam & Greenberg, 2009). In this study, 37% of men reported long wait times and difficulty getting a medical appointment as reasons for delayed access to health services, while nearly 5% reported lack of transportation as a reason for delays in care. This type of reformulation of health systems has the potential to improve access to care for underserved patients such as African American men by reducing the distance traveled between primary care providers and medical specialists and ensuring that patients who
face barriers to initial care, compliance with medical advice, or follow-up are linked with appropriate community resources.

*Community-level preventive health*

Health care reform also provides an opportunity to strengthen community-level safety nets for preventive care services. Tobacco use, dietary choices, and physical inactivity represent the primary underlying causes for nearly 40% of all American deaths (King, 2009); these health behaviors are also well established risk factors for the most frequently diagnosed cancers. Increased federal funds directed at community health programs which utilize evidence-informed primary prevention interventions could significantly reduce the chronic disease burden among populations at high risk of preventable mortality, particularly among African American men.

Community health centers are a critical resource for cancer and chronic disease preventive services to underserved communities. For example, in this study, 25% of black men reported receiving routine health care services from a health clinic or local health center as opposed to a doctor’s office in a primary care or hospital setting. Free and reduced-cost fee structures in many community health centers make preventive health services such as cancer screenings, nutritional counseling, and physical activity classes more accessible. This is particularly salient for the men in this study as nearly half of them were unemployed. Individuals such as those without adequate health insurance, those who are unemployed and individuals who face barriers such as transportation and
long wait times for appointments in the hospital-based primary care system can receive high quality care in a community health setting (Pearce et al, 2007). Health care reform should include policies which seek to expand the reach and utilization of community health centers, particularly preventive health services in socially and economically disadvantaged communities.

Addressing the social determinants of health inequities

Lack of access to high quality health care services is but one determinant of health inequities affecting African American men and other underserved populations. The term health inequity refers to a particular type of avoidable difference in health and the underlying determinants of health, in which disadvantaged social groups systematically experience worse health or health risks than more advantaged groups (Dressler, Oths & Gravelle, 2005). Social conditions such as access to safe and affordable housing, quality education, access to quality healthcare, and gainful employment opportunities are undeniable determinants of health that promote or constrain an individual’s ability to make health decisions (Glass & McAtee, 2006).

In order to improve the health status of all Americans and specifically underserved populations, policies need to be developed and evaluated which target the elimination of disadvantage across all social determinants of health. Regarding cancer and chronic disease related health disparities among black men, we should be concerned not only with describing the measurable differences in health for Black men compared to
other groups of men, but also with explicating the underlying social determinants of such
differences. These underlying causes include the impact of living and working
conditions, education, employment, social and cultural norms, and healthcare factors
(Gadson, 2006).

An effective policy seeking to improve health equity for African American men
would identify and attempt to address a range of actionable social indicators of restricted
access to health promoting resources for this population. It is the important to understand
that African American men are historically a socially marginalized population group; so
any examination of social determinants of health should consider the effects of such
marginalization as an additional social determinant of disparate health. Changes in policy
are likely the most effectual methods for systematically addressing the social
determinants of health which translate into higher cancer-related morbidity and mortality
for black men.

Implications for Future Research

The following section will discuss opportunities to further develop social
ecological theory for application to African American male health issues and then move
on to a discourse about building knowledge through continued research on African
American male health and cancer prevention strategies.

Social ecological theory
Social ecological theoretical framework was utilized as the unifying framework to understand how multi-domain personal, social, and community level factors correlate to or predict cancer-related preventive health behaviors in African American men. Findings from this study confirmed the core assumption of this theoretical framework; that black male preventive health behaviors are influenced by multi-domain conditions, experiences, or characteristics of the social environment such as having a usual source of care, level of education, employment and insurance status, and delays in medical care. These social conditions do not each occur in a vacuum; instead they exert a cumulative effect on the health trajectory of black men and their ability to make informed health choices.

This theoretical orientation allows for a contextual multi-domain analysis of health and health behavior. Researchers could use the results of the present study as a catalyst for deeper examination of how social ecological framework applies to the factors that emerged as correlates and predictors of cancer-related preventive health behaviors for black males. For example, literature indicates a strong relationship between neighborhood socioeconomic resources and health status; yet in the present study neighborhood conditions were only a very weak correlate to one of the preventive health outcomes, the receipt of prostate cancer screening. It is important to note that there may be other factors relevant to examining the relationship between neighborhood resources and health status or behaviors that were not measured in this study. However,
neighborhood conditions were also correlated to several other predictor variables such as individual material conditions, employment status, having a usual source of care, household income, and sum of delays in medical care. A scholar using social ecological framework might develop or utilize a different measure for assessing neighborhood conditions and model pathways by which neighborhood conditions indirectly affect preventive health behaviors in black men via socioeconomic barriers in daily life. One of the challenges of utilizing this theoretical framework for research is that this framework is broad and does not clearly define concepts of interest; it is for the researcher to ensure that variables and constructs are operationalized and fit well within the social ecological domains.

Studies conducted across disciplines have long identified poverty as a contributing factor to health status and more recently, to cancer and chronic disease-related health disparities affecting disadvantaged racial/ethnic and social groups (Niewczyk & Lwebuga-Mukasa, 2008). Taking the current study step further, researchers could employ social ecological framework to consider the potential relationship between multiple individual and neighborhood-level indicators of poverty and preventive health behaviors in black men. The results from this type of analysis could support public policy efforts to direct additional resources into improving the structures, safety, food availability and public services of low-resource communities in order to improve the overall health status of community residents.
Implications for research

The current study identified factors that predict cancer-related preventive health behaviors among African American men. So few scholars are researching and writing in the area of cancer prevention with black men that the present study provides prefatory impetus for broader examination of how black men perceive, learn about, access, and apply cancer prevention strategies. There is an urgent need for researchers and practitioners to initiate interdisciplinary collaboration among the fields of social work, public health, health communication, and health services to further explore individual, social, and health system factors that present barriers to preventive care for black men. Future lines of inquiry can begin by engaging black men in meaningful dialogue about the role of preventive health in their daily lives. The current study examined specific health behaviors related to the prevention of cancer but it is not known whether black men in this study exercised or consumed fresh produce for the explicit intent of preventing cancer. Additional studies should attempt to understand whether black men in differing socioeconomic, cultural, and geographical milieu express differing intent regarding health behaviors (i.e. exercising for recreation versus exercising for disease prevention).

There is also very little known about how black men process and apply knowledge about a family history of cancer to their own cancer preventive health efforts. The current study’s findings were consistent with other research in that having a family
history of cancer does not necessarily predict the receipt of cancer screening among black men (Griffith et al, 2007; Jernigan, 2001). What we do not know beyond conjecture, is why when armed with the knowledge of hereditary cancer risk, black men may be reluctant to seek out additional information about reducing personal risk. This is an important question that needs to be addressed by additional research.

Black men in this study with some college education or higher were more than twice as likely as men with a high school diploma or less to have received prostate cancer screening in any form. Future research needs to explore the role of education in health care utilization for preventive health and health literacy among African American men. Moreover, what types of interventions are appropriate and effective for narrowing the preventive health gap for black men with more and less educational attainment? Black men in this study with a usual source of care were six and a half times more likely to have been screened for prostate cancer and over three and a half times more likely to have been screened for colorectal cancer. Knowing the critical link between routine primary care and referral to and completion of cancer screenings in this population should spur intervention researchers to develop and evaluate culturally relevant pathways by which black men, particularly those in underserved areas, receive greater information about and access to primary care resources.

Nearly half of the black men in this study were unemployed. With employment status being correlated to insurance status, insurance status being correlated to having a
usual source of care, and usual source of care being predictive of cancer screening; there is a desperate need to specifically examine and address the barriers to cancer preventive care among unemployed black men. These men likely experience the most delays in accessing medical care across the board, and could benefit the most from community health resources to help them to achieve and maintain good health while looking for employment and long-term health benefits. The current study takes an initial step toward improving engagement in cancer prevention for black men by uncovering some barriers to and promoters of preventive health behavior. However, additional research is needed on each of the health behavior outcomes in this study and others such as tobacco use, use of sun screen, and receipt of other modalities of cancer screening to gauge the full picture of cancer-related preventive health for black men.

Limitations and Conclusions

Limitations

The sample size for this study is relatively small at 229 AAM out of the 1300 eligible attendees at the health fair (i.e. African American males over the age of 18 years). 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 utilized seriously 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. The demographic profile of this sample can be compared to publicly available national demographic information for African American men so that differences and similarities can be assessed for future research. However, it is important to highlight the limitations of national population-based datasets which often do not capture adequate and diverse samples of African American men even after oversampling the African American population; this also limits the potential for comparison to this study. Future research should aim to utilize a larger sample size, and a more complex sampling design to improve the predictive ability and generalizability of this study.

Despite these limitations, this study represents one of the few investigations specifically targeting both prostate and colorectal cancer-related preventive health behaviors in black men. This study fills a gap in the health disparities literature by applying a multi-domain framework to understanding factors which hinder and promote preventive health actions among black men. Furthermore, this study examines a larger range of individual, social, and health system correlates to preventive health behaviors.
than previous studies. Also, the types of correlates examined in this study are unique in comparison to other preventive health studies (e.g. sum of delays in medical care, neighborhood conditions, and family history of cancer). Lastly, the conceptualization of multi-domain influences on cancer-related preventive health behaviors among black men introduced in this study provide a schema that can be easily translated into interventions to increase cancer prevention practices among underserved black men.

Conclusions

African American men, regardless of socioeconomic status, are disproportionately burdened by cancer. This study utilized a multi-domain theoretical framework to identify and contextualize the predictors of known cancer prevention strategies among these men. In doing so, this study attempted to clarify the relationship between individual and social conditions, and specific preventive health behaviors. In general, findings suggested that factors both at and beyond the individual level exerted influence on health behaviors. Engagement in cancer-related preventive health behaviors in this population seems to be predominantly related to age, education, and having a usual source of care. These findings suggest that interventions to improve engagement in cancer prevention behaviors among black men should be multi-domain; conjointly addressing influencing factors in the individual, community, and structural domains. Improving preventive health behaviors among black men will not be effective in reducing cancer-related health
disparities if socioeconomic, health system, and institutional inequities which marginalize black men are not also addressed.
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