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Prevalence and Correlates of Sun Protection Behaviors among African Americans

A dissertation submitted in partial satisfaction of the
requirements for the degree Doctor of Philosophy

in

Public Health (Health Behavior)

by

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The Dissertation of Latrice Crystal Pichon is approved, and it is acceptable in quality and form for publication on microfilm:

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DEDICATION

I dedicate this dissertation to my parents for making several sacrifices to provide me with a quality education and a solid foundation.

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FIELDS OF STUDY

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ABSTRACT OF THE DISSERTATION

Prevalence and Correlates of Sun Protection Behaviors among African Americans

by

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Exposure to ultraviolet radiation (UVR) is a key risk factor for skin cancer. Current recommendations include sun avoidance, wearing protective clothing, and using sunscreen with an SPF of 15 during midday sun exposure. Few studies have examined sun protection behaviors among African Americans. The paucity of sun protection literature among this group is likely due to low incidence and misconceptions that darker skin offers protection against damaging effects of UVR. The literature indicates that African Americans suffer from disproportionally high rates of skin cancer mortality. Therefore, it is important to investigate current sun protection behaviors among African

Americans given these data. The primary objective of this study was to assess the prevalence and potential correlates of sun protection behaviors among a random community sample of African Americans. An anonymous health survey was administered door-to-door in 12 randomly selected census tracts in Los Angeles and San Diego Counties. African Americans were sampled from random block groups within these tracts, which varied by residential segregation and poverty levels. Participants were asked to report their frequency of sunscreen, wide brim hat, and sunglasses use during the summer on a 5-point Likert scale ranging from "never" to "always". Potential correlates of sun protection behaviors included demographic and phenotypic characteristics, skin cancer risk perception, and contextual factors. A total of 1,453 self-identified African Americans completed the health survey. The mean age was 45 (SD=16.2) ranging from 18 to 94 years. The prevalence of sun protection (% always) was 7.8% for sunscreen, 10.2% for wide brim hat, and 27.1% for sunglasses. Multivariate analyses showed that being female, having higher educational attainment, and higher income were significantly related to sunscreen use; males and older adults were more likely to wear a wide brim hat; and females and individuals with a higher income were more likely to always wear sunglasses. There were no significant associations between the other potential correlates and the three outcomes in the multivariate analyses. The key findings highlight 1) disparities in sun protection prevalence, and 2) predictors of sun protection behaviors among African Americans. Recommendations for future research and practice are discussed.

INTRODUCTION

Skin cancer is one of the most preventable forms of cancer. It also is highly curable, provided that it is detected early and not in an advanced stage. Although more prevalent among lighter-skinned individuals, skin cancers have the potential to occur in any ethnic/racial group. The goal of the proposed research is to characterize the current state of skin cancer prevention efforts, including sun protection behaviors, among African Americans. This study proposes to highlight the sun protection disparities among African American adults outlined by the following objectives:

Primary Objectives

I. Assess the prevalence of sun protection behaviors among a community sample of Southern Californian African American adults.

II. Assess the potential correlates of sun protection behaviors, including perceived skin cancer risk, among a community sample of Southern Californian African American adults.

Secondary Objectives

III. Compare prevalence and correlates of sun protection behaviors of African Americans in California obtained from a telephone-based health survey versus an in-person health survey.

BACKGROUND AND SIGNIFICANCE

Overview of Cancer Disparities

African Americans have the highest death rates and shortest survival rates out of all ethnic/racial groups in the U.S. for most cancers (ACS, 2007b). The death rate for all cancers combined is 35% higher among African American men and 18% higher among African American women in comparison to White men and White women (ACS, 2007b). In 2007, it is estimated that 62,780 African Americans will die from cancer (ACS, 2007b). Lung cancer is the leading cause of cancer mortality among African Americans, accounting for 31% of deaths in men and 22% of deaths in women (ACS, 2007b). Among African American men, the death rate for lung cancer is about 30% higher than for White men (ACS, 2007b).

Five-year relative survival rates during 1996-2002 for all cancers was 57% for African Americans (ACS, 2007b). For all cancer sites, African Americans had shorter survival rates than Whites irrespective of stage of diagnosis (ACS, 2007b). For lung, prostate, breast, and colorectal cancers, the survival rates were 12%, 98%, 77%, and 55%, respectively for African Americans in comparison to 15%, 100%, 90%, and 66%, respectively for Whites (ACS, 2007b).

These cancer disparities may be attributed to socioeconomic factors such as education, income, and poverty (Albano *et al.*, 2007). African Americans are more likely to not have healthcare insurance (U.S. Census Bureau, 2005) and to have greater difficulty accessing/utilizing healthcare services because of sociocultural factors such as racial discrimination. African Americans also face barriers to receiving cancer prevention

interventions, cancer screening procedures, and adequate treatment (Haggstrom *et al.*, 2005; Shavers & Brown, 2002).

Skin Cancer Disparities

Incidence

The incidence of skin cancer is not as common among African Americans as it is among other racial groups (e.g., with lighter skin). The rates are disproportionately higher among fair skinned populations such as White Americans (English, Armstrong, Kricker, & Fleming, 1997; Leiter and Garbe, 2008). Non-melanoma skin cancer (NMSC), which includes both basal and squamous cell carcinoma, is the most frequently diagnosed skin cancer among U.S. Whites and represents about half of all cancers diagnosed (ACS, 2007a; NCI; U.S.D.H.H.S., 2000). Approximately one million new cases are diagnosed each year in the U.S. The last published figures for NMSC among African Americans were reported during the period of 1977-1980. Incidence rates for NMSC among African Americans were 3 to 4 per 100,000 compared to 250 per 100,000 for Whites (Scotto *et al.*, 1996). These figures may be an underestimation of the actual rates for both racial groups, since NMSC is not reliably reported in state cancer registries.

Malignant melanoma incidence rates also are lower for African American men and women (1.1 and 0.9 per 100,000, respectively) compared to incidence rates for White men and women (27.2 and 17.6 per 100,000, respectively) (Ries et al., 2006). In California, rates for melanoma are comparable to national figures for African Americans. Data from the California Cancer Registry (1988-1993) provided the following age-adjusted incidence rates for African American men and women: 1.0 and 0.7 (per

100,000), respectively (Cress & Holly, 1997). Thus, malignant melanoma is more than 10 times higher in Whites than in African Americans (ACS, 2007a). Case studies have shown malignant melanoma represents 1% to 8% of all skin cancers for African Americans compared to 83% for Whites in one cancer registry (Giraud *et al.*, 1975; Halder & Bang, 1988; Johnson *et al.*, 2003). Although incidence rates for malignant melanoma may seem less threatening for African Americans because they are lower than those for Whites, mortality and survival rates are poorer than rates for Whites (Bellows *et al.*, 2001; Crowley *et al.*, 1991; Reintgen *et al.*, 1982).

Mortality

Five-year melanoma mortality rates among African Americans range from 37.5% to 85% compared to an overall rate of 30.7% among Whites (Fleming et al., 1975; Halder & Bang, 1988; Tas *et al.*, 2006). The age-adjusted mortality rate for nongenital NMSC for adults was 0.69 in the U.S. during the period of 1969-2000 (K. G. Lewis & Weinstock, 2007). Ethnic/racial differences in NMSC were apparent as rates were higher among White men than that among African American men by a factor of two. Among White men, the rate was 1.09 and among African American men the rate was 0.54. Rates were similar for White and Black women. Overall, NMSC mortality rates for Whites and African Americans have declined overtime (K. G. Lewis & Weinstock, 2007). Studies reporting mortality rates for squamous cell carcinoma, the most common skin cancer diagnosed in African Americans, have ranged from 17% to 29% (i.e., 1 in 5.9 to 1 in 3.4) (Fleming et al., 1975; Halder & Bang, 1988; Mora & Perniciaro, 1981). Among Whites

in the U.S., it is estimated that less than 1 in 500 with squamous cell carcinoma will die from the disease (Preston and Stern, 1992).

Survival

Skin cancer survival rates for African Americans also are discouraging. Melanoma case series studies in various geographic regions have reported five-year survival rates ranging from 22% to 61% for African Americans compared to 86% to 91% for Whites (Geller *et al.*, 2007; Livestro *et al.*, 2007; Reintgen et al., 1982; Reintgen *et al.*, 1983; Vayer & Lefor, 1993). Other studies have described even more startling figures among African American cases for ten-year melanoma survival rates ranging from 13% to 26% compared to 79% to 89% for Whites (Crowley et al., 1991; Livestro et al., 2007; Sutherland *et al.*, 1993). More recent national data show five-year relative melanoma survival rates by race for 1996-2002 were 93% for Whites and 75% for African Americans (ACS, 2007a).

Summary

In summary, African Americans have lower skin cancer rates, but higher mortality and poorer survival. Possible reasons for the skin cancer disparities noted above may be that African Americans are more likely to present with advanced stage of disease and have a poorer prognosis (Bellows et al., 2001; Byrd *et al.*, 2004; Mora & Perniciaro, 1981; Rahman & Taylor, 2001; Reintgen et al., 1982). A number of case series have commented on the aggressive nature of most skin cancers among African Americans. Additionally, African Americans seek most skin care from a primary care physician as

opposed to a dermatologist (McMichael & Jackson, 2000). Primary care doctors may not have the necessary training and/or skills to properly diagnose and treat skin cancer among darker ethnic/racial minorities (Cac *et al.*, 2008; Federman *et al.*, 2002; Wender, 1995). Neoplasms are often confused with other skin conditions such as eczema, psoriasis, infection, trauma, seborrheic keratoses, or nevus sebaceus (Altman *et al.*, 1987; Bang *et al.*, 1987).

Other factors might include suboptimal early detection practices, inadequate knowledge about and awareness of skin cancer, low perceptions of skin cancer risk, heightened fear of a cancer diagnosis, and living in a community with low educational attainment (Friedman *et al.*, 1994; Powe, 1996; Saraiya *et al.*, 2004b, "Survey of knowledge of and awareness about melanoma--United States, 1995", 1996; Van Durme *et al.*, 2000). Several of these potential correlates will be reviewed later in this section and explored in the analysis.

Skin Cancer Risk Factors

Overview

Scientific evidence indicates that lack of engagement in sun protection behaviors, intermittent and excessive exposure to solar ultraviolet radiation, personal phenotypic characteristics such as skin type and skin color, genetic factors, and a history of sunburn are all risk factors for skin cancer in White populations. Although scientific evidence to support most of these associations for African Americans is non-existent, several studies have assessed the distribution of skin type and the prevalence of sunburning among

African Americans. Each of these primary risk factors and their relationship to African Americans' skin cancer risk will be reviewed.

Sun Protection Behaviors

One of the objectives of Healthy People 2010 is to increase the proportion of persons who use at least one sun protective measure that may reduce the risk of skin cancer. Measures include limiting or avoiding sun exposure between 10 A.M. and 4 P.M.; wearing sun-protective clothing (e.g. wide brim hat, long sleeve shirt, sunglasses) when exposed to sunlight; using sunscreen with a sun-protective factor (SPF) of 15 or higher; and avoiding artificial sources of ultraviolet light (U.S. Department of Health and Human Services, 2000). The target goal is for 85% of U.S. adults to use at least one of these protective measures.

Several studies have been conducted to measure adherence to sun protection recommendations. Data obtained from the 1992 National Health Interview Survey (NHIS) Cancer Control Module were used to estimate sun protection behaviors among the U.S. White (Hall, May, Lew, Koh, & Nadel, 1997) and African American (Hall & Rogers, 1999) adult populations. Of African Americans, 28% used protective clothing, 45% used shade, and 9% used sunscreen. The proportions for Whites were 28%, 30%, and 32%, respectively (Hall et al., 1997; Hall & Rogers, 1999). These proportions were analyzed independently in two separate published studies for each racial/ethnic group. Thus, ethnic/racial differences in sun protection behaviors were not tested for statistical significance. However, data from the 1998 NHIS was used to analyze ethnic/racial differences in sun protection behaviors (Santmyire et al., 2001). Whites were about three

times more likely to report being “very likely” to use sunscreen compared to African Americans. In contrast, African Americans in this same study were significantly more likely to report being “very likely” to seek shade (Santmyire et al., 2001).

More recent data from the 2000 NHIS Cancer Control Module were published demonstrating rates for sun protection behaviors among the U.S. White adult population (Hall et al., 2003). Self-reported rates for “always/most of the time” staying in the shade, wearing a hat, wearing a long sleeve shirt, and using sunscreen were 39.1%, 43.4%, 36.9%, and 45.7%, respectively (Hall et al., 2003). The sun protection rates for other ethnic/racial groups were not reported. However, this study did assess the prevalence of sunburns among different ethnic/racial groups. African Americans were least likely to report sunburning within the past year compared with all other ethnic/racial groups. Having sunburned in the past year was reported for 5% of African Americans compared to 22% of Whites.

A subset of the African American community warranting special attention is outdoor workers. According to the U.S. Bureau of Labor Statistics, minorities (including African Americans) are more likely to be outdoor workers (U.S. Dept of Labor). This occupational group is particularly susceptible to elevated sun exposure levels. Among Southern California USPS letter carriers, the mean number of hours spent outdoors during work was approximately 4 hours (Oh et al., 2004). Sunscreen use rates for African American letter carriers were significantly lower than the rates for Whites (15.4% vs. 30.1%; p=0.0001) (Pichon et al., 2005). However, rates for wide brim hat use were higher among African Americans than for Whites, though not statistically significant (29.3% vs. 20.7%; p=0.22) (Pichon et al., 2005). These findings are similar to the general population

mentioned in the 1992 NHIS paper in that African American letter carriers had lower rates of sunscreen use than Whites, but higher rates of hat use/protective clothing than Whites. Another worksite study examined ethnic/racial differences in sun protection behaviors among sun sensitive African Americans and Whites (Friedman et al., 1994). Sunscreen use was 4% for African Americans and 57.7% for Whites (Friedman et al., 1994).

Summary of Sun Protection Behaviors

More population studies are needed to assess adherence rates to recommended guidelines for sun protection behaviors and prevalence of sunburn frequency among the general African American population in the U.S. Furthermore, most skin cancer prevention and screening messages are tailored to White or lighter skinned groups (Saraiya *et al.*, 2004a). Failure to target high-risk or sun sensitive African Americans in various health campaigns may be a contributing factor to the disproportionately higher skin cancer mortality rates and shorter survival rates. Lack of skin cancer education and awareness among African Americans may be directly related to low rates of sun protection behaviors. Very few skin cancer studies include African Americans because of their low incidence rates (Saraiya et al., 2004a). The purpose of this study is to highlight the sun protection disparities among African American adults in order to develop future sun safety interventions.

Role of Ultraviolet Radiation

Exposure to solar ultraviolet radiation (UVR) is a well established primary risk factor for NMSC and malignant melanoma in Whites (Leiter, 2008; Elwood, 1993;

Marks, 1995). The literature describing the risk factors for African Americans has yielded mixed results. The association of skin cancer and UVR in African Americans is not clear except for basal cell carcinoma (BCC), where 89% of these tumors develop on sun-exposed skin (Halder & Bang, 1988; Halder & Bridgeman-Shah, 1995; Pennello *et al.*, 2000).

There are pathological and anatomical differences in other cutaneous skin cancers developing in African Americans when compared to Whites. Squamous cell carcinoma (SCC) and malignant melanoma usually present on sun-exposed skin among Whites (English *et al.*, 1997; Leiter, 2008). In contrast, SCC and malignant melanoma typically present on non-sun-exposed skin in African Americans, suggesting that perhaps UVR does not play a role for this group (Fleming *et al.*, 1975; Halder & Bang, 1988; Halder & Bridgeman-Shah, 1995; McCall & Chen, 2002; Mora & Perniciaro, 1981).

However, there is some evidence supporting the role of UVR in the development of malignant melanoma in African Americans. One study found UV Index and latitude to be significantly related to melanoma incidence in African American men (Hu *et al.*, 2004). Another study found this association only for White men and women (Eide & Weinstock, 2005). Finally, there is evidence that UVR may not be a significant etiologic factor for melanoma in African Americans because of photo-protection provided by melanin pigmentation (Gloster & Neal, 2006; Halder & Bridgeman-Shah, 1995). Data show melanin in black skin has a natural sun protection factor of 13.4 and filters twice as much ultraviolet radiation B (UVB) than in White skin (Kaidbey *et al.*, 1979). Additionally, melanocytes with high melanin content were more resistant to ultraviolet

radiation A (UVA) cytotoxic damage than those with low melanin content (Yohn *et al.*, 1992).

Although melanoma is rare among African Americans, acral lentiginous melanoma and subungual melanoma have higher incidence rates within this group compared to Whites (Bellows et al., 2001; Coleman *et al.*, 1980; Cress & Holly, 1997; Giraud et al., 1975; O'Leary *et al.*, 2000; Rahman & Taylor, 2001; Reintgen et al., 1982). Approximately 60% of these cancers are commonly seen on non sun-exposed skin such as on the palms of hands, soles of feet, and under the nailbed in African Americans (Baxter, 1939; Bellows et al., 2001; Byrd et al., 2004).

Phenotypic, Genetic, and Predisposing Factors

Risk factors for NMSC among Whites other than UV exposure include phenotypic characteristics such as light-colored or red hair, blue eyes, and fair skin; a history of sunburns; and sun sensitivity (i.e., propensity to burn and tan) (Kricker *et al.*, 1991; Lock-Andersen *et al.*, 1999; Zanetti *et al.*, 1996). In contrast, non-UV exposure risk factors for NMSC among African Americans include predisposing factors such as scars, inflammation, and trauma (Halder & Bang, 1988; Halder & Bridgeman-Shah, 1995; Mora & Perniciaro, 1981). Genetic factors have influenced the incidence rates of melanoma among Whites. Major risk factors have included large number of moles and a family or personal history of skin cancer. Other risk factors for melanoma, paralleling NMSC, include fair, light or freckled skin color; light colored hair (blond, red, or light brown); light colored eyes (green, blue, hazel); blistering sunburns at an early age; and sun sensitivity (Lock-Andersen *et al.*, 1999; Titus-Ernstoff *et al.*, 2005). No published

research has assessed whether phenotypical characteristics influence melanoma risk in African Americans. Melanoma risk factors commonly documented for African Americans include albinism, burn scars, radiation therapy, trauma, immunosupression, nevi, and preexisting skin lesions (Coleman et al., 1980; Gloster & Neal, 2006; Halder & Bridgeman-Shah, 1995; Reintgen et al., 1982). Other possible risk factors to consider include vitiligo skin and the role of viruses in the development of skin cancer (Hengge, 2008; Yashiro *et al.*, 1999). Sun sensitivity as a risk factor is addressed in more detail below.

Fitzpatrick Skin Type

Fitzpatrick's Skin Type Classification is a standard measure used to assess sun sensitivity/sun reactivity (propensity to tan or sunburn) at an initial sun exposure (i.e., 1-hour of noon exposure in the early summer) (Fitzpatrick, 1988). Four categories were originally used to determine sun–reactive skin types for populations with White skin. Skin Type I describes White individuals with fair skin, blue or hazel eyes, and blond or red hair, and who always burn and never tan. A subgroup of Skin Type I consists of individuals who usually burn but develop a light tan (Skin Type II). In contrast, those with dark hair or brown eyes, who rarely burn and tan more than average are classified as Skin Type IV. A subgroup of Skin Type IV describes those who sometimes experience a mild burn and develop a moderate tan (Skin Type III). Two additional categories were later added to characterize darker skin color (Type V=brown and Type VI=black), with the same reactions as Skin Type IV individuals.

The Fitzpatrick scale was originally developed for and used with light-skinned individuals or White populations. There may be limitations to its use among individuals with skin of color. Medical providers and lay-persons tend to misclassify darker skinned ethnic/racial groups into the low sun sensitivity category. For example, most African Americans are classified as skin type IV, V, or VI. Chan and colleagues used an objective measure of skin pigmentation to assess potential correlates such as race, physician-diagnosed phototypes, and self-reported skin phototypes. Findings revealed that race correlated best with physician-diagnosed skin phototype, while race correlated poorly with self-reported skin phototype and objective measures (J. L. Chan et al., 2005). At least 21% (6 out of 28) of the African Americans considered themselves to be more photosensitive than their physician-diagnosed skin phototype evaluation (J. Chan, 2008; J. L. Chan *et al.*, 2005). Although there are known differences with regard to Black and White skin structure, where Black skin has a photo protection factor of 13.1 (3.4 for Whites), this fact alone may not accurately describe all African American individuals or justify making these classification assumptions.

Hall and Rogers (1999) found that 6% of the African American respondents in the 1992 National Health Interview Survey reported having sun sensitive skin, experiencing severe burn after 1 hour of sun exposure, and developing repeated burns with repeated sun exposure. In two recent national population-based studies, approximately 5% of African American respondents reported experiencing at least one sunburn in the past year (Hall et al., 2003; Saraiya, Hall, & Uhler, 2002). However, even within racial/ethnic groups typically associated with darker skin colors, there is some variability in skin type (Galindo *et al.*, 2007; Hall & Rogers, 1999; Saraiya *et al.*, 2002). Galindo and colleagues

described the distribution of self-reported skin type within various ethnoracial groups (Galindo et al., 2007). The proportions of Skin Type I or II, respectively, were 2.7% and 2.7% in African Americans; 0.8% and 3.5% in Pacific Islanders, and 3.3% and 10.7% in Hispanics (Galindo *et al.*, 2007).

Perceived Risk

Relationship between perceived risk and skin cancer prevention behaviors

Several health behavior theories, including the Health Belief Model, Protection Motivation Theory, Precaution Adoption Model, and Self-Regulative Systems Theory, incorporate the construct of perceived risk (Janz & Becker, 1984; Leventhal & Cameron, 1987; Weinstein, 1988; Weinstein & Nicolich, 1993). Risk perception or one's perceived vulnerability/susceptibility to illness is often assessed through self-report. The premise of these theories is that individuals with higher perceived risk will be more likely to perform health protective behaviors. This relationship has been tested with a variety of cancer-related health promotion behaviors such as cancer screening (Girgis *et al.*, 1991; Vernon, 1999; Webb *et al.*, 1996) and smoking cessation (Norman *et al.*, 1999). In the case of skin cancer, an item such as "What is your chance of getting skin cancer?" may be used to measure risk perception.

In Whites, there is conflicting evidence regarding the relationship between sun protection behaviors and perceived skin cancer risk. Among survey respondents with a family history of melanoma, sun protection behavior was significantly, positively associated with perceived risk (Azzarello *et al.*, 2006). First-degree relatives with greater perceived risk of melanoma were more likely to practice sun protection behaviors. In a

study with college students, perceived susceptibility to skin cancer was associated with high skin cancer risk behavior (Lamanna, 2004). Clark and colleagues assessed respondents' own perceived risk of skin cancer versus their beliefs of others' risk of skin cancer among a sample of young adults in Australia. They found a significant difference between general and personally relevant beliefs regarding skin cancer risk. Respondents were more likely to report the general population had a higher risk of skin cancer than their own personal risk. The relationship between personally relevant beliefs of perceived skin cancer risk and reported sun protective behavior was assessed among the same sample of respondents. Perceived skin cancer risk was a weak correlate of reported sun protection behavior and the relationship was not statistically significant (Clarke *et al.*, 1997). Perceived skin cancer risk explained only 2% of the variance for sun protection behaviors. One study assessed intentions to perform sun protection behaviors among a moderately ethnically/racially diverse sample (3% Afro-Caribbean, 29% Asian, and 68% White) at a British University (Grunfeld, 2004). The strongest predictor of intention to perform sun protection behaviors was previous performance of similar behaviors, followed by perceived skin cancer risk.

Friedman and colleagues (1994) measured perceived skin cancer risk among sun sensitive White and African American employees at a worksite skin cancer screening event. The perceived risk scale ranged from very small (1) to very high (4). White respondents had statistically higher ratings for perceived skin cancer risk compared to African Americans [2.42 vs. 1.58, respectively] (Friedman et al., 1994). Furthermore, sun protective behaviors were significantly higher for Whites compared to African Americans in this sample (Friedman et al., 1994). Unfortunately, possible correlations between risk

perception and sun protection behaviors were not tested in this study. Therefore, it is unknown whether perceived skin cancer risk influences sun protection behaviors among African Americans. Mermelstein and colleagues assessed the relationship between perceived susceptibility and frequency of sunscreen use among a multiracial sample (83% White, 7.6% Asian, 5.0% Hispanic, 1.1% Black, and 3.3% other) of Chicago high school students. Perceived susceptibility to skin cancer was positively and significantly associated with sunscreen use (Mermelstein & Riesenberg, 1992). If the above theories are valid and relevant for all ethnic/racial groups, we would expect African Americans with lower perceived skin cancer risk to engage in fewer sun protection behaviors relative to African Americans with higher perceived risk.

Relationship between perceived risk and other health behaviors

Although the relationship between sun protection behavior and perceived skin cancer risk has not been adequately explored among African Americans, several theoretical frameworks using the construct of perceived risk have been used to explain *other* cancer-related, health behaviors among this group (McDonald *et al.*, 1999). McDonald and colleagues assessed breast cancer perceptions and screening behaviors among African American women. Eighty percent of the participants from this study reported having had a previous mammogram. Most of the study participants did not perceive themselves to be more at risk for breast cancer even though they exhibited high rates of secondary prevention. Furthermore, the construct of perceived risk was not significantly related to mammography or breast self-examination. In contrast, Royak-Schaler and colleagues found the relationship between risk perception and breast cancer

screening behaviors to be significant among a sample of African American women. Women with higher perceived breast cancer risk were more likely to obtain a clinical breast examination and mammogram (Royak-Schaler *et al.*, 1995). Some authors have argued that testing the relationship between perceived risk and health behaviors has methodological flaws, which may explain, in part, the weak associations or lack of associations between the two factors often cited in the literature (Brewer *et al.*, 2004).

The relationship of risk perception with other cancer-related health behaviors has been the focus of the research of Hay and colleagues (Hay *et al.*, 2007; Hay *et al.*, 2002). This work has expanded the theoretical framework proposed by Brewer and colleagues. The framework proposes three hypotheses that should be considered in the context of risk perception (Brewer et al., 2004). First, the behavior motivation hypothesis posits that risk perceptions lead individuals to adopt health protective actions. This perspective fits with the theoretical models mentioned above. For instance, the construct of perceived susceptibility from the Health Belief Model suggests that individuals with increased perceived risk for skin cancer will engage in sun protective behaviors. Second, the accuracy hypothesis states that those who engage in risky behaviors should have higher risk perceptions. Here individuals need to accurately assess their risk for developing skin cancer based on their reported behaviors. For example, an individual who frequently sunbathes (risky behavior) without any sun protection should be more likely to report higher perceived risk of skin cancer based on the accuracy hypothesis. Finally, the risk reappraisal hypothesis emphasizes that individuals who engage in health protective behaviors to decrease their risk of illness will have lower perceptions of risk. For example, an individual that consistently applies sunscreen (preventive behavior) while in

the sun will have lower risk perceptions of skin cancer risk. The belief is that the individual is engaging in a preventive behavior which reduces the perceived risk of developing skin cancer. Thus, one of these potential "mechanisms" (i.e., behavior motivation) helps explain a positive correlation between perceived risk and health behavior, whereas the other two help explain negative correlations between these variables.

Hay and colleagues examined the bidirectional relationships between cancer risk perceptions and smoking behavior among newly diagnosed cancer patients at 3 and 12-month follow-ups (Hay et al., 2007). Participants with higher perceptions of risk for developing another cancer at three months were most likely to abstain from smoking by twelve months. In another study, oral cancer risk perception was assessed among a multiracial sample of oral cancer screening participants (Hay et al., 2002). Thirty-eight percent of the sample self-identified as African American. Most participants did not feel at high risk for developing oral cancer despite engaging in high-risk behaviors (e.g., current smoker). Specifically, 31% of current smokers perceived their risk for oral cancer to be lower than other smokers of their same age and sex. Similarly, 19% of current smokers perceived their risk for oral cancer to be lower than nonsmokers of their age group and sex. After controlling for other predictors such as sex, race, history of smoking, and history of alcohol abuse, current smoking and lifetime exposure to tobacco were the only significant independent predictors of higher risk perception.

Based on theoretical models such as the Health Belief Model one would expect African Americans who have lower perceived skin cancer risk may also have lower sun protection behaviors. This perspective fits with the behavior motivation hypothesis. In

contrast, by applying the accuracy hypothesis to our cross-sectional data, we would expect that African Americans who self-report low rates of sun protection (risky behavior) to have higher skin cancer risk perceptions. A third possibility is that African Americans engaging in regular sun protection behaviors will report lower perceived skin cancer risk which endorses the risk reappraisal hypothesis. However, with other cancer-related health behaviors, the opposite has been found or the direction is not stable or consistent. Thus, the relationship between African American sun protection behaviors and skin cancer risk perception warrants further examination.

Other Potential Correlates of Sun Protection

Among the general African American population, correlates of sun protection behaviors, in addition to the perceived risk variable mentioned above, have included demographic factors (e.g., age, sex, education, and household income) and skin type. Previous studies have shown that African American women are more likely to use sunscreen than African American men (Hall & Rogers, 1999). Among African Americans living at or above the poverty line, sunscreen use was 22% compared to 15% among African Americans living below the poverty line (Hall & Rogers, 1999). Education appears to have a linear relationship with sunscreen use. Rates for using sunscreen among African Americans with less than a high school education, with a high school education, or with some college education were 15%, 19%, and 33% respectively (Hall & Rogers, 1999). Increasing age was associated with protective clothing use and seeking shade in a national population-based study that included a representative sample of African Americans (Santmyire et al., 2001). In a sample of African Americans from a

primary care office in New York, sunscreen users were twice as likely to have a history of sunburn than sunscreen non-users (Briley *et al.*, 2007).

Other potential correlates of sun protection warrant examination. Very little is known about how the contextual factors such as residential segregation and neighborhood SES influence sun protection behaviors among African Americans. It has been well documented that segregation is a determinant of individual- and community-level socioeconomic conditions for African Americans (Williams & Collins, 2001). In turn, segregation may indirectly influence African American health status, contributing to the health disparities that exist between African Americans and Whites (Williams & Collins, 2001). There is evidence that indicates that segregation and socioeconomic status can lead to differences in key health behaviors to prevent certain cancers such as engaging in physical activity and eating fresh fruits and vegetables. For example, African American neighborhoods are less likely to have recreational facilities, safe parks, walking trails, and availability of nutritious foods (Boslaugh *et al.*, 2004; Galvez *et al.*, 2007; L. B. Lewis *et al.*, 2005; Morland & Filomena, 2007; Morland *et al.*, 2002; Powell *et al.*, 2006; Sloane *et al.*, 2003; Wilson *et al.*, 2004) which negatively impacts physical activity and nutrition. In contrast, the availability of tobacco is disproportionately higher in these communities (Morland et al., 2002) contributing to higher rates of smoking.

Studies also have shown a link between residential segregation and mortality. Jackson and colleagues found mortality increased among African Americans as residential segregation increased (Jackson *et al.*, 2000). African American women and men living in highly segregated communities had 2 and 3 times (respectively) the mortality risk compared to those living in less segregated communities (Jackson *et al.*,

2000). Furthermore, neighborhood socioeconomic status plays a key role in mortality among African Americans (Singh *et al.*, 2004). After adjusting for personal income, neighborhood socioeconomic status was associated with higher mortality among African Americans (R. T. Anderson *et al.*, 1997). African Americans living in low-income neighborhoods had 30-40% higher mortality compared to African Americans living in neighborhoods with higher income (R. T. Anderson et al., 1997). Measuring socioeconomic status at the census tract (CT) level versus the individual level provides a better picture of neighborhood socioeconomic status.

Other Relevant Considerations in Conducting Health Behavior Research with African American Participants

Distrust

Mistrust of the scientific community by African Americans has an historical basis that dates back to medical experimentation during American slavery (Gamble, 1997). Examples of the brutal experiments conducted during this period have been reported in the scientific literature (Gamble, 1997). One experiment relevant to sun exposure was conducted with an African American slave to test remedies for heatstroke. The purpose of this experiment was to test medications that would allow slaves to withstand extreme levels of heat in order to work longer hours in the fields on smoldering days.

One of the more notable historical events is the 40-year Tuskegee Syphilis Study. The Public Health Service documented the natural history of syphilis in African American men beginning in 1932. The participants were told they were being treated for their disease but in truth were not given the appropriate treatment for their illness.

Inadequate information about the study's purpose was given to all the participants involved, compromising their ability to make an informed decision to participate in this research study.

Knowledge of medical abuse and deceit from The Tuskegee Study has been associated with barriers to participating in modern day medical research studies by many African Americans (Corbie-Smith *et al.*, 1999; Gamble, 1997). Corbie-Smith and colleagues identified several barriers to participation in research while conducting focus groups with African Americans. Among these barriers were mistrust of doctors, scientists, and the government. There was a limited understanding of the informed consent process among focus group participants. Several African Americans believed the informed consent was to protect hospitals and doctors from litigation. Hence, these barriers may increase self-selection bias and compromise the validity of the participant responses.

Although a proportion of the African American community has mistrust for medical research, there are many who are willing to participate. Strategies used to increase minority participation and build trust have included employing researchers from the communities being surveyed (Dell *et al.*, 2005), inclusion of minority investigators/staff (Ashing-Giwa *et al.*, 2004), and working through community-based organizations (Partridge *et al.*, 2005). Moorman and colleagues found that cooperation rates were higher among African American women in the Carolina Breast Cancer Study when participants and interviewers were concordant on race (Moorman *et al.*, 1999).

Data Collection Methods

A first step in addressing cancer disparities is to have access to reliable, generalizable data for the target populations. Data collection strategies that work well for some ethnic/racial groups may not work as well for other groups. Telephone surveys may be a more feasible and cost-effective strategy to gather health behavior and sociodemographic data on a large population in comparison to in-person surveys (Groves, 1989; Thornberry & Massey, 1988). However, there are several inherent limitations to this methodology when sampling African Americans. For instance, non-response bias to telephone surveys significantly influences the lack of representativeness of the population under study. There also is a greater possibility that a subset of the population does not own a land-line telephone (J. E. Anderson *et al.*, 1998; Ford, 1998; Frankel *et al.*, 2003). This is directly related to lower socioeconomic status (Ford, 1998; Frankel et al., 2003; Thornberry & Massey, 1988).

In contrast, an in-person community-based sampling approach with African American participants may capture a more representative sample of this ethnic/racial group and provide more valid responses. Several tobacco-related studies sampling African Americans in person and from their community, as opposed to conducting a random digit-dial telephone survey (RDDTS), obtained higher tobacco prevalence rates (Dell et al., 2005; Liao *et al.*, 2004; Nelson *et al.*, 2003; Northridge *et al.*, 1998). Nelson and colleagues examined the comparability of national estimates from the Behavioral Risk Factor Surveillance System (BRFSS), which is a telephone survey, with the National Health Interview Survey (NHIS) (in-person survey) for cigarette smoking by race/ethnicity. The overall estimate for current smoking among African Americans was

4.1 percentage points higher in the NHIS (26.8%) compared to the BRFSS (22.7%) reaching a significant statistical difference (Nelson et al., 2003). This difference may demonstrate that or indicate that in-person interviews elicit more candid responses regarding smoking. African Americans lacking telephones (i.e., of lower SES) have higher smoking rates. Thus, an in-person, community-based sampling approach may also yield more accurate data on sun protection prevalence rates among African Americans.

Participation Rates

In general, telephone survey response rates have declined over recent years (Curtin *et al.*, 2005). National studies have shown in-person health interviews to have higher completion rates and response rates than telephone health surveys (Groves & Kahn, 1979). A comparison study of the NHIS and BRFSS showed the overall responses rate for the NHIS was nearly 20% higher than for the BRFSS (BRFSS 62.5% vs. NHIS 80.4% for the Sample Adult Core) (Nelson et al., 2003). Other studies using community-based sampling approaches have yielded respectable participation rates with African Americans (Cabral *et al.*, 2003; Miller *et al.*, 1997). Miller et al. compared a street intercept interview to a random-digit dial survey among African American adults. The in-person community-based method yielded a more representative sample of African Americans than did the random digit dial survey. The interview completion rate for the street intercept was 85.6% (RDD 61.3%) (Miller et al., 1997).

Rationale and Hypothesis

The purpose of the proposed study will be to assess the prevalence and correlates of sun protection behaviors among a community-based sample of African Americans

who completed the California Black Health Network (CBHN) Health Survey. The following hypotheses are proposed. First, we hypothesize that sun protection behaviors will be significantly related to demographic factors (e.g. age, sex, education, and income) and phenotypic factors (e.g. skin type) based on previous research with African Americans (Friedman et al., 1994; Hall & Rogers, 1999; Pichon *et al.*, 2005; Santmyire et al., 2001). Specifically, we expect sunscreen rates for African American women to be higher than rates for African American men. Older African Americans are predicted to wear protective clothing such as wide brim hats more often that younger African Americans. We predict higher education and household income to be associated with more sun protection behaviors. We also anticipate African Americans with sun sensitive skin to use sun protective behaviors more frequently than those not having sun sensitive skin.

Second, we hypothesize that sun protection behaviors among African Americans will be influenced by contextual factors (e.g. segregation, neighborhood SES). This hypothesis is based on other cancer-related health behaviors exhibited by African Americans. Tobacco research studies suggest residential segregation and low socioeconomic status influence the availability of tobacco products, and in turn poor health behaviors such as elevated smoking rates. This may hold true with our sample engaging in fewer sun protection behaviors due to the effects of segregation and neighborhood SES. We predict sun protection behaviors among African Americans living in highly segregated census tracts to be lower than the rates for African Americans living in non-segregated census tracts. Further, we predict segregation will contribute significantly even after neighborhood SES is taken into account.

The relationship between perceived skin cancer risk and sun protection behaviors among African Americans is unknown. Therefore, exploratory analyses will be performed with perceived skin cancer risk and each of the three sun protection items. Finally, we will compare sun protection behaviors (e.g., hat use, sunscreen use) among African Americans from the California Black Health Network (CBHN) Health Survey and the 2001 California Health Interview Survey (CHIS).

METHODS

Description of the Parent Study

Purpose

Sun protection behaviors among Southern California African American adults were obtained from a community-based participatory research collaboration between San Diego State University (SDSU) and the California Black Health Network (CBHN). The CBHN is the oldest and largest not-for-profit organization of African American public health professionals in California. The six local chapters are in Oakland, San Bernardino/Riverside, Los Angeles, Sacramento, and San Diego counties. This organization is well-respected and trusted by the African American community. Dr. Hope Landrine (committee member) is the principal investigator for this grant. Ms. Pichon, who was a volunteer research assistant on this project, contributed sun protection items to the self-administered questionnaire; collected data in both Los Angeles and San Diego census tracts; and scanned, entered, and cleaned the survey data.

The purpose of the parent study was to examine the role of residential segregation in smoking prevalence rates among African Americans in California. A stratified, statewide, random sample of African Americans (N=4000) aged 18 years and older were surveyed in-person, in their neighborhoods, by African American research assistants and community members of the CBHN. The CBHN Community Health Survey included items assessing tobacco use; other health behaviors such as alcohol use, physical activity, and sun protection; sociocultural factors; and demographic characteristics. A copy of the 91-item survey is included in the Appendix.

Sampling Procedures

The sampling procedures used in the parent study were modeled after four community based studies with minorities (Dell et al., 2005; Liao et al., 2004; Nelson et al., 2003; Northridge et al., 1998). It involved three distinct stages. In the first stage, data from the 2000 census was used to determine which counties in California were proportional to the African American representation for the state of California. Seven counties were selected because 80% of the African American population (N=2,263,882) resided in these communities. The distribution across these seven counties in which African American residents were sampled for the larger study ranged from 5% African American in San Francisco to 42% African American in Los Angeles.

Secondly, within these seven counties, 513 census tracts that were at least 20% African American were selected and stratified by race and poverty level. The 20% cut-off was used to efficiently sample African Americans through door-to-door sampling. The percentage of African Americans in these census tracts ranged from a minimum of 20% (low segregation) to 92% (high segregation). Next, community poverty level data were obtained from the U.S. Census Bureau. African Americans below the poverty line (BPL) in these census tracts ranged from 4% to 43%. The sample was stratified by 10 levels of segregation (i.e., % Black) and poverty level for the larger study.

Finally, the list of 513 census tracts was reduced to 85 at random (see appendix). Block groups from these census tracts were randomly selected for door-to-door sampling and one adult per household was randomly selected to complete a health survey.

Survey Procedures

An anonymous 91-item health survey, with a 7th grade readability level, was developed by SDSU with input from the CBHN. Both SDSU and the CBHN hired African American or other minority research assistants from California state colleges and/or community colleges to administer the survey. Research assistants were trained in sampling and survey procedures prior to administering the surveys within their communities. Within census tracts, random blocks were chosen to sample African American adults (ages 18 years and older). Research assistants administered the health survey door-to-door, in teams of two to three, on weekends during daylight hours. The teams were often accompanied by the CBHN staff and/or the project coordinator.

Only one adult per household, self-identifying as African American, was eligible to participate. The research assistant approached each home, stated his or her affiliation with the local CBHN, asked for the adult's participation in an anonymous health survey of African Americans in their neighborhood, and provided a culturally appropriate letter explaining the study to the potential participant. If only one adult was currently at home, that adult was surveyed. If more than one adult was in the home, the adult whose birthday was closest to the day of sampling was selected. This method was adapted from the Kish procedure (Kish, 1949).

Each participant had several options for completing the health survey, including the following: 1) the paper-and-pencil survey was completed by the participant as the research assistant waited, 2) the participant completed the survey and the research assistant returned later to collect it, or 3) the research assistant read the survey aloud for the participant and manually recorded the responses (occurred <5% of the time). Each

participant received $10 in cash upon completion of the survey. Households that were approached and no self-identified African American adult resided in the home were not included. Research assistants thanked the resident for their time and proceeded to the next home. Data collection began in September of 2006 and is expected to be completed by May of 2008.

Description of the Present Study

The purpose of the present study was to assess the prevalence and correlates of sun protection behaviors among a community-based sample of African Americans (N=1453) from the larger study described above. This dissertation includes data from participants in Los Angeles County and San Diego County. For Los Angeles County, 1036 participants from 9 census tracts were included; for San Diego County, 417 participants from 3 census tracts were included. These two counties were chosen because 1) data collection began there first due to feasibility, the close proximity to the SDSU research office, and the need to refine data collection procedures; 2) data collection is ongoing and has not been gathered in the remaining counties; and 3) data collection is complete and the sampling criteria have been met for these two counties. The response rates ranged from 95% to100% for census tracts in both Los Angeles County and San Diego County.

Measures

Outcome Measures. Three sun protection behaviors were assessed with our community sample: sunscreen use, sunglasses use, and wide brim hat use. These

behaviors are efficacious in reducing UVR exposure (Damian, Halliday, & Barnetson, 1997; Diffey & Cheeseman, 1992; van Praag et al., 1993) and are recommended for the general public (American Optometric Association, 2007; U.S.D.H.H.S., 2000). Participants were asked, "During the summer months, how often do you do the following when you are out in the sun for more than 15 minutes?" Behaviors consisted of wearing sunscreen with sun protection factor (SPF) of 15 or higher, wearing sunglasses, and wearing a hat with a surrounding brim of at least 2.5 inches. Response options, based on a Likert-type scale, were "never", "sometimes", "about half of the time", "often", and "always".

These items were slightly modified from a previously validated measure used in a randomized controlled trial with United States Postal Service letter carriers (Oh *et al.*, 2004). In that study, participants were asked how often they had used similar items while carrying mail during their five previous workdays. These items demonstrated respectable validity in the previous study. For example, wide brim hat use and use of sunglasses was validated with direct observations within 1-week before survey administration. Concordance between these measures at baseline (n=1036) was good for wide brim hat use (K=0.62; 95% C.I.=0.57, 0.67) and sunglasses use (K=0.51; 95% C.I.=0.45, 0.56) (Oh et al., 2004). Sunscreen use was validated at the postal station level with average ounces of communal sunscreen used per participant. Self-reported sunscreen use was significantly correlated with the objective measure (r= 0.42, $p< .05$, for year 1 and r= 0.62, $p< .001$, for year 2) (Mayer *et al.*, 2007).

Potential Correlates. The potential correlates tested were age, sex, education, household annual income, skin type, perceived skin cancer risk, neighborhood census tract segregation level, and neighborhood socioeconomic status (SES).

The items used to assess demographic variables included age (continuous), sex, education, and household income. The distributions are presented in Table 1. The response categories for education and income were later reduced to three categories for the main analysis. These items were adapted from other population-based studies such as the National Health Interview Survey, Behavioral Risk Factor Surveillance System, and the California Health Interview Survey.

A variation of a standard scale (Fitzpatrick, 1988) was used to assess skin type. The item asked: "Which of the following best describes your skin's usual reaction to your first exposure to summer sun, without sunscreen, for one-half hour at midday?" The five response categories were type I (always burn, unable to tan), type II (usually burn, then can tan if I work at it), type III (sometimes mild burn, then tan easily), type IV (rarely burn, tan easily), and we added "none of the above describes me". Self-reported skin type using this standard scale was validated with an objective measure in a previous study with outdoor workers (Galindo et al., 2007). Skin type and colorimeter values (possible range of 0 black – 100 white) were significantly correlated in the predicted direction for non-Hispanic Whites (r=-0.217; $p<0.0001$) and Hispanics (r=-0.250; $p<0.0001$) for all four skin types. For African Americans, the relationship between skin type and colorimeter values were in the predicted direction only for Skin Type I and Skin Type IV (r=-0.152; $p=0.0178$). Skin type was trichotomized as Skin Type I/II, Skin Type III/IV, and none of the above.

Perceived skin cancer risk was measured with a modified item used previously to assess breast cancer risk (α=0.82) (McGregor *et al.*, 2004). Participants were asked: "On a scale of 0 to 100, what do you think your chances of getting skin cancer are, where 0 is no chance of getting skin cancer, and 100 means you will definitely get it?" (McGregor *et al.*, 2004). For the univariate and multivariate analyses, perceived skin cancer risk was dichotomized as no risk (value=0) versus some risk (range 1-100).

Census tract segregation levels for San Diego and Los Angeles were obtained from the Census 2000 data (Census 2000, 2000). In defining segregation, researchers have established that a neighborhood in which greater than 61% or 70% of the residents are African American constitutes a highly segregated census tract (Fang *et al.*, 1998; Inagami *et al.*, 2006). For the purposes of the present study, census tracts were dichotomized as segregated (values greater than 61%) versus non-segregated. Segregated census tracts ranged from 61% to 92% African American (versus non-segregated 36% to 51% African American).

Community poverty level data were obtained from the U.S. Census Bureau. The U.S. Census Bureau defines poverty areas as census tracts where at least 20% of the residents were below the poverty level (*U.S. Census Bureau*). Here, a neighborhood was operationally defined as a census tract. Thus, neighborhood SES was dichotomized as low poverty (≤20%) versus high poverty (≥20 %).

California Health Interview Survey Items. Data from the California Health Interview Survey (CHIS) were compared to the CBHN health survey. CHIS is a telephone-administered survey that is conducted every two years. In 2001, sun protection

items similar to the ones used in CBHN were used to ascertain prevalence rates of sunscreen and hat use among African Americans (N= 2369) in California. Respondents were asked: *"When you go outside on a very sunny day for more than one hour, how often do you …* wear any kind of hat that shades your face, ears, and neck from the sun? wear long sleeved shirt? stay in the shade? use sunscreen of SPF 15 or greater?" The response options were "always", "sometimes", and "never". We compared and contrasted African Americans' sun protection prevalence rates between the two surveys. Also, the CHIS data were used to see if correlates of sun protection found in the CBHN were replicated for age (continuous), sex, education, and household annual income.

Data Analysis

The statistical analyses were conducted with the Statistical Package for the Social Sciences (SPSS) for Windows Version 15.0 (Chicago, IL) and SAS Version 9.1.3 (Cary, NC). Only participants self-identifying as African American were used in the analyses. The three sun protection behavior outcomes (i.e., sunscreen, sunglasses, and wide brim hat use) were examined separately. These variables were trichotomized as "never", "sometimes/half of the time/often", and "always" compliant with sun protection recommendations for each behavior. These categories were selected for the CBHN items because a) they were comparable to the categories used in CHIS and b) the frequency distributions suggested this grouping was acceptable.

Descriptive data (e.g. means, standard deviations, frequencies, and percentages) were generated for all variables. We reported the distribution of each sun protection

behavior and each of the potential correlates by the three groups mentioned above (i.e., never, sometimes/half of the time/often, and always).

Univariate Analysis. The univariate associations between each sun protection behavior (i.e., sunscreen, sunglasses, and wide brim hat use) and each of the potential correlates (i.e., age, sex, education, household income, skin type, perceived skin cancer risk, neighborhood census tract segregation level, and neighborhood SES) were tested using the chi-square statistic (for categorical variables) and ANOVA (for continuous variables). Each sun protection behavior was tested independently.

Multivariate Analysis. In the multivariate analyses, the three dependent variables of sunscreen, wide brim hat, and sunglasses were examined separately. Each of these sun protection behavior variables was trichotomized as never, sometimes/half of the time/often, and always. Univariate and multivariate ordinal logistic regression analyses were conducted to test the relationship between each sun protection behavior and each of the potential correlates (i.e., age, sex, education, household income, skin type, perceived skin cancer risk, neighborhood census tract segregation level, and neighborhood SES). The proportional odds assumption was not met for two of the three outcomes. Thus, two binary logistic regression models were tested ─ 1) "never" vs. "sometimes/half of the time/often /always" and, 2) "never/sometimes half of the time/often" vs. "always" for each sun protection outcome.

The intraclass correlation (ICC), design effect (DEFF), and effective sample size were calculated for each outcome. Where appropriate, analyses were adjusted for high

census tract clustering. Census tract was treated as a random effect in a generalized linear mixed model using the Proc GLIMMIX procedure in SAS version 9.1.3.

Comparison Analysis. Similar to the CBHN survey, descriptive statistics (e.g. means, standard deviations, frequencies, and percentages) were generated for all variables of interest in the CHIS. We included only those participants self-identifying as African American in the analyses. The univariate relationship was tested between each sun protection behavior i.e., hat, long sleeved shirt, shade, and sunscreen) and each of the potential correlates i.e., age, sex, education, and household income) using the chi-square statistic and ANOVA. Univariate and multivariate ordinal logistic regression analyses were performed for each sun protection behavior to test the relationship between sun protection behavior and each potential correlate simultaneously. Similar to the ordinal models from the CBHN survey, the proportional odds assumption was not met for three of the four sun protection outcomes. Therefore, two binary logistic regression models were conducted separately for each outcome. To examine the comparability between the CHIS and CBHN Health Survey, we used the chi-square statistic to examine differences in the proportions for hat and sunscreen use between the two surveys.

RESULTS

Distribution of Sun Protection Behaviors and Potential Correlates among California Black Health Network (CBHN) Health Survey Respondents

Description of Sample

A total of 1,453 self-identified African Americans completed the California Black Health Network (CBHN) health survey. Of the 1,453 survey respondents, 1,036 resided in Los Angeles and 416 resided in San Diego. The sample's demographic characteristics are summarized in Table 1. Approximately 60% of the sample was female, 95% had at least a high school education, and 42% had an annual income of $50,000. The mean age of the participants was 45 years (SD=16.2) ranging from 18 to 94 years. For the Los Angeles County participants, the mean age was 44.7 (SD=15.9). In San Diego County, the mean age for participants was 45.9 (SD=16.8). For the remaining analyses, the six education categories were reduced to the following: 1) high school degree or less, 2) some college/vocational school, and 3) college degree or higher. Income was also trichotomized (based on the distribution) as followed 1) $0-25,999, 2) $26,000-75,999, or 3) ≥$76,000.

Distributions of Potential Correlates of Sun Protection Behaviors

In addition to the demographic variables described above (e.g., sex, education, income, and age) other potential correlates of sun protection behaviors included skin type, perceived skin cancer risk, neighborhood socioeconomic status (SES)/poverty level, and neighborhood segregation. The distribution for skin type including the "none of the above describes me" category was: Type I (always burn, unable to tan)=1.5% (n=21);

Type II (usually burn, then can tan if I work at it)=2.5% (n=35); Type III (sometimes mild burn, then tan easily)=8.5% (n=131); Type IV (rarely burn, tan easily)=27.8% (n=383); and "None of the above describes me"=58.6% (n=807). For the main analyses, skin type was trichotomized as 1) Skin Type I/II, 2) Skin Type III/IV, and 3) none of the above. The distribution when removing the not applicable category was Type I=3.7%, Type II=6.1%, Type III=23.0%, and Type IV=67.2%.

Participants were asked on a scale of 0 (no chance) to 100 (definitely) what their chance of getting skin cancer was (Table 2). The mean was 15.3 (SD=22.5). Over 45% of the participants reported having a 0 chance. Sixty-seven percent of the sample reported 10 or less. For the main analyses, perceived skin cancer risk was dichotomized as zero risk versus some risk [range=1-100]. Self-reported skin type was significantly associated with perceived skin cancer risk (r=-0.117; $p<0.007$).

Table 3 illustrates the census tracts from which we sampled African Americans varying by segregation and poverty level. For Los Angeles County, 1,036 participants from 9 census tracts were surveyed; for San Diego County, 417 participants from 3 census tracts were surveyed. For the main analyses, neighborhood segregation was dichotomized as high (≥61%) versus low (≤51%). Neighborhood poverty level was dichotomized as low poverty (≤20%) versus high poverty (≥20 %).

Prevalence of Sun Protection Behaviors

Participants were asked on a 5-point Likert scale how often they wear 1) sunscreen, 2) sunglasses, and 3) a hat with a surrounding brim of at least 2.5 inches (wide brim hat) when out in the sun for more than 15 minutes. The distributions of these three

behaviors are presented in Table 4. Approximately 60% of the participants reported that they never wear sunscreen and almost 40% reported never wearing a wide brim hat. Sunglasses use had more variability among this sample. Over 40% of African Americans reported often or always wearing sunglasses. Based on these distributions, the three sun protection behaviors were trichotomized as 1) never, 2) sometimes/about half the time/often, and 3) always for all univariate and multivariate analyses.

The distribution of sun safety behaviors by census tracts is presented in Table 5. Always reporting sunscreen use ranged from 2.5% to 17.6%. Among the high segregated census tracts the range was 4.9% to 17.6% compared to 2.5% to 8.9% for the low segregated census tracts. For sunglasses, overall use ranged from 18.4% to 33.6%. Lastly, always wearing wide brim hat ranged from 6.5% to 13.7% for all census tracts.

Bivariate and Multivariate Relationships between Sun Protection Behaviors and Each Correlate

Frequency Distributions and Bivariate Associations with Sun Protection Behaviors

One-way analysis of variance (ANOVA) followed by post hoc analyses for pairwise comparisons with Scheffe (Table 6), and chi-square statistics (Table 7, 9, 13) were performed to assess the bivariate relationship between each sun protection behavior and each of the eight potential correlates. Age was significantly related to sunglasses and wide brim hat use. As age increased, respondents were more likely to report always wearing sunglasses and a wide brim hat. There was no association between age and sunscreen use. Females were more likely to report always wearing sunscreen and

sunglasses compared to males. Six percent of females reported always wearing wide brim hats compared to 14.6% of males. As education and annual household income increased, participants were more likely to report always wearing sunscreen and sunglasses. Over 45% of participants with a high school education or less never wear wide brim hats compared to 34.9% of those with some college education and 31.8% of those with a college degree. Income was not significantly related to wide brim hat use.

Sun sensitivity was significantly related to engaging in sun protection behaviors. Participants with skin type I/II were more likely to report always using sunscreen compared to the other two groups. About 40% of those not endorsing either of the Fitzpatrick skin type categories reported never wearing a wide brim hat compared to 32% of those with skin type I/II and 35.5% of those with skin type III/IV. Perceived skin cancer risk was significantly related to sunscreen use. Participants that reported no risk were less likely to report “sometimes” using sunscreen compared to those reporting some risk.

Neighborhood level factors were significantly related to sunscreen use and wearing sunglasses. About 10% of participants living in neighborhoods with low poverty reported always using sunscreen compared to 3.5% of participants living in high poverty neighborhoods. Neighborhood segregation was significantly related to sunscreen use and wearing sunglasses. Participants living in low segregated census tracts were more likely to report never using sunscreen and wearing sunglasses compared to those living in higher segregated census tracts. There was no association between poverty and segregation levels for wide brim hat use.

Logistic Regression Analysis

Ordinal logistic regression analyses were then conducted to test the relationship between each sun protection behavior and each potential correlate. The reference categories were males, participants with at least a college degree, those with an annual household income of $70,001 or higher, skin type III/IV, some perceived skin cancer risk, high poverty, and high segregation. The results are presented in Tables 8, 10, and 14.

As illustrated in Table 8, females were over three times more likely to use sunscreen than males. The odds of the two lower education groups always using sunscreen was 0.544 and 0.504, respectively compared to the highest education group. The odds of the two lower income groups always using sunscreen is 0.406 and 0.523, respectively, compared to the highest income group. Age and perceived skin cancer risk were not related to sunscreen use in the multivariate model. For individuals not endorsing the four Fitzpatrick skin type categories, the odds of always using sunscreen (as opposed to the sometimes and never groups) were 0.369 that of type III/IV holding all other variables constant. Participants living in low poverty neighborhoods were 1.6 times more likely to always use sunscreen compared to participants living in impoverished census tracts.

For sunglasses (Table 10), females were over 2 times more likely to always wear sunglasses relative to males. The odds of always wearing sunglasses increased as annual household income increased. For each year of age, the odds of always wearing sunglasses increased by a multiple of 1.01. There was no significant association between education,

skin type, perceived skin cancer risk, poverty, or segregation level with wearing sunglasses in the multivariate model.

The proportional odds assumption was not met for wearing sunglasses. As a result, two binary logistic regression models were conducted to test the associations between wearing sunglasses and each potential correlate based on the cut points in the ordinal model. The never group versus all other groups was assessed in the first model (Table 11). In the second model (Table 12), the always group versus the other two groups was assessed. Females remained over 2 times more likely to wear sunglasses than males in both models. Comparing the never group versus the other two groups, the lowest income group was 0.559 times as likely as the highest income group to wear sunglasses. In this same regression model, individuals living in a low poverty census tract were over 1.5 times as likely to wear sunglasses relative to those living in a high poverty census tract. In the second model (always versus the other two groups), as income and age increased, the odds of wearing sunglasses also increased.

For wide brim hat use (Table 14), the odds of females always wearing a wide brim hat was less than half that of males. Participants with a high school diploma or less were 0.578 times as likely as those with a college degree or higher to wear a wide brim hat. For each year of age, the odds of always wearing wide brim increased by a multiple of 1.022. There were no significant associations with wearing a wide brim hat and the other potential correlates in the multivariate model.

The proportional odds assumption was not met for wearing a wide brim hat in the multivariate ordinal logistic regression model. Therefore, similar cut points like those mentioned above for wearing sunglasses were used to assess the binary relationships

between wearing a wide brim hat and each correlate. With the “sometimes/half the time/ often” and “always” groups combined (Table 15), females were 0.468 times as likely to wear a wide brim hat compared to males. The lowest education group was 0.530 times as likely as the highest education group to wear a wide brim hat. With the “never” and “sometimes/half the time/often” groups combined (Table 16), as age increased wearing a wide brim hat increased by a multiple of 1.040.

Census Tract Clustering

The intraclass correlation (ICC), design effect (DEFF), and effective sample size were calculated for each sun protection behavior. These data are presented in Table 17. The ICC for sunscreen use necessitated treating census tract as a random effect in multivariate analyses. The effects of the level-1 outcome behavior (sunscreen use) as a function of level-1 (e.g., age, sex, education, household income, skin type, and skin cancer risk perception) and level-2 (e.g., neighborhood segregation and poverty levels) predictors was examined.

The multivariate binary logistic regression analyses adjusted for census tract are shown in Tables 18 and 19. Being female, having a college degree, and making a yearly household income over $76,000 remained significant predictors of sunscreen use in both multivariate models after adjusting for clustering. Skin type was significantly associated with sunscreen use only when the “never” respondents were compared with the “sometimes and always” respondents combined. Individuals with sun sensitive skin were 1.2 times more likely to use sunscreen compared to those with low sun sensitivity.

Distribution of Sun Protection Behaviors and Potential Correlates among California Health Interview Survey (CHIS) African American Respondents

Sample Characteristics

A total of 2,369 self-identified African Americans completed the telephone-administered California Health Interview Survey. Demographic characteristics of the sample may be found in Table 20. Over 60% of the sample was female, almost 90% had at least a high school education, and approximately 32% had an annual income over $50,000. The mean age of the participants was 47 years (SD=16.8) ranging from 18 to 85 years. For the remaining analyses, education was recoded to reduce the 10 categories to 3: 1) high school degree or less, 2) some college/vocational school, and 3) college degree or higher. Income also was trichotomized based on their distributions as followed−1) ≤$30,000, 2) $30,000-70,000, or 3) ≥$70,001.

Sun Protection Behaviors

Participants were asked how often they 1) wear a hat that shades your face, ears, and neck from the sun, 2) wear a long sleeved shirt, 3) stay in the shade, and 4) use sunscreen of SPF 15 or greater when you go outside on a very sunny day for more than one hour. The frequency distributions of these sun protection behaviors are presented in Table 21. Overall, sun protection behaviors were low for each outcome. Over 40% of the sample reported never wearing a hat or long sleeved shirt. A quarter of the sample reported always seeking shade. Less than 10% of the participants reported always using sunscreen.

Bivariate and Multivariate Relationships between Sun Protection Behaviors and Each Correlate

Frequency Distributions and Bivariate Associations with Sun Protection Behaviors

One-way analysis of variance (ANOVA) followed by post hoc analyses for pairwise comparisons with Scheffe (Table 22) and chi-square statistics (Tables 23, 27, 31, and 33) were used to test the relationship between sun protection behaviors and each potential correlate. Age was related to two of the sun protection behaviors. As mean age increased, reporting hat use and wearing a long sleeved shirt increased from never to always. There were no significant differences in mean age for seeking shade or using sunscreen. Thirty-six percent of males reported always wearing a hat in comparison to 16.8% of females. For long sleeved shirt use, 42% of females reported never wearing a long sleeved shirt compared to 36.6% of males. Females were more likely to always seek shade and to always use sunscreen than males.

Participants with at least a high school education were more likely to report always wearing a long sleeved shirt and seeking shade compared to those with some college or a college degree or higher. Only 6.1% of those with at least a high school education reported always using sunscreen compared to 10.7% with some college, and 14.9% with a college degree. Educational attainment was not associated with wearing a hat. The lowest income group was less likely to report sometimes wearing a hat than those with a higher income. The reverse was true for wearing a long sleeved shirt and seeking shade. The highest income group (≥$70,001) was the least likely to always wear a long sleeved shirt and seek shade. For sunscreen use, 13.3% of those with an income of

$70,001 or greater reported always using sunscreen compared to 8.0% of those making less than $30,000 a year.

Logistic Regression Analysis

Ordinal logistic regression analyses were conducted to assess the relationship between each of the four sun protection behaviors and each of the four potential correlates. The reference categories were males, having an educational level of a college degree or greater, and having an annual household income of $70,001. As shown in Table 24, the odds of females always wearing a hat were less likely than for males. Age was significantly and positively related to hat use. For each year of age, hat use increased by a multiple of 1.034. For hat use, the proportional odds assumption failed. Therefore, two binary logistic regression models were conducted based on the cut points in the ordinal model. The never group was compared with the other two groups in the first model (Table 25). In the next logistic regression model (Table 26), the never and sometimes response categories were combined and compared to the always respondents. Sex and age remained significant in both models and the estimates changed only minimally.

Table 28 presents the correlates that were associated with wearing a long sleeved shirt. Age was the only significant correlate in the multivariate model. For every decade, the odds of wearing a long sleeve shirt increased by 1.40. The proportional odds assumption was not met for this multivariate analysis. Thus, two binary logistic regression models were performed using the same cut points used for hat use. In Table 29, the comparison between the never respondents and the other two categories combined are shown. The significant predictors included age plus sex. In the second model (Table

30) combining the never and sometimes response categories together versus the always respondents, age was the only significant predictor. The odds of wearing a long sleeved shirt increased by a factor of 1.051 for every increment of age.

For shade (Table 32), significant predictors included sex and educational attainment. Females were 1.7 times more likely to seek shade than males. Those respondents with a high school education were 1.5 times more likely to seek shade than those with a college degree or greater. For this analysis, the proportional odds assumption was met.

As shown in Table 34, sunscreen use was associated with sex, education, and annual household income. Females were almost 3 times more likely than males to report sunscreen use. As educational attainment increased, the odds of using sunscreen also increased. The lowest income group was significantly less likely to report using sunscreen compared to the highest income category. There were no significant differences between the middle and highest income categories. The proportional odds assumption failed in this model. Two binary logistic models were used with the same cut points as hat and long sleeve shirt use. When the never response group was compared to the remaining two groups (Table 35), the significant predictors from the ordinal model held in the binary model and the estimates were similar. However, when the always response category was compared to the never/sometimes combined categories, age entered as a significant predictor (Table 36). Also, females were almost 5 times as likely to report using sunscreen relative to males.

Comparison of California Black Health Network (CBHN) Health Survey and the California Health Interview Survey (CHIS)

The distributions from CBHN and CHIS for sunscreen use and wearing a hat are presented in Tables 37 and 38. The CBHN Health Survey was self-administered whereas CHIS was administered via telephone. Consistently (i.e., always) performing both sun protection behaviors was low for both surveys. Chi-square tests were conducted to assess possible differences between the two samples in the proportions of sunscreen use and wearing a hat. These tests revealed significant differences in sun protection behaviors by study. A total of 61.0% of participants from the CBHN study reported never using sunscreen compared to 68.0% of the African American respondents from the CHIS (χ^2 =40.993 df (2), p<0.001). For hat use, 10% of the CBHN sample reported always wearing a hat compared to 23.7% of African Americans from CHIS (χ^2=169.807 df (2), p<0.001).

Summary of Key Findings

In summary, several of the variables evaluated were significant predictors of sun protection behaviors in multivariate analyses among African American respondents completing the California Black Health Network (CBHN) health survey. For sunscreen use, the results showed that females were more likely than males to report using sunscreen during summer months. There was a positive linear relationship between educational attainment and annual household income for using sunscreen. Wearing sunglasses was significantly related to being female. The lowest income group

(≤$25,999) was the least likely to report wearing sunglasses while out in the sun for more than 15 minutes. For wide brim hat use, males were consistently more likely to report wearing a wide brim hat compared to females. Older African Americans were more likely to report wearing a wide brim hat relative to younger African Americans.

Similar predictors of sun protection behaviors found in the CBHN health survey were replicated in the multivariate analyses among African American respondents completing the California Health Interview Survey (CHIS). Females were significantly more likely to report using sunscreen than males. Individuals with a high school education and an annual household income of $30,000 were significantly less likely to use sunscreen than those with a college degree and those with the highest income. Males and older African Americans were significantly more likely to report wearing a hat when out in the sun for more than an hour. Wearing a long-sleeved shirt on sunny days was significantly related to older age. Lastly, seeking shade was related to sex and education. Females were more likely than males, and those with a high school education were more likely than individuals with some college and individuals with a college degree to seek shade.

The prevalence of sun protection behaviors was suboptimal for African American respondents from both the CBHN and CHIS. Less than 10% of African Americans reported always using sunscreen in both surveys. Rates for hat use were somewhat higher than sunscreen use. Ten percent of African Americans from the CBHN health survey reported always wearing a wide brim hat. Prevalence of hat use for CHIS respondents was more than double that of the CBHN respondents, with almost a quarter of the

respondents reporting always wearing a hat on sunny days. Nonetheless, these rates still remain less than ideal.

DISCUSSION

Data from this study contributes to the small but growing literature on sun protection behaviors in African American adults. The discussion below will describe the study's key findings and implications, while comparing the findings to previous sun protection research. The study's strengths and limitations also will be addressed. Finally, recommendations for future research and practice will be presented in an effort to develop more skin cancer prevention programs tailored to the specific health needs of African Americans.

Key Findings and Implications

The primary objective of this study was to assess the prevalence and potential correlates of sun protection behaviors among African American respondents from the California Black Health Network (CBHN) health survey. We hypothesized that sun protection behaviors would be significantly related to demographic factors (e.g., age, sex, education, and income) and phenotypic factors (e.g., skin type). This relationship was partially supported in the multivariate analyses. Only demographic factors were associated with specific sun protection outcomes. Second, we hypothesized that sun protection behaviors among African Americans would be influenced by contextual factors (e.g. segregation, neighborhood SES). This was not supported in the multivariate analyses. We explored the unknown relationship between perceived skin cancer risk and sun protection behaviors among African Americans. Our data did not support a significant relationship between these variables in the multivariate analyses. Finally, we were interested in how sun protection behaviors for the community sample of African Americans might compare with prevalence data for African Americans from the

California Health Interview Survey (CHIS). Our findings showed significant differences in hat and sunscreen use between these two studies.

The key findings from this study highlight the disparities in sun protection behaviors among African American adults with regard to the Healthy People 2010 goals. The respondents from the CBHN study reported low rates of using sunscreen, wearing sunglasses, and wearing wide brim hats while being in the sun during summer months. The results also illustrate possible predictors of sun protection behaviors among African Americans and potential places where public health researchers may intervene.

One of the more efficacious sun protection behaviors to reduce skin cancer incidence is sunscreen use (Gasparro *et al.*, 1998; Naylor & Farmer, 1997; van Praag *et al.*, 1993). Health organizations such the American Cancer Society recommend that the general public use sunscreen with a sun-protective factor (SPF) of 15 or higher when out in the sun during midday (ACS, 2007a). Only 7.8% of the CBHN sample reported always using sunscreen during the summer while out in the sun for more than 15 minutes. Among the CHIS sample, 9.9% reported that they always use sunscreen of SPF 15 or greater when they go outside on a very sunny day for more than an hour. As noted earlier, there were significant differences in sunscreen use by study. A possible explanation of these differences could be based on survey modality in that the CBHN survey was administered in-person and the CHIS was conducted over the telephone. Nonetheless, these low prevalence rates from both samples indicate that African Americans are not meeting recommendations for sunscreen use and more efforts need to be made to promote sunscreen use among this population.

The low rates of sunscreen use among the CBHN sample of African Americans were comparable to the low rates for African Americans reported in two national studies. The 1992 National Health Interview Survey (NHIS) ascertained sunscreen use with the following item: If you were to go outside on a sunny day for more than an hour, how likely are you to use sunscreen? The response options were very likely, somewhat likely, and unlikely. Nine percent of the African Americans reported being very likely to use sunscreen (Hall & Rogers, 1999). The same item was used in the 1998 NHIS to assess sunscreen prevalence. Data showed that 12% of African Americans were very likely to use sunscreen (Santmyire et al., 2001).

Briley et al. (2007) measured sunscreen use among a sample of African Americans (N=55) being seen at a primary care medical office from an Atlantic Ocean beach community in Queens, New York. Twenty-six percent of the participants reported that they had used sunscreen on *one or more occasions,* which varies considerably to how the CBHN sample was asked about their sunscreen use (Briley et al., 2007). Nonetheless, the differences in sunscreen rates from the Briley et al. study could be a result of the variation in the sunscreen item used, the small sample size, the fact that the survey respondents were being seen at a healthcare facility, and biases related to location or living near a beach community compared to the CBHN study.

Among Southern Californian U.S. Postal Service (USPS) letters carriers, 15.4% of African Americans reported always using sunscreen on their last 5 work days while delivering mail (Pichon et al., 2005). The rates of sunscreen use among African American letter carriers were higher than the rates reported from the CBHN sample. These differences are likely due to having an outdoor occupation. In a worksite skin cancer

screening program, sun protection behaviors were measured among sun sensitive African Americans. Only 4% of those participants used sunscreen even though they are considered high-risk (Friedman et al., 1994). These figures were lower than what we found in the CBHN study.

Low prevalence rates for sunscreen use may be attributed to several factors. One possibility is the belief that African Americans are less susceptible to getting skin cancer. In fact, the CBHN data showed that 45% of the community sample perceived their skin cancer risk to be zero. Although these low skin cancer risk perceptions are accurate for this population given the current melanoma incidence rates for Californian African Americans are low (i.e., 0.7 per 100,000), there is another important factor to consider, which is an individual's propensity to tan or burn (skin type) (Cress & Holly, 1997). Having darker skin offers some protection from harmful solar ultraviolet radiation (UVR). Black skin has an SPF of 13.1 in comparison to White skin with an SPF of 3.4 (Kaidbey et al., 1979). However, there is heterogeneity in African American skin, as our data show. Four percent of the CBHN sample reported having sun sensitive skin. The findings for perceived skin cancer risk and skin type will be discussed in greater detail in a later section.

Sex, educational attainment, and annual household income were significant predictors of sunscreen use among the CBHN and CHIS samples of African Americans. Females in the CBHN and CHIS studies were significantly more likely to report always wearing sunscreen than males. In the CBHN study, 10.2% of the females reported always wearing sunscreen compared to 3.4% of males. Similarly, 13.6% of the females from the CHIS reported always using sunscreen relative to 3.5 % of males. Being in the highest

educational and income categories was associated with greater sunscreen use among the respondents in these two studies.

One of the main predictors of sunscreen use among African Americans found in several other studies is sex. Briley et al. (2007) found similar results to the CBHN and CHIS studies where more females compared to males used sunscreen (77% vs. 23%) on one or more occasions. The 1992 NHIS also found significant differences by sex for sunscreen use. About 11% of females reported being very likely to use sunscreen compared to 6.7% of males. In addition to sex, we also found educational attainment to be a significant predictor of sunscreen use. The odds of using sunscreen increased with higher educational achievement among CBHN and CHIS respondents.

Several studies from the literature reported that educational attainment was a significant predictor for sunscreen use among the general U.S. population, outdoor workers, and specific racial groups including African Americans (Hall & Rogers, 1999; Pichon et al., 2005; Santmyire et al., 2001). Hall et al. (1999) illustrated that 15% of the African Americans in their study with less than a high school education used sunscreen compared to 19% with a high school education and 33% with some college education. Annual household income also was significantly associated with sunscreen use (in a linear direction) among the CBHN and CHIS samples of African Americans. Likewise, among African American respondents from the 1992 NHIS study, 22% living at or above the poverty index reported being very likely or somewhat likely to use sunscreen compared to 15% living below the poverty line (Hall & Rogers, 1999).

One possible explanation for differences in sunscreen use among males and females may have to do with socially contrived historical beliefs that lighter-skinned

African American females are more attractive (Martin, 1964). Another consideration is that many facial cosmetics such as moisturizers (worn mainly by women) contain a sun protection factor (SPF). These sex differences are also found among the general White population (Stanton *et al.*, 2004). Another predictor of sun protection included educational attainment, suggesting African Americans in lower educational categories need to be targeted in future skin cancer prevention programs. Household income also was significantly associated with sunscreen use. African Americans with higher incomes were more likely to use sunscreen. This indicates that for those with lower incomes, purchasing sunscreen may be a burdensome expenditure given the high costs of quality sunscreen brands.

Wide brim hat use has been shown to reduce UVR exposure (B. L. Diffey & Cheeseman, 1992; Wong *et al.*, 1996). Only 10% of the participants from the CBHN sample reported always wearing a wide brim hat. Among CHIS respondents, 23.7% reported always wearing any kind of hat that shades the face, ears, and neck from the sun. There were significant differences in hat use for these two studies, which likely is due to the hat specifications provided in the CBHN study (i.e., 2.5-inch brim). Also, mode of survey administration may have influenced responses. The CBHN survey was administered in-person and participants may have acknowledged the possibility that the CBHN staff could be observing hat use.

Approximately 30% of African American USPS letters carriers reported always wearing a wide brim hat during their work days (Pichon et al., 2005). Compared to their White co-workers, African Americans were significantly more likely to always wear a wide brim hat on working days (Lewis EC *et al.*, 2006). In contrast, on days of leisure

African Americans were less likely to always wear a wide brim hat compared to Whites. For the entire sample of letter carriers, wide brim hat use diminished from 24% on work days to 4% on days not worked. The prevalence of wide brim hat use for the letter carriers on work days was much higher than what we found among the CBHN community sample. However, on days of leisure, the letter carriers reported lower rates of wide brim hat use compared to the participants in CBHN study. These differences may be attributed to uniform standards set by the USPS. Two of the hats allowed by the USPS are the plastic and mesh pith helmets. Both of these have a 2.5 inch brim and are popular among letter carriers. Also, it could be that on days off, letter carriers prefer to stay indoors and there is no need to wear a wide brim hat.

Predictors of wide brim hat use among the CBHN and CHIS respondents included sex and age. Males were more likely than females to report wearing a hat. These findings are consistent with other studies found in the literature. Female letter carriers were half as likely to report always wearing a wide brim hat compared to males (Lewis EC et al., 2006; Pichon et al., 2005). These male/female differences may be attributed to appearance-based attitudes and beliefs for females to maintain their hairstyle. Anecdotally, female letter carriers would often mention their concerns about their hair as a reason for not wearing a hat. Older age was associated with hat use in both the CBHN and CHIS studies. This is consistent with other sun protection literature among the general U.S. population. Santymire et al. (2001) found a linear relationship between wearing protective clothing (which includes hats) and increasing age. There may be other factors influencing wide brim hat use among older African Americans beyond appearance-based expectations that should be explored.

Sunglasses provide eye protection against UVR and may offer some protection against eye diseases such as cataracts and ocular cancer (Gies *et al.*, 1998; Rosenthal *et al.*, 1988). Wearing sunglasses had more variability than sunscreen and wide brim hat use among the CBHN sample. Over a quarter of the participants reported always wearing sunglasses and another 50% reported wearing them sometimes, half the time, or often. To date, there has been only one other study reporting sunglasses use among African American adults. Pichon et al. (2005) found that 44.1% of African American USPS letter carriers reported always wearing sunglasses during the last 5 days of work. This was more than 15% higher than what we found among the CBHN sample. These differences may be attributed to letter carriers being in the sun on a daily basis, for longer periods of time, and their need to be able to read while delivering mail in direct sunlight. The fact that over 25% of the CBHN sample reported always wearing sunglasses implies that our sample acknowledges the importance of eye protection for the brightness of the sun.

In the CBHN study, we found that females were significantly more likely to wear sunglasses than males. This also was the case among female letter carriers in the Pichon et al. (2005) study. The odds of female letter carriers wearing sunglasses were 1.78 times that of male letter carriers. Very few studies have assessed other predictors of sunglasses use, such as income, among the general population. We found that African Americans in the lowest income category were the least likely to report wearing sunglasses. Lagerlund et al. (2006) also found the lowest SES group to be the least likely to wear sunglasses compared to the highest SES group in a community sample of Australians. Demographic predictors have implications on wearing sunglasses. Differences by sex may be related to appearance-based expectations that drive this behavior. The finding that individuals in the

lowest income category were less likely to wear sunglasses may be related to the affordability of high quality sunglasses.

Seeking shade on sunny days is another preventive behavior recommended by organizations such as the American Cancer Society to reduce UVR exposure (ACS, 2007a). This behavior was assessed in the California Health Interview Survey (CHIS). Almost 25% of African Americans reported always seeking shade. These findings are lower than those found in the NHIS for African Americans. In the 1992 NHIS, 44.8% of the African Americans reported that they were very likely to seek shade. During the 1998 administration of the NHIS, these rates decreased to 37% among African American respondents. Higher prevalence rates for shade seeking among the NHIS sample compared to the CHIS sample may be due to the wording of the response options. Being "very likely" to seek shade as opposed to "always" seeking shade differ considerably in their meaning and may explain in part the differences in prevalence rates for shade.

Demographic predictors of seeking shade included being female and being a high school graduate. Females were 1.7 times more likely to seek shade than males. Individuals with only a high school education were more likely to report always seeking shade relative to those with some college education and those with a college degree. The relationship for sex is consistent with other national studies cited in the literature (Hall *et al.*, 1997; Hall & Rogers, 1999; Santmyire et al., 2001). Data from Hall et al. (1999) found that 51% of African American females reported being very likely to avoid the sun by staying in the shade compared to 37% of African American males. The findings for education were inconsistent with data from the 1998 NHIS. Santmyire et al. found the highest educational level achieved to be significantly related to seeking shade.

Females may seek shade to avoid getting darker because of subscribing to societal beliefs that darker skin is less desirable or their acknowledgement of prejudices within the African American community with regard to skin color (Briley et al., 2007). It could also be that African American females would prefer to maintain youth-like skin by not overly exposing their skin to UV rays. Having a high school education may limit one's employment prospects. Those in the lowest educational group may be more likely to be employed in outdoor professions, thereby experiencing large doses of sun exposure. Seeking shade may offer solace on very hot work days.

There is evidence that some clothing fabrics provide protection against UVR (Menter et al., 1994). Long sleeved shirt use was assessed in the CHIS study. Almost 13% of the African American sample reported always wearing a long sleeved shirt. Compared to the CHIS sample, 5.3% of USPS letter carriers reported always wearing a long sleeve shirt over their last 5 days of work. The low rates of reported clothing use in these two studies could be the result of environmental factors such as weather conditions (Dixon et al., 2008).

Age was a consistent predictor of long sleeved shirt use in multivariate tests for the CHIS sample. For every decade, wearing a long sleeved shirt increased by a factor of 1.4. These findings were similar to other studies conducted among the general population (Pruim *et al.*, 1999). Among a sample of men with a history of non-melanoma skin cancer, predictors of long sleeved shirt use included being over 50 years of age (Woolley et al., 2004). Age was also associated with protective clothing use (including long sleeve shirt) among teenagers and adults in an observational study conducted in Australia. The odds of wearing protective clothing was lower for those under 50 years compared to

individuals aged 50 and older (Dixon et al., 2008). Age being a predictor of protective clothing use could be the result of competing fashion trends among younger African Americans. These findings suggest the importance of targeting younger age groups to increase protective clothing use in future health communication messages.

Oftentimes skin cancer prevention studies lump together multiple types of protective clothing in the same item, such as wearing a hat and long sleeved shirt (Dixon et al., 2008). The 1992 and 1998 NHIS studies found protective clothing use (including hat and long sleeve shirt use) among African Americans to be 23% and 28.2%, respectively (Hall & Rogers, 1999; Santmyire et al., 2001). These findings are twice the proportion we found in the CBHN study for wide brim hat use alone. These extreme differences are likely due to combining hat use and other protective clothing behaviors into one item in the NHIS study, thus masking the contribution of specific behaviors being performed.

Comparing the CHIS hat data to the sun protective clothing items, which include hat use, from both the 1992 and 1998 NHIS for African Americans, the prevalence is similar (Table 39). However, if we compare the individual item on long sleeved shirt use from the CHIS with the protective clothing item from both the NHIS 1992 and 1998 surveys, we see that rates of wearing a long sleeved shirt are much lower. If low long sleeved shirt use was generalized to other states besides California, then this would suggest that hat use may be the driving force for the NHIS items on protective clothing use.

To summarize, it was found that several demographic variables were significant predictors of sun protection behaviors among the CBHN community sample, as we had

initially hypothesized. In general, the associations for these significant relationships were in the expected direction. Many of the demographic predictors found in the CBHN were replicated in the CHIS. Next, the remaining potential correlates—skin type and perceived skin cancer risk—will be addressed, followed by a discussion regarding the relationship between community level factors (i.e., segregation and poverty) and sun protection behaviors.

The skin type distribution of the CBHN sample when including the not applicable category was 4% for the higher sun sensitivity categories (Type I/II) and 36% for the lower sun sensitivity categories (Type III/IV). If the not applicable category is subtracted, the distributions are 9.8% for Skin Type I/II and 90.2% for Skin Type III/IV. The findings for sun sensitivity when we include the N/A response category were consistent with previous data with African Americans. In the 1992 NHIS study, 5.6% of the African Americans reported having sun sensitive skin (Hall & Rogers, 1999). However, if we compare the distribution where we have excluded the N/A category, we see that the CBHN study reports higher rates of sun sensitivity compared to the NHIS (9.8% vs. 5.6%, respectively). Thus, the more appropriate comparison is to use the item that omits the N/A category for the CBHN study.

These discrepancies in skin type may be due to the differences in the items used to measure sun sensitivity. First, the CBHN study specifies a time span of 30-minutes whereas the NHIS gives a time period of 1 hour. Also, adding the "none of the above category" to the CBHN sun sensitivity item allowed almost 60% of the sample who did not consider themselves to fit in any of the four original categories to choose a more representative response. If we exclude the not applicable category, the distributions

change in that 9.8% of the CBHN participants fall in the higher sun sensitivity group and 90.2% fall in the low sun sensitivity group. This indicates that if African Americans are given this fifth option, they are not compelled to endorse the Type IV category.

Skin type was not a significant predictor of sun protection behaviors in the multivariate analyses for the CBHN community sample as we had initially hypothesized. However, bivariate tests showed there were significant differences in sun protection behaviors by self-reported skin type. For sunscreen use, 19.2 % of African Americans with sun sensitive skin reported always using sunscreen compared to 11.3% of those with non-reactive skin and 4.6% of those that believed none of the skin type categories applied to them. The results for sun sensitive respondents from the CBHN study were similar to those found in the Hall et al. (1999) study where 20.8% of African American adults with sun sensitive skin reported being very likely to use sunscreen. For hat use, 14% of those with Skin Type I/II from the CBHN study reported always wearing a wide brim hat. This was much lower than what the 1992 NHIS reported for African Americans. Sixty percent of the African Americans from the NHIS reported being very likely to wear protective clothing, which included hats. This difference of about 45% seems to be attributed to the very precise definition of a 2.5-inch wide brim used in the CBHN study compared to the more general definition of protective clothing (includes hat use) in the 1992 NHIS.

Perceived skin cancer risk was included as another potential predictor of sun protection behaviors among African Americans in the CBHN study. There were no significant relationships between any of the three sun protection behaviors and skin cancer risk perception in the multivariate analyses. Overall, perceived skin cancer risk among the community sample was low. Forty-five percent of the respondents reported

having zero skin cancer risk. These findings are consistent with one study assessing perceived skin cancer risk among African Americans. Data from Friedman et al. (1994) showed that on a scale of 1 to 4, where 1 was a very small chance, African Americans reported a mean perceived skin cancer risk score of 1.58 (SD=0.62).

In bivariate tests, 37% of individuals from the CBHN study with some perceived risk reported sometimes using sunscreen compared to 26.4% with no risk. The odds of individuals with no perceived skin cancer risk of using sunscreen was 0.60 times that of those reporting some risk. These significant findings for sunscreen use in the bivariate tests did not hold when controlling for other predictors in the multivariate model. This is not surprising given the results from other studies concluding a weak association between skin cancer risk perception and sun protection behaviors. As documented in one study assessing skin cancer risk perception among Whites, only 2% of the variance for sun protection behaviors was explained by perceived skin cancer risk (Clarke et al., 1997).

For wide brim hat use, 12.5% of those with no risk reported always wearing a wide brim hat compared to 7.3% with some risk. One would expect those with some perceived skin cancer risk to report higher rates of sun protection behaviors than those with no risk. However, it could be that those who reported always wearing a wide brim hat believe they have reduced their risk for skin cancer by engaging in a preventive behavior. This rationale fits with the risk reappraisal hypothesis which emphasizes that individuals who engage in health protective behaviors to decrease their risk of illness will have lower perceptions of risk (Brewer et al., 2004).

Testing the relationship between perceived risk and health behaviors has several liabilities, as some researchers have argued (Brewer et al., 2004). This may explain the

weak association in bivariate tests and the lack of associations in multivariate models between perceived skin cancer risk and the three sun protection behaviors for our community sample. Brewer and colleagues (2004) developed a framework which proposed three hypotheses to mitigate these methodological flaws in measuring risk perception. The risk reappraisal hypothesis was mentioned in the preceding paragraph. The other two are the motivation hypothesis and accuracy hypothesis. Given the cross-sectional design of this study only the accuracy hypothesis would be appropriate to consider.

The accuracy hypothesis posits that individuals who engage in risky behaviors have higher actual risk and thus, should have higher perceived risk (Brewer et al., 2004). The majority of participants in the CBHN study reported low sun sensitivity and low perceived skin cancer risk. Our data also show a significant correlation between actual risk and perceived risk. African Americans with lower sun sensitivity (Skin Type IV) reported the lowest scores on the perceived skin cancer risk scale ($r=-0.117$, $p<0.007$). This suggests that African Americans in our sample may have accurately assessed their low skin cancer risk, which might explain the lack of a relationship between perceived risk and sun protective behaviors in the multivariate model.

The lack of association between perceived skin cancer risk and sun protection behaviors among the CBHN sample also may be the result of the measure used. The work of Ronis (1992) recommends that susceptibility items be conditional on action (Ronis, 1992). Including a behavioral anchor prior to asking about risk perception may improve the quality of the item, lending itself to more valid results. An example of this might include the following: "*If you do not practice sun protection behaviors,* what are your

chances of getting skin cancer." Additionally, it may be warranted to also measure perceived severity of skin cancer in combination with perceptions of susceptibility as these two constructs together may better predict intentions to engage in sun protection behaviors (Strecher and Rosenstock, 1997).

Another consideration for the lack of a relationship between perceived skin cancer risk and sun protection behaviors includes distinguishing between episodic versus chronic exposure. For instance, sun exposure may be considered an episodic event (with the exception of occupational sun exposure) where people may receive higher doses of UVR only during the summer months, while on vacation in warmer climates, or on unusually hot days (B. Diffey, 2008). Because intense sun exposure may be infrequent, this may lead people to perceive their risks for skin cancer as low.

Other studies cited in the literature have assessed perceived susceptibility to illness in regard to other preventive health behaviors such as vaccinations, medication compliance, and cancer screening (Beydoun & Beydoun, 2008; Brown & Segal, 1996; Fung & Cairncross, 2007; Janz & Becker, 1984; McCaul *et al.*, 1996). These studies illustrate the variations in results for risk perception for habitual health behaviors such as hand washing and medication regimens, and other less frequent behaviors such medical screenings. These data shed light on the complexities of risk perception and preclude direct comparisons between summer sun protection behaviors assessed in the CBHN study.

The final two potential predictors of sun protection behaviors assessed in the CBHN study included levels of residential segregation and neighborhood poverty. We initially hypothesized that these contextual factors would influence sun protection

behaviors. Our multivariate analyses found no significant relationships between either of the community-level factors on the three sun protection behaviors. Null findings may be the result of having very little variability among sun protection behaviors for these potential predictors. It also could be that African Americans living in more integrated census tracts may not be exposed to the sun protective practices of Whites as we had expected. This would then wash out the effect of segregation.

Strengths

This was one of the first and largest studies to collect sun protection behavior data from a community-based sample of African Americans using a community-based participatory research approach. Participants included in the analyses were all African American, a group that is understudied in sun protection research. The research staff was primarily African American, reflecting the makeup of our intended sample and potentially minimizing distrust. The literature suggests that concordance on race between researchers and participants increases participation among African Americans (Moorman et al., 1999). Indeed, our participation rate exceeded 95% in both counties. We sampled census tracts with a variation of residential segregation and poverty levels, which increases the generalizability of our findings to other African Americans. We used validated sun protection and skin type measures. Data collector training and supervision was ongoing to ensure that we attained high quality data. Finally, the data were entered and cleaned by experienced doctoral students.

Limitations

One limitation is that temporality cannot be inferred because of the cross-sectional nature of the data (i.e., we are not able to determine whether predictor variables influenced sun protection behaviors, the reverse, or neither of these). Study design was a particular concern with measuring skin cancer risk perception. We were unable to test the three hypotheses from the Brewer at al. risk perception framework. Based on their findings, only the accuracy hypothesis could be tested with this study's data, as the other two hypotheses require longitudinal data. Second, participants were asked to recall their sun protection behaviors performed during the summer months. The surveys were completed from September 2006 through December 2007. Thus, there may be seasonal biases influencing self-reported sun protection behaviors. Third, we relied on self-report, which may be vulnerable to recall and social desirability biases. Fourth, we cannot connect data collection mode (i.e., CBHN survey read versus self-administered) with participant ID. However, we do have descriptive data on the overall percentages of the varying modes of data collection.

A fifth limitation is that we did not evaluate skin cancer screening rates among high-risk individuals (e.g., skin self exams or clinical skin exams). Detecting skin cancers at an early stage is important for reducing skin cancer mortality among African Americans. Sixth, the item that was used to assess skin type has double barreled response options. The question ascertains information about both burning and tanning. These two outcomes may vary by individual. For example, it is highly probable that an African American respondent may not burn, but they also may not tan. It would be inaccurate for a respondent with these characteristics to endorse Skin Type IV, since only 50% of the

statement is true. However, adding the fifth option of "none of the above describes me" may have yielded more valid responses. Seventh, there may be a possibility that the results from this study may not generalize to all African Americans, especially those living in other geographic regions, as the data were collected only in San Diego and Los Angeles. The climate in Southern California could be linked to the health behavior under investigation. Finally, there may be important methodological differences between the California Black Health Network Health Survey and the California Health Interview Survey that may limit conclusions as to whether there were true differences in sun protection rates.

Recommendations for Research and Practice

Several studies assessing sun protection behaviors among African American adults have consistently shown low rates of sunscreen and hat use (Briley et al., 2007; Friedman et al., 1994; Hall & Rogers, 1999; Lewis EC et al., 2006; Pichon et al., 2005; Santmyire et al., 2001). Up until this study, current sun protection prevalence rates among a community sample of African Americans were not available. A comparison of the prevalence rates from the CBHN community study with two national studies and one state study suggest that the rates are still low and have not changed dramatically for African Americans over time (California Health Interview Survey; Hall & Rogers, 1999; Santmyire et al., 2001).

One key element that is missing from these studies is the reason why these behaviors are not being performed. It could be that African Americans are unaware of the damaging effects of sun exposure and sunburn, and the role these risk factors play in the

development of skin cancer (Pennello et al., 2000). Very few African Americans are aware that African Americans can get skin cancer (Briley et al., 2007). Most African Americans do not know anyone that has had skin cancer (Briley et al., 2007; Friedman et al., 1994). Thus, African Americans may not realize that skin cancer is a deadly disease if left untreated. Further, health care providers may not discuss skin cancer prevention or perform clinical skin examinations with high-risk African American patients (DePue *et al.*, 2008; Saraiya et al., 2004b). This may lead some individuals to think that skin cancer is of no concern to them since prevention was not advised by their medical provider.

There are many misconceptions among African Americans that having darker skin provides protection against the damaging effects of UVR. Although this is partially true, Black skin varies from individual to individual (Galindo et al., 2007; Kaidbey et al., 1979). There is evidence that African Americans experience sunburn and a proportion of those who sunburn experience repeated sunburns ("Sunburn prevalence among adults--United States, 1999, 2003, and 2004", 2007). Far worse than any of the possible reasons presented so far as to why sun protection behaviors may be low, the most discouraging is that many African Americans may not know what skin cancer is. Drawing from the literature, we know that 75% of U.S. African American adults do not know that melanoma is a type of cancer of the skin ("Survey of knowledge of and awareness about melanoma--United States, 1995", 1996). Improved sun protection items are needed to link knowledge-based and behavioral questions together to better understand the low levels of sun protection behaviors among African Americans.

Our data highlights the need to refine measurement tools used to adequately assess sun sensitivity among African Americans. We propose future studies include our

modified version of the Fitzpatrick Skin Type Classification which includes the fifth option “none of the above describes me”. It also is suggested that separate items be used to assess sunburning and to assess tanning. For items measuring perceived skin cancer risk, it is recommended that behavioral and temporal factors be included. Conducting cognitive interviews to explore new survey items with African Americans may be warranted, given the complexity of skin type and skin cancer risk perception.

In the context of other health concerns of African Americans, sun protection and skin cancer prevention trail behind. Some may argue the need for or relevance of skin cancer prevention among African Americans, given the low incidence rates of melanoma for this ethnic/racial group (Cress & Holly, 1997; Ries *et al.*, 2005).Yet, it is important to acknowledge the low survival rates for African Americans who develop skin cancers compared to Whites (Crowley et al., 1991; Fleming et al., 1975; Halder & Bang, 1988; Reintgen et al., 1982). Very little is known about the reasons for these disparities. Until more evidence is provided by the scientific community, health educators, public health practitioners, and medical providers should promote both primary and secondary prevention among higher risk African Americans. In order to change sun protection behaviors, researchers will need to develop novel interventions and health communication campaigns, targeting subgroups of the African American population.

The data from the CBHN study emphasize sex differences in key sun protection behaviors. It may be necessary that the next phase of intervention research tailor messages to subsets of the African American population such as promoting hat use for females and sunscreen use for males, and encouraging all individuals with sun sensitive skin to engage in multiple sun protection behaviors. Taking a progressive approach as an

initial start to increase sun protection behaviors among African Americans may be beneficial. For instance, encouraging African Americans to begin using one behavior regularly and progressively increasing to two behaviors and so on may offer a more practical solution. Currently, 44% of African Americans are regularly using at least one sun protective behavior (U.S.D.H.H.S., 2000). This is considerably lower than the recommendations set by Healthy People 2010 to achieve the goal of 85%.

Linking sun protection with other prevention messages may be effective among some African Americans. Other studies with the general U.S. population have detected significant relationships between skin cancer risk behaviors and other risky behaviors, such as smoking and drinking (Coups *et al.*, 2008). Friedman et al. (2004) found that African Americans in a worksite skin cancer screening program were the least likely to use sunscreen, eat a low-fat diet, and exercise compared to Whites and Hispanics. It is possible that while targeting other risky behaviors, health promotion specialists also could add intervention strategies to target skin cancer prevention and screening (Simmons *et al.*, 2008).

Psychosocial factors including health beliefs, attitudes, and knowledge about sun protection should also be investigated among African Americans. From our data, we learned that perceived skin cancer risk is low among a community sample of African Americans. We are uncertain of the factors contributing to these beliefs. Our data showed low educational attainment and low income to be predictors of sunscreen use. It would be useful to know why these are barriers to sun protection. There may be an interaction between psychosocial and demographic factors influencing patterns of sun protection behaviors. Using the methods outlined in the current study, identifying African

Americans in communities of low educational attainment and low income to explore this phenomenon may prove advantageous.

It is the hope of the researchers involved in this study that the findings be used to change existing sun protection behaviors among African Americans and to inform interventions designed to meet Healthy People 2010 goals. The data were able to expand the list of important correlates to include in skin cancer prevention analyses. The information ascertained from this study may be used to target at risk African Americans identified by our work with this community sample, such as individuals with sun sensitive skin. The data we gathered may be translated and used to tailor key sun protection messages to subsamples of African Americans identified by this study that were engaging in especially low levels of sun protection, such as males and younger adults.

Although our sample was restricted to Southern California African Americans and the generalizability of these findings may be limited to African Americans in these communities sampled, there still remain many lessons learned that could be applied to other African Americans across this nation. First, we confirmed that there is variability with regard to Black skin. There was a proportion of the sample that reported sun-sensitive skin, which is a key risk factor for skin cancer. This finding complements the results of other studies assessing skin type distribution among African Americans. Second, a substantial proportion of our sample did not endorse any of the four Fitzpatrick Skin Type Classifications. To our knowledge, this is the first time this has been measured. Perhaps this finding may be replicated with other African American samples

to gather more empirical data in support of modifying this standard measure used to assess sun sensitivity.

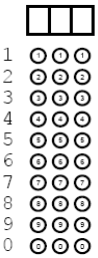
Finally, this is the first study to explore the relationship between contextual factors such as community poverty and residential segregation as potential predictors of sun protection. Although these findings were not significant in multivariate analyses with this sample, these potential predictors should be included in future research to determine if they are relevant to skin cancer prevention. From the literature on all-cause Black mortality, there are significant associations between these community level factors and Black mortality. Likewise, several studies conclude that skin cancer mortality is higher for African Americans compared to Whites. Therefore examining this relationship in the context of skin cancer warrants further investigation given this disparity. In conclusion, this study was able to 1) successfully draw attention to the disparities in sun protection behaviors among African Americans, an area of disparities research that up until now has received very little attention, and 2) point to future directions skin cancer prevention research should embark.

Appendices

Key Sun Safety/Skin Cancer Prevention Items**:**

4. On a scale of 0 to 100, what do you think your chances of getting skin cancer are, where 0 is no chance of getting skin cancer, and 100 means you will definitely get it?

Write the number in the boxes to the right and fill in the circles beneath.



During the summer months, how often do you do the following when you are out in the sun for more than 15 minutes?

53a. Wear sunscreen with SPF of 15 or higher..... ☐ Never ☐ Sometimes ☐ About half the time ☐ Often ☐ Always

53b. Wear sunglasses..... ☐ Never ☐ Sometimes ☐ About half the time ☐ Often ☐ Always

53c. Wear a hat with a surrounding brim of at least 2 1/2 inches..... ☐ Never ☐ Sometimes ☐ About half the time ☐ Often ☐ Always

54. Which of the following best describes your skin's usual reaction to your first exposure to summer sun, without sunscreen, for one-half hour at midday?

☐ Always burn, unable to tan
☐ Usually burn, then can tan if I work at it
☐ Sometimes mild burn, then tan easily
☐ Rarely burn, tan easily
☐ None of the above describes me

California Black Health Network Survey

Draft

CALIFORNIA BLACK HEALTH NETWORK HEALTH SURVEY

For Office Use Only
SC: CT

The first questions are about your health

1. Has a doctor ever told you that you have hypertension (high blood, high blood pressure)? ☐ yes ☐ no

2. Has a doctor ever told you you have diabetes (high sugar)? ☐ yes ☐ no

3a. Has a doctor ever told you that you have cancer of any kind? ☐ yes ☐ no

3b. If yes, what kind of cancer?

☐ Breast ☐ Prostate ☐ Lung ☐ Cervical ☐ Other type

4. On a scale of 0 to 100, what do you think your chances of getting skin cancer are, where 0 is no chance of getting skin cancer, and 100 means you will definitely get it?

Write the number in the boxes to the right and fill in the circles beneath.

5. Has a doctor ever told you that you have heart disease? ☐ yes ☐ no

6. Has a doctor ever told you that you have asthma? ☐ yes ☐ no

7. In general, your health is: ☐ Excellent ☐ Very good ☐ Good ☐ Fair ☐ Poor

8. Do you have health/medical insurance? ☐ yes ☐ no

9. Do you have a regular doctor? ☐ yes ☐ no

10. About how long has it been since you last saw a doctor about your own mental or physical health?
☐ Less than one year ago ☐ 1 to 2 years ago ☐ More than 2 years ago

11. In the past year, did you seek help at a hospital or clinic for your PHYSICAL health? ☐ yes ☐ no

12. In the past year, did you visit an emergency room for your PHYSICAL health? ☐ yes ☐ no

13. In the past year, did you seek help from a friend or family member about your PHYSICAL health? ☐ yes ☐ no

14. In the past year, did you seek help from a minister or folk healer about your PHYSICAL health? ☐ yes ☐ no

15. In the past year, did you EVER feel that you would have gotten better medical care/treatment for your PHYSICAL health if you had been a member of a DIFFERENT race or ethnic group?
☐ yes ☐ no ☐ I didn't seek physical health care in past year

16. In the past year, did you seek help from a psychologist or counselor about your MENTAL health? ☐ yes ☐ no

17. In the past year, did you visit an emergency room for your MENTAL health? ☐ yes ☐ no

18. In the past year, did you seek help from a friend or family member for your MENTAL health? ☐ yes ☐ no

19. In the past year, did you seek help from a minister or folk healer for your MENTAL health? ☐ yes ☐ no

20. In the past year, did you EVER feel that you would have gotten better medical care/treatment for your MENTAL health if you had been a member of a DIFFERENT race or ethnic group?

☐ yes ☐ no ☐ I didn't seek mental health care in past year

The next two questions are about women's health and are for WOMEN ONLY

21a. A mammogram is an x-ray taken only of the breast by a machine that presses against the breast. Have you EVER HAD a mammogram?

☐ yes ☐ no ☐ I don't know

21b. How many mammograms have you had in the last 6 years?

☐ 0 ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐ 8 ☐ 9 ☐ 10 ☐ more than 10

22a. A Pap smear is a routine test for women in which the doctor examines the cervix, takes a cell sample from the cervix with a small stick or brush and sends it to the lab. Have you EVER HAD a Pap smear test?

☐ yes ☐ no ☐ I don't know

22b. How many Pap smear tests have you had in the last 6 years?

☐ 0 ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐ 8 ☐ 9 ☐ 10 ☐ more than 10 ☐ I don't know

The next question is about men's health and is for MEN ONLY

23a. A PSA test is a blood test to detect prostate cancer. It is also called a prostate-specific antigen test. Have you EVER HAD a PSA test?

☐ yes ☐ no ☐ I don't know

23b. How many PSA tests have you had in the last 5 years?

☐ 0 ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐ 8 ☐ 9 ☐ 10 ☐ more than 10 ☐ I don't know

The next questions are about smoking and are for everyone whether you smoke or not

24. Have you smoked at least 100 cigarettes in your lifetime? ☐ yes ☐ no

25. Do you smoke cigarettes now - even once in a while? ☐ yes ☐ no (if no, GO TO question #35)

26. When you smoke cigarettes (even a puff) do you smoke ☐ Menthol ☐ Non-Menthol ☐ Both

27. How many cigarettes do you smoke each day?

Write the number in the boxes to the right and fill in the circles beneath.

1	○	○
2	○	○
3	○	○
4	○	○
5	○	○
6	○	○
7	○	○
8	○	○
9	○	○
0	○	○

28. Do you intend to quit smoking in the next 30 days? ☐ yes ☐ no ☐ maybe

29. Do you intend to quit smoking in the next 6 months? ☐ yes ☐ no ☐ maybe

30. Has a doctor or nurse ever advised you to quit smoking? ☐ yes ☐ no

31. Have you made an attempt to quit smoking in the past that led to your not smoking for 24 hours or longer? ☐ yes ☐ no

32. If a free, quit-smoking program were nearby in this neighborhood, would you use it? ☐ yes ☐ no ☐ maybe ☐ I don't know

33. How old were you in years when you started smoking?

Write the number in the boxes to the right and fill in the circles beneath.

1	○	○
2	○	○
3	○	○
4	○	○
5	○	○
6	○	○
7	○	○
8	○	○
9	○	○
0	○	○

34. Do you believe that nicotine gum or patches could help you quit smoking?

☐ yes ☐ no ☐ maybe ☐ I don't know

35. Has your minister/pastor/priest EVER advised your church congregation to quit smoking?

☐ yes ☐ no ☐ I don't know ☐ I don't go to church

36. Are people EVER allowed to smoke (cigarettes, cigars, pipes, weed) INSIDE this house/apartment (indoors)?

☐ yes ☐ no

37. In a typical week, how many days per week do people smoke (cigarettes, cigars, pipes, weed) INSIDE this home? ☐ 0 ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7

Have you EVER in your entire life smoked any of these...

38a. Bidis..... ☐ yes ☐ no 38b. Blunts..... ☐ yes ☐ no 38c. Black & Mild or Philly.. ☐ yes ☐ no

38d. Kreteks (cloves).. ☐ yes ☐ no 38e. Other Cigars.. ☐ yes ☐ no 38f. Marijuana (weed)..... ☐ yes ☐ no

Have you smoked any of these in the past 30 days - even a puff?

39a. Bidis..... ☐ yes ☐ no 39b. Blunts..... ☐ yes ☐ no 39c. Black & Mild or Philly.. ☐ yes ☐ no

39d. Kreteks (cloves).. ☐ yes ☐ no 39e. Other Cigars.. ☐ yes ☐ no 39f. Marijuana (weed)..... ☐ yes ☐ no

How old were you when you tried these for the FIRST time?

40a. Bidis..... ☐ Never tried ☐ 5-10 ☐ 11-14 ☐ 15-17 ☐ 18-20 ☐ 21-30 ☐ 31 or up

40b. Blunts..... ☐ Never tried ☐ 5-10 ☐ 11-14 ☐ 15-17 ☐ 18-20 ☐ 21-30 ☐ 31 or up

40c. Cigarettes..... ☐ Never tried ☐ 5-10 ☐ 11-14 ☐ 15-17 ☐ 18-20 ☐ 21-30 ☐ 31 or up

40d. Kreteks (cloves)..... ☐ Never tried ☐ 5-10 ☐ 11-14 ☐ 15-17 ☐ 18-20 ☐ 21-30 ☐ 31 or up

40e. Marijuana (weed)..... ☐ Never tried ☐ 5-10 ☐ 11-14 ☐ 15-17 ☐ 18-20 ☐ 21-30 ☐ 31 or up

40f. Black&Mild or other cigars... ☐ Never tried ☐ 5-10 ☐ 11-14 ☐ 15-17 ☐ 18-20 ☐ 21-30 ☐ 31 or up

41. Do any of the people you live with EVER smoke cigarettes - even a puff? ☐ yes ☐ no ☐ no, I live alone

The next questions ask about the things you eat and drink

42. During the past 7 days, how many times did you drink fruit JUICE?

Write the number in the boxes to the right and fill in the circles beneath.

☐☐
1 ○○
2 ○○
3 ○○
4 ○○
5 ○○
6 ○○
7 ○○
8 ○○
9 ○○
0 ○○

43. During the past 7 days, how many times did you eat FRUIT (including fresh, frozen, and canned fruit and applesauce)?

Write the number in the boxes to the right and fill in the circles beneath.

☐☐
1 ○○
2 ○○
3 ○○
4 ○○
5 ○○
6 ○○
7 ○○
8 ○○
9 ○○
0 ○○

44. During the past 7 days, how many times did you eat SALAD made with lettuce or spinach?

Write the number in the boxes to the right and fill in the circles beneath.

☐☐
1 ○○
2 ○○
3 ○○
4 ○○
5 ○○
6 ○○
7 ○○
8 ○○
9 ○○
0 ○○

45. During the past 7 days, how many times did you eat POTATOES (baked, boiled, mashed, potato salad, sweet potatoes or yams, red potatoes, french fries, hash browns, and home fries)?

Write the number in the boxes to the right and fill in the circles beneath.

☐☐
1 ○○
2 ○○
3 ○○
4 ○○
5 ○○
6 ○○
7 ○○
8 ○○
9 ○○
0 ○○

46. During the past 7 days, how many times did you eat BEANS (cooked, dried, refried or baked beans, bean soup, pork and beans, and bean salad)?

Write the number in the boxes to the right and fill in the circles beneath.

☐☐
1 ○○
2 ○○
3 ○○
4 ○○
5 ○○
6 ○○
7 ○○
8 ○○
9 ○○
0 ○○

47. During the past 7 days, how many times did you eat OTHER VEGETABLES such as tomatoes, carrots, collard greens, corn, spinach, broccoli, other greens, and okra?

Write the number in the boxes to the right and fill in the circles beneath.

☐☐
1 ○○
2 ○○
3 ○○
4 ○○
5 ○○
6 ○○
7 ○○
8 ○○
9 ○○
0 ○○

48. In a typical week, how many days do you drink alcohol (beer, wine, wine coolers, hard liquor)?

☐ 0 ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐ I don't drink alcohol

49. On days when you drink alcohol, how many days do you typically drink? Put 00 if you don't drink alcohol (one drink is the same as one 12oz. bottle of beer, one 5oz. glass of wine, or one shot of liquor)

Write the number in the boxes to the right and fill in the circles beneath.

☐☐
1 ○○
2 ○○
3 ○○
4 ○○
5 ○○
6 ○○
7 ○○
8 ○○
9 ○○
0 ○○

50. How many days in the last month have you had 5 or more drinks of alcohol in one sitting? (Put 00 if you don't drink alcohol.)

Write the number in the boxes to the right and fill in the circles beneath.

☐☐
1 ○○
2 ○○
3 ○○
4 ○○
5 ○○
6 ○○
7 ○○
8 ○○
9 ○○
0 ○○

The next questions are about the things you usually do

51. Over the past 30 days, did you do any HARD or VIGOROUS physical activities (such as exercise, sports or dancing) for at least 10 minutes that caused heavy sweating or large increases in your breathing or heart rate?

☐ yes ☐ no

52. Over the past 30 days, did you do any MODERATE physical activities (such as exercise, sports, or dancing) for at least 10 minutes that caused light sweating or slight increases in your breathing or heart rate?

☐ yes ☐ no

During the summer months, how often do you do the following when you are out in the sun for more than 15 minutes?

53a. Wear sunscreen with SPF of 15 or higher..... ☐ Never ☐ Sometimes ☐ About half the time ☐ Often ☐ Always

53b. Wear sunglasses..... ☐ Never ☐ Sometimes ☐ About half the time ☐ Often ☐ Always

53c. Wear a hat with a surrounding brim of at least 2 1/2 inches..... ☐ Never ☐ Sometimes ☐ About half the time ☐ Often ☐ Always

54. Which of the following best describes your skin's usual reaction to your first exposure to summer sun, without sunscreen, for one-half hour at midday?

☐ Always burn, unable to tan
☐ Usually burn, then can tan if I work at it
☐ Sometimes mild burn, then tan easily
☐ Rarely burn, tan easily
☐ None of the above describes me

Because neighborhoods affect health, the next questions ask about this neighborhood

55. About how many churches are there in this neighborhood?

☐ 0 ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐ 8 ☐ 9 ☐ 10 ☐ More than 10

56. About how many of the stores in this neighborhood sell cigarettes?

☐ None of them ☐ A few ☐ Some ☐ Most ☐ All

57. About how many of the stores in this neighborhood sell fresh fruit and vegetables?

☐ None of them ☐ A few ☐ Some ☐ Most ☐ All

58. About how many of the stores in this neighborhood sell alcohol (beer, wine, or hard liquor)?

☐ None of them ☐ A few ☐ Some ☐ Most ☐ All

59. About how many stores in this neighborhood sell single (individual) cigarettes (loosies)?

☐ None of them ☐ A few ☐ Some ☐ Most ☐ All ☐ I don't know

60. How long have you lived in this neighborhood? ☐ Less than 1 year ☐ 1-2 years ☐ More than 2 years

61. Is there a park close-by in this neighborhood? ☐ Yes ☐ No ☐ Don't know

62. About how many hospitals/medical centers are in this neighborhood?

☐ 0 ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐ 8 ☐ More than 8

63. How dangerous is this neighborhood? ☐ Not at all ☐ A little ☐ Somewhat ☐ Very

64. How much do you fear going outside at night in this neighborhood?

☐ Not at all ☐ A little ☐ Somewhat ☐ A lot

65. How much crime is there in this neighborhood? ☐ Not at all ☐ A little ☐ Some ☐ A lot ☐ Don't know

66. How much traffic is there in this neighborhood? ☐ Not at all ☐ A little ☐ Some ☐ A lot ☐ Don't know

67. How noisy is this neighborhood? ☐ Not at all noisy ☐ A little noisy ☐ Somewhat noisy ☐ Very noisy

These last questions are about you and your life

68. How old are you?

Write the number in the boxes to the right and fill in the circles beneath.

☐☐

1 ○○
2 ○○
3 ○○
4 ○○
5 ○○
6 ○○
7 ○○
8 ○○
9 ○○
0 ○○

69. What is your employment status?

☐ Working full time (40 hours or more per week)
☐ Working part time (less than 40 hours per week)
☐ Full time student, not working
☐ Student and working full time (working 40 hours or more per w
☐ Student and working part time
☐ Unemployed (not working and looking for a job)
☐ Home-maker
☐ Retired
☐ Disabled
☐ Other

70. What is your level of education (the highest degree or grade you completed)?

☐ Less than high school
☐ High school graduate or GED
☐ Some college
☐ BA or BS degree
☐ Masters degree
☐ Doctorate or other professional degree

71. What is your family (household) yearly income?

☐ Less than 5000
☐ 5,000 to 10,999
☐ 11,000 to 16,999
☐ 17,000 to 25,999
☐ 26,000 to 49,999
☐ 50,000 to 75,999
☐ 76,000 to 99,999
☐ 100,000 or higher

72. How religious or spiritual are you? ☐ Not at all ☐ A little ☐ Somewhat ☐ Very much

73. What is your religion?

☐ Methodist, Baptist, or other Protestant ☐ Catholic ☐ Muslim ☐ None ☐ Other

74. People sometimes use spiritual practices such as prayer as a way of dealing with illness or trying to stay healthy. Have you EVER prayed for your own health? ☐ yes ☐ no

75. How much racism or discrimination have YOU personally experienced in your ENTIRE LIFE?

☐ None ☐ A little ☐ Some ☐ A lot

76. How much racism or discrimination have YOU personally experienced in THE PAST YEAR?

☐ None ☐ A little ☐ Some ☐ A lot

77. How much racism or discrimination have your FAMILY and FRIENDS experienced in THE PAST YEAR?

☐ None ☐ A little ☐ Some ☐ A lot

78. How often do you read Black magazines/newspapers (for example: Ebony, Jet)?

☐ Never ☐ 1-2 times a month ☐ Once a week ☐ More than once a week

79. How often do you watch Black TV shows?

☐ Never ☐ 1-2 times a month ☐ Once a week ☐ More than once a week

80. How often do you attend Black community events such as concerts or fashion shows?

☐ Never ☐ 1-2 times a month ☐ Once a week ☐ More than once a week

Please answer questions 83-87 only if you are Latino.

81. How often do you read Latino magazines/newspapers or magazines/newspapers in Spanish?

☐ Never ☐ 1-2 times a month ☐ Once a week ☐ More than once a week

82. How often do you watch Latino TV shows or TV shows in Spanish?

☐ Never ☐ 1-2 times a month ☐ Once a week ☐ More than once a week

83. How often do you listen to music in Spanish?

☐ Never ☐ 1-2 times a month ☐ Once a week ☐ More than once a week

84. Are you male or female?

☐ male ☐ female

85. Do you have a cell phone?

☐ yes ☐ no

86. Do you have a regular (landline) telephone?

☐ no ☐ sometimes ☐ yes

87. Are you:

☐ Single/Never married
☐ Married or living as married
☐ Separated, Divorced, Widowed

88. What is your race/ethnic group?

☐ African American/Black
☐ Latino/Hispanic
☐ White/Anglo
☐ American Indian
☐ Asian American

89. What language do you speak at home?

☐ English ☐ Spanish ☐ Other Language

90. What country were you born in?

☐ United States ☐ Other country

Randomly Selected Census Tracts (N=85)

CTS FROM WHICH TO SAMPLE			CT Total N	CT Whites		CT Blacks		CT Residents Below Poverty Line		
ROW #	CT	County		N	%	N	%	% Overall	% Blacks	% Whites
01	424.11	Riverside	2847	1637	57%	580	20%	4.61%	4%	3%
02	610	San Francisco	2542	484	19%	506	20%	10%	4%	13%
03	458	Riverside	11137	3625	33%	2216	20%	21.45%	6%	10%
04	4052	Alameda	4991	1804	36%	1004	20%	7.41%	9%	5%
05	426.06	Riverside	3670	1797	49%	729	20%	12.75%	11%	8%
06	5401.02	Los Angeles	6839	2308	34%	1335	20%	14%	13%	14%
07	2911.3	Los Angeles	3369	1026	30%	688	20%	8%	14%	3%
08	1041.03	Los Angeles	3840	1261	33%	755	20%	13%	15%	6%
09	2286	Los Angeles	4667	1460	31%	929	20%	37%	22%	51%
10	5753	Los Angeles	4919	1062	22%	998	20%	31%	25%	33%
11	12	San Diego	5641	3231	57%	1107	20%	20.17%	27%	15%
12	5421.02	Los Angeles	7669	1893	25%	1504	20%	29%	28%	41%
13	4235	Alameda	2967	1569	53%	596	20%	27.32%	33%	21%
14	2285	Los Angeles	4506	1313	29%	890	20%	43%	35%	45%
15	462	Riverside	3335	1323	40%	658	20%	29.61%	37%	24%
16	27.09	San Diego	4212	1328	32%	836	20%	45.28%	37%	14%
17	74.08	San Bernardino	3785	1599	42%	762	20%	33.06%	49%	18%
18	428	Riverside	6451	2009	31%	1300	20%	35.48%	52%	20%
19	425.04	Riverside	2808	1370	49%	574	20%	41.98%	62%	26%
20	408.05	Riverside	5350	3851	72%	1280	24%	0.00%	0%	0%
21	426.05	Riverside	18387	7902	43%	4357	24%	13.53%	14%	7%
22	4055	Alameda	4147	642	15%	996	24%	18.13%	15%	9%
23	305.01	Riverside	4597	1142	25%	1090	24%	35.33%	29%	25%
24	34.02	San Bernardino	8543	3054	36%	2081	24%	27.65%	31%	20%
25	42	Sacramento	4861	954	20%	1179	24%	34%	34%	30%
26	425.19	Riverside	1652	712	43%	396	24%	37.17%	59%	11%
27	27.06	San Diego	8096	2879	36%	2410	30%	17.60%	19%	9%
28	42	Sacramento	5722	1836	32%	1724	30%	17%	22%	13%
29	158	San Francisco	6871	3284	48%	2029	30%	19%	31%	8%
30	163	San Francisco	4521	2452	54%	1355	30%	18%	41%	5%
31	2397	Los Angeles	5991	1491	25%	1820	30%	40%	46%	75%
32	31.12	San Diego	4484	823	18%	1613	36%	16.41%	19%	6%
33	4611	Los Angeles	4840	1821	38%	1739	36%	20%	20%	10%
34	34.01	San Diego	5890	1833	31%	2114	36%	12.95%	21%	9%
35	38	Sacramento	5307	1607	30%	1901	36%	21%	23%	11%
36	2221	Los Angeles	3738	644	17%	1333	36%	28%	28%	0%
37	65	Sacramento	5890	1816	31%	2143	36%	32%	30%	28%
38	33.02	San Diego	9347	1730	19%	3358	36%	32.98%	32%	19%
39	42.02	San Bernardino	4645	1166	25%	1695	36%	39.37%	38%	55%
40	2321.1	Los Angeles	2943	606	21%	1046	36%	39%	44%	0%
41	2398	Los Angeles	7563	1341	18%	2689	36%	45%	47%	0%
42	83	Sacramento	6828	2440	36%	2460	36%	53%	51%	57%

Randomly Selected Census Tracts (cont.)

CTS FROM WHICH TO SAMPLE			CT Total N	CT Whites		CT Blacks		CT Residents Below Poverty Line		
ROW #	CT	County		N	%	N	%	% Overall	% Blacks	% Whites
43	2073	Los Angeles	3804	1310	34%	1368	36%	48%	58%	42%
44	2062	Los Angeles	3467	549	16%	1238	36%	57%	68%	72%
45	53	Sacramento	1483	574	39%	531	36%	63%	69%	70%
46	2172	Los Angeles	3950	827	21%	1727	44%	13%	11%	9%
47	4005	Alameda	3415	1376	40%	1488	44%	14.12%	16%	14%
48	31.03	San Diego	6159	1063	17%	2703	44%	15.46%	17%	7%
49	4093	Alameda	5492	1129	21%	2417	44%	26.73%	32%	30%
50	605.02	San Francisco	3393	253	7%	1500	44%	37%	55%	47%
51	2411.1	Los Angeles	2653	259	10%	1173	44%	32%	56%	0%
52	2063	Los Angeles	4995	1148	23%	2183	44%	66%	71%	62%
53	5410.01	Los Angeles	1175	242	21%	593	50%	20%	4%	27%
54	5413	Los Angeles	5696	730	13%	2855	50%	18%	22%	0%
55	5410.02	Los Angeles	3320	936	28%	1705	51%	6%	3%	6%
56	4604	Los Angeles	859	139	16%	434	51%	11%	7%	0%
57	4078	Alameda	2340	701	30%	1198	51%	7.90%	11%	5%
58	161	San Francisco	5257	1577	30%	2690	51%	22%	18%	19%
59	6001	Los Angeles	6172	690	11%	3152	51%	4%	43%	74%
60	4603.02	Los Angeles	4330	1012	23%	2362	55%	8%	7%	6%
61	2349	Los Angeles	7064	1046	15%	3875	55%	44%	42%	38%
62	6002.02	Los Angeles	6312	965	15%	3457	55%	15%	48%	73%
63	232	San Francisco	4490	403	9%	2661	59%	17%	19%	0%
64	5716	Los Angeles	1980	214	11%	1161	59%	11%	66%	49%
65	31.01	San Diego	3718	643	17%	2259	61%	11.52%	11%	17%
66	4016	Alameda	1768	290	16%	1087	61%	40.88%	46%	10%
67	4077	Alameda	4599	958	21%	2877	63%	11.52%	11%	10%
68	4082	Alameda	4388	829	19%	2762	63%	20.53%	23%	9%
69	4014	Alameda	4765	439	9%	3003	63%	49.75%	51%	33%
70	6003.02	Los Angeles	3378	242	7%	2428	72%	38%	18%	0%
71	5408	Los Angeles	5583	423	8%	4008	72%	37%	29%	85%
72	4010	Alameda	5709	805	14%	4110	72%	30.72%	32%	10%
73	2362.01	Los Angeles	6289	496	8%	4518	72%	42%	41%	46%
74	231.03	San Francisco	4657	76	2%	3354	72%	52%	54%	0%
75	2379	Los Angeles	3537	66	2%	2879	81%	19%	16%	0%
76	2382	Los Angeles	5243	260	5%	4228	81%	20%	21%	0%
77	4021	Alameda	1258	13	1%	1020	81%	52.07%	58%	#DIV/0!
78	7031	Los Angeles	5445	420	8%	4671	86%	18%	4%	0%
79	2380	Los Angeles	5887	154	3%	5046	86%	16%	11%	49%
80	6005.01	Los Angeles	2716	33	1%	2343	86%	46%	17%	40%
81	6007.04	Los Angeles	2996	179	6%	2585	86%	44%	19%	18%
82	5433.04	Los Angeles	6374	122	2%	5786	91%	7%	4%	32%
83	6004	Los Angeles	4151	186	4%	3762	91%	43%	22%	62%
84	6008.01	Los Angeles	3181	47	1%	2929	92%	14%	9%	0%
85	2343	Los Angeles	4262	77	2%	3940	92%	16%	17%	0%

Notes: CT=Census Tract

TABLES

Table 1. Demographic Characteristics of the Sample (N=1453)

Characteristic		**Overall**		Los Angeles		San Diego	
		N	%	N	%	N	%
Sex							
	Female	797	59.0	579	60.4	218	55.6
	Male	553	41.0	379	39.6	174	44.4
Education							
	Less than high school	79	5.6	46	4.6	33	8.2
	High school graduate or GED	332	23.6	227	22.7	105	26.0
	Some college	659	46.9	453	45.3	206	51.0
	BA or BS degree	222	15.8	179	17.9	43	10.6
	Masters degree	91	6.5	75	7.5	16	4.0
	Doctorate or other professional degree	21	1.5	20	2.0	1	0.2
Income							
	<$5,000	103	8.2	78	8.8	25	6.8
	$5,000 to 10,999	92	7.3	58	6.6	34	9.2
	$11,000 to 16,999	91	7.3	57	6.4	34	9.2
	$17,000 to 25,999	121	9.7	76	8.6	45	12.2
	$26,000 to 49,999	325	25.9	209	23.6	116	31.4
	$50,000 to 75,999	256	20.4	194	21.9	62	16.8
	$76,000 to 99,999	135	10.8	105	11.9	30	8.1
	≥$100,000	130	10.4	107	12.1	23	6.2

Table 2. Distribution of Perceived Skin Cancer Risk (N=1289)

Perceived Risk [1]	N	%
0 (not likely)	591	45.8
1-5	141	10.9
6-10	137	10.6
11-25	123	9.5
26-49	75	5.8
50	153	11.9
>50	69	5.4

[1] Possible Range 0-100

Table 3. Distribution of Survey Respondents by Census Tract Segregation and Poverty Levels (N=1453)

Segregation	CT	Segregation level % Black	% Blacks below poverty	N
Low	33.02	36 (SD)	32	98
	31.03	44 (SD)	17	182
	5413.00	50 (LA)	22	86
	5410.02	51 (LA)	3	108
	6001.00	51 (LA)	43	121
			Total	**595**
High	31.01	61 (SD)	11	137
	2382.00	81 (LA)	21	150
	6005.01	86 (LA)	17	115
	5433.04	91 (LA)	4	113
	6004.00	91 (LA)	22	113
	6008.01	92 (LA)	9	112
	2343.00	92 (LA)	17	118
			Total	**858**

Note: CT=Census Tract; SD=San Diego; LA=Los Angeles

Table 4. Distribution of Sun Protection Behaviors among California Black Health Network Survey Respondents

	Never		Sometimes		About half the time		Often		Always	
	N	%	N	%	N	%	N	%	N	%
Sunscreen (N=1372)	831	60.6	255	18.6	90	6.6	89	6.5	107	7.8
Sunglasses (N=1368)	319	23.3	353	25.8	124	9.1	201	14.7	371	27.1
Wide Brim Hat (N=1369)	511	37.3	432	31.6	126	9.2	160	11.7	140	10.2

Table 5. Percentage of Participants Always Engaging in Sun Protection Behaviors by Census Tract and Segregation Level

Segregation	CT	County	Sunscreen % Always	Sunglasses % Always	Wide Brim % Always
Low	33.02	SD	3.2	27.1	13.7
	31.03	SD	8.9	28.7	11.1
	5413.00	LA	2.5	21.3	11.4
	5410.02	LA	8.8	26.7	8.0
	6001.00	LA	2.7	18.4	7.1
High	31.01	SD	7.8	29.5	12.6
	2382.00	LA	4.9	22.9	9.9
	6005.01	LA	9.0	28.0	11.4
	5433.04	LA	10.3	33.3	11.1
	6004.00	LA	5.4	33.6	11.0
	6008.01	LA	11.3	24.5	6.5
	2343.00	LA	17.6	29.9	8.8

Table 6. Bivariate Associations Between Each Sun Protection Behavior and Mean Age

Behavior		N	Mean Age	SD
Sunscreen				
	Never	750	45.4	16.6
	Sometimes	406	44.0	15.6
	Always	102	47.2	13.0
Sunglasses				
	Never[a]	276	42.9	17.0
	Sometimes[b]	636	44.1	15.7
	Always[c]	340	49.3	15.3
Wide Brim Hat				
	Never[d]	463	43.0	15.7
	Sometimes[e]	673	45.6	15.8
	Always[f]	119	53.2	17.4

[a] This category is significantly different from the third category.
[b] This category is significantly different from the third category.
[c] This category is significantly different from the other two categories.
[d] This category is significantly different from the other two categories.
[e] This category is significantly different from the other two categories.
[f] This category is significantly different from the other two categories.

Table 7. Bivariate Associations between Sunscreen Use and Potential Correlates

Correlate		Never		Sometimes		Always		χ^2
		N	%	N	%	N	%	
Sex								67.443**
	Female	394	52.4	281	37.4	77	10.2	
	std. residual	-3.2		3.1		2.8		
	Male	394	74.5	117	22.1	18	3.4	
	std. residual	3.8		-3.7		-3.4		
Education								66.649**
	≤ High school	277	70.8	103	26.3	11	2.8	
	std. residual	2.6		-1.8		-3.6		
	Some college	387	62.6	185	29.9	46	7.4	
	std. residual	0.6		-0.7		-0.4		
	≥ College graduate	145	44.6	131	40.3	49	15.1	
	std. residual	-3.7		2.9		4.6		
Income								58.307**
	$0-25,999	277	71.9	92	23.9	16	4.2	
	std. residual	3.1		-3.0		-2.4		
	$26,000-75,999	317	57.5	199	36.1	35	6.4	
	std. residual	-0.7		1.4		-1.0		
	≥$76,000	119	46.3	99	38.5	39	15.2	
	std. residual	-2.8		1.6		4.5		
Skin Type								129.743**
	Type I/II	14	26.9	28	53.8	10	19.2	
	std. residual	-3.1		2.8		3.0		
	Type III/IV	222	44.8	218	44	56	11.3	
	std. residual	-4.5		4.9		2.9		

Table 7. Bivariate Associations between Sunscreen Use and Potential Correlates (cont.)

Correlate		Never		Sometimes		Always		χ^2
		N	%	N	%	N	%	
	None of these	566	73	173	22.3	36	4.6	
	std. residual	4.4		-4.6		-3.1		
Perceived Risk								20.22**
	No risk	376	67.0	148	26.4	37	6.6	
	std. residual	2.1		-2.4		-0.9		
	Some risk	362	54.4	246	37.0	57	8.6	
	std. residual	-1.9		2.2		0.8		
Poverty								24.719**
	Low Poverty	554	56.9	327	33.6	93	9.5	
	std. residual	-1.5		1.1		2		
	High Poverty	277	69.6	107	26.9	14	3.5	
	std. residual	2.3		-1.7		-3.1		
Segregation								14.996*
	Low	371	66.5	155	27.8	32	5.7	
	std. residual	1.8		-1.6		-1.7		
	High	460	56.5	279	34.3	75	9.2	
	std. residual	-1.5		1.3		1.4		

*p-value <0.05
**p-value <0.001

Table 8. Univariate and Multivariate **Ordinal** Logistic Regression Analysis for Variables Predicting Sunscreen Use (N=920)

		Univariate[1]		Multivariate[2]	
		Unadjusted OR	95% C.I.	Adjusted OR	95% C.I.
Sex					
	Female	2.691**	2.117, 3.421	3.378**	2.478, 4.605
	Male	—		—	
Education					
	≤ High school	0.312**	0.230, 0.421	0.545*	0.355, 0.835
	Some college	0.469**	0.361, 0.610	0.507**	0.359, 0.717
	≥ College graduate	—		—	
Income					
	$0-25,999	0.313**	0.227, 0.432	0.393**	0.255, 0.605
	$26,000-75,999	0.58**	0.436, 0.772	0.515**	0.361, 0.735
	≥$76,000	—		—	
Age		0.999	0.992, 1.006	0.995	0.986, 1.004
Skin Type					
	None of the above	0.307**	0.243, 0.387	0.369**	0.275, 0.494
	Type I/II	2.019*	1.175, 3.467	2.032	0.993, 4.161
	Type III/IV	—		—	
Perceived Risk					
	No risk	0.604**	0.480, 0.759	0.806	0.602, 1.078
	Some risk	—		—	
Poverty					
	Low	1.800**	1.08, 2.303	1.578*	1.107, 2.249
	High	—		—	
Segregation					
	Low	0.649**	0.521, 0.809	0.923	0.672, 1.267
	High	—		—	

Note: OR=Odds Ratio; C.I.=Confidence Interval

*p-value <0.05
**p-value <0.01

[1]Test for proportional odds assumption for univariate model: sex χ^2=0.636, p=0.425; education χ^2=5.698, p=0.058; income χ^2 =4.639, p=0.098; age χ^2=4.025, p=0.045; skin type χ^2=1.735, p=0.420; perceived risk χ^2=1.384, p=0.239; poverty χ^2= , p=0.052; segregation χ^2=0.184, p=0.668

[2]Test for proportional odds assumption for multivariate model: χ^2=16.625, p=0.119 and Nagelkerke=0.253

Table 9. Bivariate Associations Between Sunglasses Use and Potential Correlates

Correlate		Never		Sometimes		Always		
		N	%	N	%	N	%	χ^2
Sex								46.162**
	Female	137	18.2	372	49.3	245	32.5	
	std. residual	-3.0		-0.2		3.1		
	Male	163	31.0	267	50.9	95	18.1	
	std. residual	3.6		0.3		-3.8		
Education								49.005**
	≤ High school	134	34.6	178	46	75	19.4	
	std. residual	4.6		-0.9		-3.0		
	Some college	118	19.1	327	52.8	174	28.1	
	std. residual	-2.2		1.2		0.4		
	≥ College graduate	58	18.1	150	46.7	113	35.2	
	std. residual	-2.0		-0.7		2.7		
Income								49.986**
	$0-25,999	127	33.3	179	47	75	19.7	
	std. residual	4.3		-0.8		-2.8		
	$26,000-75,999	103	18.8	295	53.9	149	27.2	
	std. residual	-2		1.3		0		
	≥$76,000	41	16	118	45.9	98	38.1	
	std. residual	-2.3		-0.9		3.4		
Skin Type								25.183**
	I/II	8	16.3	27	55.1	14	28.6	
	std. residual	-1		0.6		0.2		
	III/IV	82	16.6	270	54.5	143	28.9	
	std. residual	-3.2		1.7		0.7		

Table 9. Bivariate Associations Between Sunglasses Use and Potential Correlates (cont.)

Correlate		Never		Sometimes		Always		
		N	%	N	%	N	%	χ^2
	None of these	219	28.4	352	45.6	201	26.0	
	std. residual	2.8		-1.5		-0.6		
Perceived Risk								12.046*
	No risk	144	25.9	254	45.8	157	28.3	
	std. residual	1.7		-1.7		0.8		
	Some risk	130	19.6	367	55.4	166	25	
	std. residual	-1.6		1.6		-0.7		
Poverty								15.297**
	Low	198	20.5	500	51.7	270	27.9	
	std. residual	-1.8		0.9		0.5		
	High	121	30.3	178	44.5	101	25.3	
	std. residual	2.9		-1.4		-0.7		
Segregation								14.197*
	Low	159	28.5	260	46.6	139	24.9	
	std. residual	2.5		-1.0		-1.0		
	High	160	19.8	418	51.6	232	28.6	
	std. residual	-2.1		0.8		0.8		

*p-value <0.05
**p-value <0.001

Table 10. Univariate and Multivariate **Ordinal** Logistic Regression Analysis for Variables Predicting Sunglasses Use (N=914)

		Univariate[1]		Multivariate[2]	
		Unadjusted OR	95% C.I.	Adjusted OR	95% C.I.
Sex					
	Female	2.100**	1.694, 2.604	2.254**	1.729, 2.938
	Male	—		—	
Education					
	≤ High school	0.412**	0.310, 0.547	0.759	0.515, 1.120
	Some college	0.795	0.616, 1.026	1.203	0.869, 1.664
	≥ College graduate	—		—	
Income					
	$0-25,999	0.370**	0.273, 0.502	0.460**	0.312, 0.678
	$26,000-75,999	0.676*	0.510, 0.897	0.710*	0.510, 0.988
	≥$76,000	—		—	
Age		1.018**	1.011, 1.024	1.018**	1.009, 1.026
Skin Type					
	None of the above	0.684**	0.552, 0.847	0.933	0.715, 1.219
	Type I/II	0.997	0.573, 1.733	0.909	0.443, 1.864
	Type III/IV	—		—	
Perceived Risk					
	No risk	0.926	0.748, 1.146	1.044	0.807, 1.351
	Some risk	—		—	
Poverty					
	Low	1.395*	1.120, 1.740	1.273	0.937, 1.731
	High	—		—	
Segregation					
	Low	0.718*	0.586, .881	0.828	0.623, 1.100
	High	—		—	

Note: OR=Odds Ratio; C.I.=Confidence Interval

*p-value <0.05; **p-value <0.001

[1]Test for proportional odds assumption for univariate model: sex χ^2=0.205, p=0.651; education χ^2=3.927, p=0.140; income χ^2 =4.083, p=0.130; age χ^2=4.819, p=0.028; skin type χ^2=12.916, p=0.002; perceived risk χ^2=11.556, p=0.001; poverty χ^2= 6.167, p=0.013; segregation χ^2=3.953, p=0.047

[2]Test for proportional odds assumption for multivariate model: χ^2=34.523, p<0.001 and Nagelkerke=0.129

Table 11. Univariate and Multivariate **Binary** Logistic Regression Analysis for Variables Predicting Sunglasses Use: Never vs. Sometimes/Half the Time/Often/Always (N=914)

		Univariate (never vs. other)		Multivariate (never vs. other)	
		OR	95% C.I.	OR	95% C.I.
Sex					
	Female	2.028**	1.561, 2.634	2.170**	1.545, 3.048
	Male	–		–	
Education					
	≤ High school	0.416**	0.293, 0.593	0.762	0.464, 1.253
	Some college	0.936	0.661, 1.326	1.492	0.947 2.352
	≥ College graduate	–		–	
Income					
	$0-25,999	0.380**	0.255, 0.564	0.559*	0.336, 0.928
	$26,000-75,999	0.818	0.550, 1.217	0.942	0.591, 1.502
	≥$76,000	–		–	
Age		1.012*	1.003, 1.021	1.009	0.998, 1.020
Skin Type					
	None of these	0.501**	0.377, 0.666	0.704	0.489, 1.014
	Type I/II	1.018	0.460, 2.250	1.062	0.346, 3.262
	Type III/IV	–		–	
Perceived Risk					
	No risk	0.696*	0.532, 0.912	0.855	0.609, 1.201
	Some risk	–		–	
Poverty					
	Low	1.687**	1.295, 2.197	1.591*	1.082, 2.339
	High	–		–	
Segregation					
	Low	0.618**	0.480, 0.795	0.785	0.542, 1.139
	High	–		–	

Note: OR=Odds Ratio; C.I.=Confidence Interval

*p-value <0.05
**p-value <0.001

Table 12. Univariate and Multivariate **Binary** Logistic Regression Analysis for Variables Predicting Sunglasses Use: Always vs. Never/Sometimes/Half the Time/Often (N=914)

		Univariate (other vs. always)		Multivariate (other vs. always)	
		OR	95% C.I.	OR	95% C.I.
Sex					
	Female	2.179**	1.664, 2.852	2.480**	1.766, 3.482
	Male	–		–	
Education					
	≤ High school	0.442**	0.315, 0.622	0.819	0.508, 1.319
	Some college	0.720*	0.539, 0.960	1.043	0.714, 1.523
	≥ College graduate	–		–	
Age		1.022**	1.014, 1.030	1.026**	1.016, 1.037
Income					
	$0-25,999	0.398**	0.278, 0.568	0.377**	0.234, 0.607
	$26,000-75,999	0.607*	0.444, 0.832	0.562*	0.383, 0.825
	≥$76,000	–		–	
Skin Type					
	None of these	0.866	0.673, 1.115	1.147	0.828, 1.590
	Type I/II	0.985	0.514, 1.885	0.889	0.369, 2.141
	Type III/IV	–		–	
Perceived Risk					
	No risk	1.181	0.915, 1.524	1.203	0.877, 1.651
	Some risk	–		–	
Poverty					
	Low	1.145	0.878, 1.494	1.014	0.694, 1.482
	High	–		–	
Segregation					
	Low	0.826	0.647, 1.056	0.879	0.619, 1.249
	High	–		–	

Note: OR=Odds Ratio; C.I=Confidence Interval

*p-value <0.05
**p-value <0.001

Table 13. Bivariate Associations Between Wide Brim Hat Use and Potential Correlates

Correlate		Never		Sometimes		Always		
		N	%	N	%	N	%	χ^2
Sex								
	Female	327	43.4	382	50.7	45	6.0	40.804**
	std. residual	2.5		-0.8		-3.2		
	Male	157	29.8	292	55.5	77	14.6	
	std. residual	-3.0		0.9		3.8		
Education								
	≤ High school	178	45.6	166	42.6	46	11.8	22.205**
	std. residual	2.7		-2.7		0.9		
	Some college	217	34.9	344	55.4	60	9.7	
	std. residual	-1.0		1.1		-0.6		
	≥ College graduate	101	31.8	185	58.2	32	10.1	
	std. residual	-1.6		1.5		-0.2		
Income								
	$0-25,999	166	43.7	182	47.9	32	8.4	7.872
	std. residual	1.8		-1.3		-0.6		
	$26,000-75,999	198	36.0	297	54.0	55	10.0	
	std. residual	-0.8		0.5		0.5		
	≥$76,000	88	34.2	145	56.4	24	9.3	
	std. residual	-1.0		0.9		0.0		
Skin Type								
	Type I/II	16	32.0	27	54.0	7	14.0	10.748*
	std. residual	-0.7		0.2		0.9		
	Type III/IV	175	35.5	281	57.0	37	7.5	
	std. residual	-0.8		1.5		-1.5		

Table 13. Bivariate Associations Between Wide Brim Hat Use and Potential Correlates (cont.)

Correlate		Never		Sometimes		Always		
		N	%	N	%	N	%	χ^2
	None of these	304	39.5	378	49.1	88	11.4	
	std. residual	0.8		-1.2		1.2		
Perceived Risk								
	No risk	230	40.6	265	46.8	71	12.5	15.251**
	std. residual	0.9		-1.7		2.2		
	Some risk	241	36.5	371	56.2	48	7.3	
	std. residual	-0.8		1.5		-2.0		
Poverty								
	Low	353	36.2	523	53.7	98	10.1	2.157
	std. residual	-0.6		0.5		-0.2		
	High	158	40	195	49.4	42	10.6	
	std. residual	0.9		-0.8		0.3		
Segregation								
	Low Segregation	204	36.6	296	53.1	57	10.2	0.210
	std. residual	-0.3		0.2		0.0		
	High Segregation	307	37.8	422	52	83	10.2	
	std. residual	0.2		-0.2		0.0		

*p-value <0.05
**p-value <0.001

Table 14. Univariate and Multivariate **Ordinal** Logistic Regression Analysis for Variables Predicting Wide Brim Hat Use (N=919)

		Univariate[1]		Multivariate[2]	
		Unadjusted OR	95% C.I.	Adjusted OR	95% C.I.
Sex					
	Female	0.508**	0.408, 0.633	0.430**	0.327, 0.565
	Male	—		—	
Education					
	≤ High school	0.650*	0.487, 0.866	0.578*	0.388, 0.862
	Some college	0.892	0.687, 1.160	0.914	0.655, 1.275
	≥ College graduate	—		—	
Income					
	$0-25,999	0.709*	0.522, 0.965	1.026	0.690, 1.523
	$26,000-75,999	0.958	0.718, 1.278	1.041	0.742, 1.461
	≥$76,000	—		—	
Age		1.019**	1.012, 1.026	1.022**	1.013, 1.031
Skin Type					
	None of the above	1.000	0.770, 1.192	0.903	0.686, 1.188
	Type I/II	1.000	0.748, 2.317	1.195	0.571, 2.501
	Type III/IV	—		—	
Perceived Risk					
	No risk	0.982	0.791, 1.120	0.965	0.740, 1.257
	Some risk	—		—	
Poverty					
	Low	1.121	0.894, 1.405	1.096	0.800, 1.503
	High	—		—	
Segregation					
	Low	1.041	0.845, 1.281	1.263	0.943, 1.691
	High	—		—	

Note: OR=Odds Ratio; C.I.=Confidence Interval

*p-value <0.05; **p-value <0.001

[1]Test for proportional odds assumption for univariate model: sex χ^2=4.000, p=0.046; education χ^2=12.384, p=0.002; income χ^2 =0.969, p=0.616; age χ^2=8.161, p=0.004; skin type χ^2=9.621, p=0.008; perceived risk χ^2=15.240, p=<0.001; poverty χ^2=1.192, p=0.275; segregation χ^2=0.069, p=0.792

[2]Test for proportional odds assumption for multivariate model: χ^2=29.681, p=0.002 and Nagelkerke=0.087

Table 15. Univariate and Multivariate **Binary** Logistic Regression Analysis for Variables Predicting Wide Brim Hat Use: Never vs. Sometimes/Half the Time/Often/Always (N=919)

		Univariate (never vs. other)		Multivariate (never vs. other)	
		OR	95% C.I.	OR	95% C.I.
Sex					
	Female	0.556**	0.439, 0.703	0.468**	0.349, 0.628
	Male	–		–	
Education					
	≤ High school	0.554**	0.407, 0.755	0.530*	0.346, 0.812
	Some college	0.867	0.650, 1.156	0.902	0.627, 1.296
	≥ College graduate	–		–	
Income					
	$0-25,999	0.671*	0.484, 0.932	1.096	0.717, 1.675
	$26,000-75,999	0.926	0.678, 1.263	1.069	0.741, 1.542
	≥$76,000	–		–	
Age		1.015**	1.007, 1.022	1.016**	1.007, 1.026
Skin Type					
	None of these	0.844	0.667, 1.066	0.805	0.600, 1.080
	Type I/II	1.169	0.628, 2.179	1.200	0.534, 2.696
	Type III/IV	–		–	
Perceived Risk					
	No risk	0.840	0.667, 1.058	0.864	0.652, 1.145
	Some risk	–		–	
Poverty					
	Low	1.173	0.923, 1.491	1.170	0.837, 1.635
	High	–		–	
Segregation					
	Low	1.052	0.841, 1.315	1.183	0.864, 1.620
	High	–		–	

Note: OR=Odds Ratio; C.I.=Confidence Interval

*p-value <0.05
**p-value <0.001

Table 16. Univariate and Multivariate **Binary** Logistic Regression Analysis for Variables Predicting Wide Brim Hat Use: Always vs. Never/Sometimes/Half the Time/Often (N=919)

		Univariate (Always vs. other)		Multivariate (Always vs. other)	
		OR	95% C.I.	OR	95% C.I.
Sex					
	Female	0.370**	0.252, 0.545	0.313**	0.187, 0.525
	Male	–		–	
Education					
	≤ High school	1.195	0.741, 1.927	0.884	0.431, 1.813
	Some college	0.956	0.608, 1.502	0.943	0.515, 1.726
	≥ College graduate	–		–	
Income					
	$0-25,999	0.893	0.513, 1.555	0.794	0.379, 1.663
	$26,000-75,999	1.079	0.652, 1.786	0.993	0.537, 1.837
	≥$76,000	–		–	
Age		1.033**	1.021, 1.045	1.040**	1.024, 1.056
Skin Type					
	None of these	1.590*	1.064, 2.377	1.378	0.795, 2.391
	Type I/II	2.006	0.844, 4.771	1.462	0.312, 6.849
	Type III/IV	–		–	
Perceived Risk					
	No risk	1.829*	1.244, 2.687	1.473	0.894, 2.428
	Some risk	–		–	
Poverty					
	Low	0.940	0.642, 1.378	0.830	0.470, 1.465
	High	–		–	
Segregation					
	Low	1.001	0.701, 1.429	1.505	0.885, 2.560
	High	–		–	

Note: OR=Odds Ratio; C.I.=Confidence Interval

*p-value <0.05
**p-value <0.001

Table 17. The Intraclass Correlation, Design Effect and Effective Sample Size for Sun Protection Outcomes

Outcome	ICC[a]	DEFF[b]	Effective Sample Size
Sunscreen	0.0295	4.332	335
Sunglasses	0.0060	1.674	868
Wide Brim	0.0000	1.000	1453

[a]Intraclass Correlation
[b]Design Effect

Table 18. Sunscreen Use Adjusted for Census Tract Clustering – **Never** vs. Sometimes/Half the Time/Often/Always

		Unadjusted OR	95% C.I.	Adjusted OR	95% C.I.
Sex					
	Female	3.255	2.364, 4.482	1.250**	1.179, 1.326
	Male	—		—	
Education					
	≤ High school	0.593*	0.378, 0.930	0.898*	0.823, 0.980
	Some college	0.533*	0.367, 0.774	0.883*	0.821, 0.950
	≥ College graduate	—		—	
Income					
	$0-25,999	0.399**	0.252, 0.631	0.843*	0.773, 0.921
	$26,000-75,999	0.554*	0.377, 0.814	0.889*	0.825, 0.959
	≥$76,000	—		—	
Age		0.995	0.986, 1.005	1.000	1.000, 1.000
Skin Type					
	None of these	0.339**	0.250, 0.460	0.795**	0.748, 0.845
	Type I/II	2.903*	1.109, 7.603	1.216*	1.033, 1.431
	Type III/IV	—		—	
Perceived Risk					
	No risk	0.798	0.588, 1.083	1.044	0.985, 1.107
	Some risk	—		—	
Poverty					
	Low	1.428	0.991, 2.059	0.929	0.865, 0.997
	High	—		—	
Segregation					
	Low	0.919	0.659, 1.282	1.014	0.950, 1.083
	High	—		—	

Note: OR=Odds Ratio; C.I.=Confidence Interval

*p-value <0.05; **p-value <0.001

Table 19. Sunscreen Use Adjusted for Census Tract Clustering – **Never/Sometimes/Half the Time/Often** vs. Always

		Unadjusted OR	95% C.I.	Adjusted OR	95% C.I.
Sex					
	Female	4.312**	2.171, 8.564	1.081**	1.046, 1.118
	Male	–		–	
Education					
	≤ High school	0.268*	0.106, 0.680	0.914*	0.871, 0.961
	Some college	0.401*	0.220, 0.729	0.920**	0.883, 0.959
	≥ College graduate	–		–	
Income					
	$0-25,999	0.423*	0.187, 0.957	1.076*	0.884, 0.977
	$26,000-75,999	0.377*	0.206, 0.691	0.919*	0.880, 0.959
	≥$76,000	–		–	
Age		1.002	0.984, 1.021	1.000	1.000, 1.000
Skin Type					
	None of these	0.604	0.344, 1.059	0.971	0.939, 1.005
	Type I/II	1.426	0.501, 4.060	1.067	0.973, 1.169
	Type III/IV	–		–	
Perceived Risk					
	No risk	0.914	0.520, 1.606	1.007	0.975, 1.041
	Some risk	–		–	
Poverty					
	Low	3.091*	1.307, 7.313	0.952	0.905, 1.001
	High	–		–	
Segregation					
	Low	1.108	0.609, 2.015	0.997	0.951, 1.045
	High	–		–	

Note: OR=Odds Ratio; C.I.=Confidence Interval

*p-value <0.05; **p-value <0.001

Table 20. Select Characteristics of African Americans (N=2369) from the California Health Interview Survey

Characteristic		N	%
Sex			
	Female	1513	63.9
	Male	856	36.1
Education			
	Grades 1-8	73	3.1
	Grades 9-11	182	7.7
	Grade 12/High School Diploma	662	27.9
	Some College	507	21.4
	Vocational School	81	3.4
	AA or AS Degree	291	12.3
	BA or BS Degree	367	15.5
	Some Graduate School	23	1.0
	MA or MS Degree	146	6.2
	Ph.D. or Equivalent	37	1.6
Income			
	$0-$5000	141	6.0
	$5001-$10000	209	8.8
	$10001-$15000	202	8.5
	$15001-$20000	258	10.9
	$20001-$30000	316	13.3
	$30001-$40000	274	11.6
	$40001-$50000	222	9.4
	$50001-$60000	160	6.8
	$60001-$70000	126	5.3
	$70001-$80000	115	4.9
	$80001-$90000	67	2.8
	$90001-$100000	64	2.7
	$100001-$135000	98	4.1
	>$135000	117	4.9

Table 21. Distribution of Sun Protection Behaviors among African Americans from the California Health Interview Survey

Behavior	Never		Sometimes		Always	
	n	%	n	%	n	%
Hat (n=2350)	1010	43.0	782	33.3	558	23.7
Long Sleeved Shirt (n=2349)	941	40.1	1109	47.2	299	12.7
Shade (n=2350)	138	5.9	1634	69.5	578	24.6
Sunscreen (n=2363)	1602	67.8	526	22.3	235	9.9

Table 22. Mean Age Difference for Each Sun Protection Outcome

Behavior		N	Mean Age	SD
Hat				
	Never[a]	1010	43.5	15.7
	Sometimes[b]	782	47.1	16.5
	Always[c]	558	55.6	16.0
Long Sleeved Shirt				
	Never[d]	941	43.2	14.9
	Sometimes[e]	1109	47.8	16.5
	Always[f]	299	60.3	16.1
Shade				
	Never	138	47.1	15.0
	Sometimes	1634	47.2	16.5
	Always	578	49.0	17.6
Sunscreen				
	Never	1602	47.8	17.3
	Sometimes	526	46.3	14.8
	Always	235	49.3	16.5

[a] This category is significantly different from the other two categories.
[b] This category is significantly different from the other two categories.
[c] This category is significantly different from the other two categories.
[d] This category is significantly different from the other two categories.
[e] This category is significantly different from the other two categories.
[f] This category is significantly different from the other two categories.

Table 23. Bivariate Associations Between Hat Use and Potential Correlates

Correlate		Never		Sometimes		Always		χ^2
		n	%	n	%	n	%	
Sex								
	Male	233	27.4	312	36.7	306	36.0	163.937**
	std. residual	-6.9		1.7		7.3		
	Female	777	51.8	470	31.4	252	16.8	
	std. residual	5.2		-1.3		-5.5		
Education								
	≤ High school	404	44.5	274	30.2	230	25.3	9.428
	std. residual	0.7		-1.6		1.0		
	Some college/vocation	375	43.0	293	33.6	205	23.5	
	std. residual	0.0		0.1		-0.2		
	≥ College graduate	231	40.6	215	37.8	123	21.6	
	std. residual	-0.9		1.9		-1.0		
Income								
	$0-30,000	518	46.5	324	29.1	271	24.3	18.726*
	std. residual	1.8		-2.4		0.4		
	$30,001-70,000	318	40.9	285	36.6	175	22.5	
	std. residual	-0.9		1.6		-0.7		
	≥$70,001	174	37.9	173	37.7	112	24.4	
	std. residual	-1.7		1.6		0.3		

*p-value <0.05
**p-value <0.001

Table 24. Univariate and Multivariate **Ordinal** Logistic Regression Analysis for Variables Predicting Hat Use (N=2350)

		Univariate[1]		Multivariate[2]	
		Unadjusted OR	95% C.I.	Adjusted OR	95% C.I.
Sex					
	Female	0.355**	0.302, 0.416	0.342**	0.290, 0.404
	Male	–		–	
Education					
	≤ High school	0.971	0.800, 1.181	0.977	0.780, 1.224
	Some college/vocation	0.975		1.026	0.831, 1.267
	≥ College graduate	–		–	
Income					
	$0-30,000	0.798*	0.652, 0.975	0.897	0.710, 1.131
	$30,001-70,000	0.894	0.723, 1.107	1.038	0.829, 1.298
	≥$70,001	–		–	
Age		1.031**	1.027, 1.037	1.034**	1.029, 1.038

Note: OR=Odds Ratio; C.I.=Confidence Interval

*p-value <0.05
**p-value <0.001

[1]Test of Proportional Odds Assumption for Univariate Model: sex χ^2=0.072, p=0.788; education χ^2=9.294, p=0.010; income χ^2=13.641 p=0.001; age χ^2=14.830, p<0.001

[2]Test of Proportional Odds Assumption for Multivariate Model: χ^2=27.156, p<0.001 Nagelkerke=0.160

Table 25. Univariate and Multivariate **Binary** Logistic Regression Analysis for Variables Predicting Hat Use: Never vs. Sometimes/Always (N=2350)

		Univariate (Never vs. Other)		Multivariate (Never vs. Other)	
		OR	95% C.I.	OR	95% C.I.
Sex					
	Female	0.350**	0.292, 0.420	0.350**	0.290, 0.422
	Male	–		–	
Education					
	≤ High school	0.853	0.689, 1.054	0.905	0.704, 1.162
	Some college/vocation	0.908	0.732, 1.125	0.992	0.784, 1.255
	≥ College graduate	–		–	
Income					
	$0-30,000	0.701*	0.561, 0.876	0.806	0.621, 1.046
	$30,001-70,000	0.883	0.697, 0.119	1.025	0.796, 1.322
	≥$70,001	–		–	
Age		1.027**	1.022, 1.033	1.030**	1.024, 1.035

Note: OR=Odds Ratio; C.I.=Confidence Interval

*p-value <0.05
**p-value <0.001

Table 26. Univariate and Multivariate **Binary** Logistic Regression Analysis for Variable Predicting Hat Use: Always vs. Never/Sometimes (N=2350)

		Univariate (Always vs. Other)		Multivariate (Always vs. Other)	
		OR	95% C.I.	OR	95% C.I.
Sex					
	Female	0.360**	0.296, 0.437	0.336**	0.273, 0.413
	Male	—		—	
Education					
	≤ High school	1.230	0.959, 1.579	1.101	0.816, 1.484
	Some college/vocation	1.113	0.863, 1.434	1.167	0.881, 1.545
	≥ College graduate	—		—	
Income					
	$0-30,000	0.997	0.774, 1.284	0.995	0.734, 1.350
	$30,001-70,000	0.899	0.685, 1.180	0.995	0.741, 1.337
	≥$70,001	—		—	
Age		1.039**	1.033, 1.045	1.041**	1.034, 1.047

Note: OR=Odds Ratio; C.I.=Confidence Interval

*p-value <0.05
**p-value <0.001

Table 27. Bivariate Associations Between Long Sleeved Shirt Use and Potential Correlates

		Never		Sometimes		Always		χ^2
		n	%	n	%	n	%	
Sex								
	Male	311	36.6	433	50.9	106	12.5	8.001*
	std. residual	-1.6		1.6		-0.2		
	Female	630	42.0	676	45.1	193	12.9	
	std. residual	1.2		-1.2		0.2		
Education								
	≤ High school	361	39.8	398	43.8	149	16.4	20.588**
	std. residual	-0.1		-1.5		3.1		
	Some college/vocation	349	39.8	429	49.0	98	11.2	
	std. residual	-0.1		0.8		-1.3		
	≥ College graduate	231	40.9	282	49.9	52	9.2	
	std. residual	0.3		0.9		-2.3		
Income								
	$0-30,000	440	39.4	493	44.2	183	16.4	27.01**
	std. residual	-0.3		-1.5		-0.3		
	$30,001-70,000	312	40.2	390	50.3	74	9.5	
	std. residual	0.1		1.2		-2.5		
	≥$70,001	189	41.4	226	49.5	42	9.2	
	std. residual	0.4		0.7		-2.1		

Note: OR=Odds Ratio; C.I.=Confidence Interval

*p-value <0.05
**p-value <0.001

Table 28. Univariate and Multivariate **Ordinal** Logistic Regression Analysis for Variables Predicting Long Sleeved Shirt Use (N=2349)

		Univariate[1]		Multivariate[2]	
		Unadjusted OR	95% C.I.	Adjusted OR	95% C.I.
Sex					
	Female	0.850*	0.725, 0.998	0.850	0.720, 1.002
	Male	—		—	
Education					
	≤ High school	1.212	0.992, 1.480	1.039	0.826, 1.305
	Some college/vocation	1.077	0.880, 1.317	1.076	0.868,1.332
	≥ College graduate	—		—	
Income					
	$0-30,000	1.244*	1.010, 1.530	1.171	0.924,1.483
	$30,001-70,000	1.044	0.838, 1.301	1.084	0.862, 1.365
	≥$70,001	—		—	
Age		1.036**	1.030, 1.041	1.035**	1.029, 1.040

Note: OR=Odds Ratio; C.I.=Confidence Interval

*p-value <0.05
**p-value <0.001

[1]Test of Proportional Odds Assumption for Univariate Model: sex χ^2=4.054, p=0.044; education χ^2=16.629, p<0.001; income χ^2=21.102, p<0.001; age χ^2=35.146, p<0.001

[2]Test of Proportional Odds Assumption for Multivariate Model: χ^2=47.390, p<0.001 Nagelkerke=0.098

Table 29. Univariate and Multivariate **Binary** Logistic Regression Analysis for Variables Predicting Long Sleeve Shirt Use: Never vs. Sometimes/Always (N=2349)

		Univariate (Never vs. Other)		Multivariate (Never vs. Other)	
		OR	95% C.I.	OR	95% C.I.
Sex					
	Female	0.796*	0.669, 0.946	0.797*	0.666, 0.954
	Male	—		—	
Education					
	≤ High school	1.048	0.846, 1.298	0.948	0.741, 1.211
	Some college/vocation	1.044	0.842, 1.295	1.055	0.839, 1.328
	≥ College graduate	—		—	
Income					
	$0-30,000	1.083	0.868, 1.352	1.083	0.841, 1.395
	$30,001-70,000	1.049	0.829, 1.327	1.110	0.868, 1.418
	≥$70,001	—		—	
Age		1.028**	1.022, 1.033	1.028**	1.023, 1.034

Note: OR=Odds Ratio; C.I.=Confidence Interval

*p-value <0.05
**p-value <0.001

Table 30. Univariate and Multivariate **Binary** Logistic Regression Analysis for Variables Predicting Long Sleeve Shirt Use: Always vs. Never/Sometimes (N=2350)

		Univariate (Always vs. Other)		Multivariate (Always vs. Other)	
		OR	95% C.I.	OR	95% C.I.
Sex					
	Female	1.037	0.805, 1.336	1.004	0.766, 1.316
	Male	—		—	
Education					
	≤ High school	1.937**	1.385, 2.707	1.247	0.841, 1.850
	Some college/vocation	1.243	0.872, 1.771	1.169	0.796, 1.717
	≥ College graduate	—		—	
Income					
	$0-30,000	1.938**	1.359, 2.763	1.315	0.869, 1.989
	$30,001-70,000	1.042	0.700, 1.550	0.975	0.642, 1.482
	≥$70,001	—		—	
Age		1.054**	1.046, 1.063	1.051**	1.043, 1.060

Note: OR=Odds Ratio; C.I.=Confidence Interval

*p-value <0.05
**p-value <0.001

Table 31. Bivariate Associations Between Seeking Shade and Potential Correlates

		Never		Sometimes		Always		χ^2
		n	%	n	%	n	%	
Sex								
	Male	61	7.2	641	75.5	147	17.3	39.362**
	std. residual	1.6		2.1		-4.3		
	Female	77	5.1	993	66.2	431	28.7	
	std. residual	-1.2		-1.6		3.2		
Education								
	≤ High school	48	5.3	591	65.3	266	29.4	26.448**
	std. residual	-0.7		-1.5		2.9		
	Some college/vocation	54	6.2	611	69.7	212	24.2	
	std. residual	0.3		0.0		-0.3		
	≥ College graduate	36	6.3	432	76.1	100	17.6	
	std. residual	0.5		1.9		-3.4		
Income								
	$0-30,000	60	5.4	727	65.4	325	29.2	25.772**
	std. residual	-0.7		-1.7		3.1		
	$30,001-70,000	45	5.8	571	73.2	164	21.0	
	std. residual	-0.1		1.2		-2.0		
	≥$70,001	33	7.2	336	73.4	89	19.4	
	std. residual	1.2		1.0		-2.2		

*p-value <0.05
**p-value <0.001

Table 32. Univariate and Multivariate **Ordinal** Logistic Regression Analysis for Variables Predicting Seeking Shade (N=2350)

		Univariate[1]		Multivariate[2]	
		Unadjusted OR	95% C.I.	Adjusted OR	95% C.I.
Sex					
	Female	1.794**	1.487, 2.166	1.733**	1.432, 2.096
	Male	—		—	
Education					
	≤ High school	1.744**	1.384, 2.197	1.501*	1.158, 1.944
	Some college/vocation	1.353*	1.070, 1.709	1.288*	1.008, 1.645
	≥ College graduate	—		—	
Income					
	$0-30,000	1.644**	1.294, 2.090	1.225	0.937, 1.600
	$30,001-70,000	1.135	0.880, 1.467	0.996	0.766, 1.294
	≥$70,001	—		—	
Age		1.006*	1.001, 1.011	1.005	0.999, 1.010

Note: OR=Odds Ratio; C.I.=Confidence Interval

*p-value <0.05
**p-value <0.001

[1]Test of Proportional Odds Assumption for Univariate Model: sex χ^2=2.328, p=0.127; education χ^2=4.033, p=0.133; income χ^2=2.990, p=0.224; age χ^2=0.646, p=0.421

[2]Test of Proportional Odds Assumption for multivariate model: χ^2=8.085, p=0.232 and Nagelkerke=0.036

Table 33. Bivariate Associations Between Sunscreen Use and Potential Correlates

		Never		Sometimes		Always		χ^2
		n	%	n	%	n	%	
Sex								
	Male	669	78.5	153	18.0	30	3.5	88.976**
	std. residual	3.8		-2.7		-5.9		
	Female	933	61.7	373	24.7	205	13.6	
	std. residual	-2.9		2.0		4.5		
Education								
	≤ High school	731	80.0	127	13.9	56	6.1	126.126**
	std. residual	4.5		-5.4		-3.7		
	Some college/vocation	571	65.0	213	24.3	94	10.7	
	std. residual	-1.0		1.3		0.7		
	≥ College graduate	300	52.5	186	32.6	85	14.9	
	std. residual	-4.4		5.2		3.7		
Income								
	$0-30,000	855	76.1	178	15.9	90	8.0	72.289**
	std. residual	3.4		-4.6		-2.1		
	$30,001-70,000	482	61.7	215	27.5	84	10.8	
	std. residual	-2.1		3.1		0.7		
	≥$70,001	265	57.7	133	29.0	61	13.3	
	std. residual	-2.6		3.0		2.3		

*p-value <0.05
**p-value <0.001

Table 34. Univariate and Multivariate **Ordinal** Logistic Regression Analysis for Variables Predicting Sunscreen Use (n=2363)

		Univariate[1]		Multivariate[2]	
		Unadjusted OR	95% C.I.	Adjusted OR	95% C.I.
Sex					
	Female	2.377**	1.962, 2.883	2.872**	2.334, 3.518
	Male	—		—	
Education					
	≤ High school	0.289**	0.230, 0.362	0.344**	0.267, 0.444
	Some college/vocation	0.614**	0.499, 0.756	0.700*	0.561, 0.875
	≥ College graduate	—		—	
Income					
	$0-30,000	0.443**	0.353, 0.554	0.532**	0.410, 0.689
	$30,001-70,000	0.840	0.668, 1.055	0.855	0.672, 1.088
	≥$70,001	—		—	
Age		0.999	0.994, 1.004	1.004	0.999, 1.010

Note: OR=Odds Ratio; C.I.=Confidence Interval

*p-value <0.05
**p-value <0.001

[1]Test of Proportional Odds Assumption for Univariate Model: sex χ^2=14.456, p<0.001; education χ^2=3.290, p=0.193; income χ^2=6.895, p=0.032; age χ^2=6.888, p=0.009

[2]Test of Proportional Odds Assumption for multivariate model: χ^2=26.234, p<0.001 and Nagelkerke=0.126

Table 35. Univariate and Multivariate **Binary** Logistic Regression Analysis for Variable Predicting Sunscreen Use: Never vs. Sometimes/Always (N=2363)

		Univariate (Never vs. Other)		Multivariate (Never vs. Other)	
		OR	95% C.I.	OR	95% C.I.
Sex					
	Female	2.265**	1.866 2.749,	2.752**	2.241, 3.381
	Male	—		—	
Education					
	≤ High school	0.277**	0.220, 0.349	0.339**	0.261, 0.440
	Some college/vocation	0.595**	0.480, 0.738	0.688*	0.546, 0.867
	≥ College graduate	—		—	
Income					
	$0-30,000	0.428**	0.340, 0.539	0.522**	0.399, 0.682
	$30,001-70,000	0.847	0.670, 1.072	0.874	0.680, 1.125
	≥$70,001	—		—	
Age		0.998	0.933, 1.003	1.003	0.997, 1.009

Note: OR=Odds Ratio; C.I.=Confidence Interval

*p-value <0.05
**p-value <0.001

Table 36. Univariate and Multivariate **Binary** Logistic Regression Analysis for Variables Predicting Sunscreen Use: Always vs. Never/Sometimes (N=2363)

		Univariate (Always vs. Other)		Multivariate (Always vs. Other)	
		OR	95% C.I.	OR	95% C.I.
Sex					
	Female	4.301**	2.903, 6.371	4.943**	3.312, 7.376
	Male	–		–	
Education					
	≤ High school	0.373**	0.262, 0.532	0.400**	0.266, 0.601
	Some college/vocation	0.686*	0.501, 0.939	0.783	0.557, 1.099
	≥ College graduate	–		–	
Income					
	$0-30,000	0.568*	0.403, 0.803	0.598*	0.401, 0.892
	$30,001-70,000	0.786	0.553, 0.118	0.743	0.513, 1.076
	≥$70,001	–		–	
Age		1.006	0.999, 1.015	1.012*	1.003, 1.021

Note: OR=Odds Ratio; C.I.=Confidence Interval

*p-value <0.05
**p-value <0.001

Table 37. Comparison of Sunscreen Use by Study

	Never				Sometimes				Always			
	CBHN		CHIS		CBHN		CHIS		CBHN		CHIS	
	N	%	N	%	N	%	N	%	N	%	N	%
OVERALL**	831	60.6	1602	67.8	434	31.6	526	22.3	107	7.8	235	9.9
Age												
18-29	148	60.7	252	72.8	85	34.8	68	19.7	11	4.5	26	7.5
30-49	311	59.7	673	64.7	169	32.4	264	25.4	41	7.9	103	9.9
50-64	183	54.5	356	65.6	110	32.7	129	23.8	43	12.8	58	10.7
65+	108	68.8	321	74.0	42	26.8	65	15.0	7	4.5	48	11.1
Sex												
Male	394	74.5	669	78.5	117	22.1	153	18.0	18	3.4	30	3.5
Female	394	52.4	933	61.7	281	37.4	373	24.7	77	10.2	205	13.6
Education												
≤High School	277	70.8	731	80.0	103	26.3	127	13.9	11	2.8	56	6.1
Some College	387	62.6	571	65.0	185	29.9	213	24.3	46	7.4	94	10.7
≥College Grad.	145	44.6	300	52.5	131	40.3	186	32.6	49	15.1	85	14.9
Income												
$0-50,000	459	66.6	1173	72.5	203	29.5	309	19.1	27	3.9	136	8.4
>$50,000	254	50.4	429	57.6	187	37.1	217	29.1	63	12.5	99	13.3

Notes: CBHN=California Black Health Network; CHIS=California Health Interview Survey

**$p<0.001$

Table 38. Comparison of **Hat** Use by Study

	Never				Sometimes				Always			
	CBHN		CHIS		CBHN		CHIS		CBHN		CHIS	
	N	%	N	%	N	%	N	%	N	%	N	%
OVERALL	511	37.3	1010	43.0	718	52.4	782	33.3	140	10.2	558	23.7
Age												
18-29	103	43.3	203	58.7	122	51.3	114	32.9	13	5.5	29	8.4
30-49	202	39.2	490	47.4	279	54.2	357	34.5	34	6.6	187	18.1
50-64	117	34.5	200	36.8	182	53.7	178	32.8	40	11.8	165	30.4
65+	41	25.2	117	27.4	90	55.2	133	31.1	32	19.6	177	41.5
Sex												
Male	157	29.8	233	27.4	292	55.5	312	36.7	77	14.6	306	36.0
Female	327	43.4	777	51.8	382	50.7	470	31.4	45	6.0	252	16.8
Education												
≤High School	178	45.6	404	44.5	166	42.6	274	30.2	46	11.8	230	25.3
Some College	217	34.9	375	43.0	344	55.4	293	33.6	60	9.7	205	23.5
≥College Grad.	101	31.8	231	40.6	185	58.2	215	37.8	32	10.1	123	21.6
Income												
$0-50,000	284	41.5	726	45.2	338	49.4	499	31.1	62	9.1	382	23.8
>$50,000	168	33.4	284	38.2	286	56.9	283	38.1	49	9.7	176	23.7

Notes: CBHN=California Black Health Network; CHIS=California Health Interview Survey

*p-value <0.05
**p-value <0.001

Table 39. A Comparison of African American Sun Protection Behaviors and Sunburn Prevalence

	1992 NHIS[1]	1998 NHIS[1]	1999 BRFSS	2000 NHIS[1]	2001 CHIS[2]	2003 BRFSS	2004 BRFSS	2006 CBHN[2]
Variable								
Protective clothing (hat, long sleeve)	28.2	23.0	—	—	—	—	—	—
Shade	44.8	37.0	—	—	24.6	—	—	—
Sunscreen	9.1	12.0	—	—	9.9	—	—	7.8
Wide Brim Hat/Any Hat	—	—	—	—	23.7	—	—	10.2
Sunglasses	—	—	—	—	—	—	—	27.1
Long Sleeve	—	—	—	—	12.7	—	—	—
Sunburn Prevalence[3]	5.6	—	5.2	5.0	10.2	5.1	5.8	—

Notes: NHIS=National Health Interview Survey; BRFSS=Behavioral Risk Factor Surveillance System; CHIS=California Health Interview Survey; CBHN=California Black Health Network

[1]Reported “very likely”.

[2]Reported “always”.

[3]Experienced at least one sunburn in the past year.

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