RACISM AND CANCER PREVENTION: THE ROLE OF PERCEIVED RACISM AND RACE-BASED RESIDENTIAL SEGRETATION ON BEHAVIORAL CANCER RISK PROFILES

by
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ABSTRACT

Problem statement: Cancer is a significant public health problem in the United States; since 1999 cancer has been the leading cause of death among those 85 years and younger. Racial/ethnic disparities in cancer exist. Some groups have experienced decreases or a leveling off with respect to their cancer burden while others have experienced increases. Though there is evidence that lifestyle and screening behaviors may contribute to a reduction in the cancer burden, they are not being fully utilized by all adults with prevalence rates varying by racial/ethnic groups. Racism has been hypothesized as a potential contributor to these disparities with limited research evaluating the relationship between racism and cancer risk behaviors.

Methods: The purpose of this study is to evaluate the relationship between racism and cancer risk profiles with data obtained primarily from the 2003 California Health Interview Survey and the 2000 US Census. Racism measures included perceived racism at the individual-level and race-based residential segregation at the county-level. Cancer risk profiles were measured as a set of primary (e.g., tobacco use, physical inactivity) and secondary (e.g., lack of participation in early detection) cancer risk behaviors. Analyses included individual level and multilevel linear regression modeling.

Results: The prevalence of perceived racism varied by racial/ethnic groups with minority groups having reported perceived racism experiences between 57% and 85%. In individual-level analyses, perceived racism and cancer risk profiles were associated with fixed effects that were moderated by gender, age, and education. Race/ethnicity-stratified analyses showed that these relationships were not maintained across all groups. Multilevel analyses demonstrated evidence of unexplained variance at the county-level

for most racial/ethnic groups; after accounting for segregation and area correlates, for secondary risk profiles no more unexplained variation remained by county.

Conclusion: This research underscores the importance of considering social determinants of health behaviors and understanding not just individual characteristics that shape these behaviors but also contextual effects. Further research into the association of racism and cancer risk profiles is needed to establish causality, identify additional pathways, and to begin to address some public health policy and practice solutions to prevent racism and its negative consequences on health.

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"Of all forms of inequality, injustice in health care

is the most shocking and inhumane."

-Martin Luther King, Jr.

Table of Contents

List of Tables

List of Figures

Chapter 1: Introduction

Cancer disparities

Cancer is a significant public health problem in the United States (US) and since 1999 cancer has been the leading cause of death among those 85 years and younger (American Cancer Society, 2005a). Racial/ethnic disparities in cancer exist and have been documented across cancer outcomes including incidence, stages of diagnosis, survival and mortality as well as across cancer-related health behaviors such as screening, smoking, diet and physical activity (American Cancer Society, 2004; Haynes MA & Smeldey BD (eds.), 1999; National Cancer Institute, 2005b; American Cancer Society, 2005a). Since the early 1970s, the US has been engaged in a 'war against cancer' and during this time progress has been made in reducing the burden of cancer (Freeman HP, 2004). However, this progress has not been equitably distributed across racial/ethnic groups: while some groups have experienced decreases or a leveling off with respect to their cancer burden, others have experienced increases (American Cancer Society, 1997; Kagawa-Singer M, 2001; Satcher D, 2001; McDonald CJ, 2001; Shinagawa S, 2000).

Two demographic trends will also contribute to the increasing significance of the problem: the increasing rate of growth for racial/ethnic minority (emerging majority) communities as well as the aging of these populations (Glanz K, Croyle RT, Chollette VY, & Pinn VW, 2003). It is anticipated that by 2050, almost 50% of the population will identify as non-White in the US (Satcher D, 2001; U.S. Census Bureau, 2002; Kagawa-Singer M, 2001). Thus, as these cancer disparities persist, the increased burden of cancer will not be limited to these communities but will also impact the larger US society, both with respect to number of lives lost as well as financial costs. Recognizing the

importance of addressing these disparities, the US Department of Health and Human Services (DHHS) included cancer screening and management as one of its six priority areas for eliminating racial/ethnic disparities by 2010 (Perez TE, 2001).

Cancer is a complex set of diseases with a myriad of causes (American Cancer Society, 2005a; Harras A, Edwards BK, Blot WJ, & Gloeckler Ries LA, 1996). It is estimated that while about 5-10% of cancer are caused by inherited genetic abnormalities, 90% of cancers are attributed to lifestyle factors (Kagawa-Singer M, 2001). According to the American Cancer Society, tobacco contributes to one-third of cancers and poor diet, obesity and physical activity contribute to another third (McDonald CJ, 2001). Alcohol and infections are each estimated to contribute to less than 10% of cancers. In addition to these primary cancer risk factors, lack of screening (or participation in early detection) increases risk of cancer incidence and mortality (American Cancer Society, 2004; Centers for Disease Control and Prevention, 2005; National Cancer Institute, 2005b; The Agency for Healthcare Research and Quality, 2005; American Cancer Society, 2005a). For example, with colorectal cancer screening, the American Cancer Society anticipates reductions in mortality and incidence through identification of pre-cancerous polyps as well as early stage cancers (American Cancer Society, 2005a). Similarly, for cervical cancer, screening through Pap Smears is associated with reductions in both incidence and mortality (The Agency for Healthcare Research and Quality, 2005). These primary and secondary attributable risks underscore the important contribution of health behaviors in reducing the burden of cancer in our communities.

According to national behavioral survey prevalence data presented in Table 1, adults in the US are not taking full advantage of these cancer prevention opportunities

with a significant proportion of the population still engaging in unhealthy behaviors that contribute to cancer risk (American Cancer Society, 2004). In addition, the prevalence of these behaviors varies by racial/ethnic group. Across most behaviors, American Indians/Alaska Natives have the worst outcomes with respect to cancer prevention, while Asian Americans have the best outcomes for primary prevention and Whites have the best outcomes for secondary prevention. However, there is some variation when specific behaviors are considered. For example, among women, non-Hispanic White women have the lowest prevalence of no leisure-time physical activity and Hispanic and African American women have the highest rates; for cervical cancer screening, African American women have the best outcomes for recent screening while Asian American women have the worst outcomes. As the data is presented by aggregate racial/ethnic group, this may mask the heterogeneity within these groups.

Table 1. Prevalence of Major Cancer Risk Factors and Screening Utilization by Race/Ethnicity among Adults 18 and Older, United States, 2000.

Characteristic	Current Smokers (%)		Reporting No Leisure-Time Physical Activity (%)		Obese (%)	
Race/ethnicity	Men	Women	Men	Women	Men	Women
White (non-Hispanic)	25.7	23.0	33.1	36.8	21.3	19.6
African American (non-Hispanic)	25.5	20.4	47.3	55.7	24.4	35.9
Hispanic/Latino	23.2	12.8	51.9	56.5	23.0	26.1
American Indian and Alaska Native	27.4	38.6	46.5	52.1	38.9	43.2
Asian American	19.6	7.9	29.1	42.1	6.0	8.3
Characteristic	Mammography prevalence in women ≥ 40		Colorectal cancer screening in adults ≥ 50		Pap test in women ≥ 18	
Race/ethnicity	(within 2 years)	(within last year)	Fecal occult blood test	Endoscopy	(within 3 years)	
White	72.1	56.9	18.3	31.1	83.9	
African American	68.2	52.8	14.9	27.0	85.5	
Hispanic/Latino	62.6	48.0	9.8	21.8	77.9	
American Indian and Alaska Native	52.0	36.6	14.0	25.2	78.4	
Asian American	57.0	47.8	14.5	19.2	68.2	

Source: (American Cancer Society, 2004).

Social justice framework

The discourse on cancer disparities has been evolving and more recently the issue of cancer disparities has been framed within a social justice perspective. At a national cancer control meeting, Thomas Perez, from the Office of Civil Rights within DHHS, set the tone by framing the elimination of racial/ethnic health disparities as a social justice issue (Perez TE, 2001). Building on this framework, others have drawn attention to the importance of context. For example, Harold Freeman through his leadership in cancer control efforts at the National Cancer Institute as well as the American Cancer Society has underscored the importance of understanding the circumstances in which cancer occurs, paying particular attention to poverty, culture, and social injustice as key determinants of cancer disparities (Freeman HP, 2004). Dr. Freeman defines social injustice to include racial injustice, both historical and current.

The importance of context is also recognized by other cancer control leaders (Ward E et al., 2004; Rakowski W & Breslau ES, 2004; Meissner HI et al., 2004). In recent reviews of cancer screening, Rakowski et al and Meissner et al acknowledge the importance of understanding the full context of cancer screening which includes geographical and societal phenomena (Rakowski W & Breslau ES, 2004; Meissner HI et al., 2004). These experts recommend the evaluation of the contextual effects on individual health behaviors, morbidity and mortality using ecological frameworks. They underscore the importance of such an approach for studying screening and follow-up services, as they may be influenced, in particular, by social and health services characteristics at the environmental level. Another advantage of these frameworks is that they also allow for the consideration of interactions that may occur across levels (e.g.,

individual and area). The conceptualization of screening as resulting from the interaction between the social and physical environments and the individual sets up a framework with multiple pathways through which the environment influences individual behavior (Meissner HI et al., 2004). However, many of these pathways have not yet been identified and explored. Even in the broader racism/segregation literature, this need to better understand how social factors influence individual beliefs and behaviors which ultimately affect health is echoed (Williams DR, 1999). In addition, health behaviors have been hypothesized as a critical pathway through which perceptions of discrimination can influence health (Williams DR, Neighbors HW, & Jackson JS, 2003).

Using contextual frameworks facilitates a shift from individual level determinants to more fundamental causes of disease or health. A fundamental cause is defined as one that "involves access to resources, resources that help individuals avoid disease and their negative consequences through a variety of mechanisms [and] social conditions as factors that involve a person's relationship to other people" (Link BG & Phelan J, 1995)—p.81. Research questions developed from these frameworks center around identifying the social patterning of disease or health by a variety of factors including SES, gender, race/ethnicity, marital status, population density, and religion. Link & Phelan recognize the importance of not just considering how risk factors influence health, but to also look more broadly and understand the conditions that place people at risk or 'contextualizing risk factors' (Link BG & Phelan J, 1995). Some of the challenges to addressing these social conditions have been identifying mechanisms that connect these social conditions to health and illness. Several frameworks are available within the public health literature to address this including the ecosocial theory, social networks model, and King and

Williams' framework for understanding racial disparities in health (Krieger N, 2000; Berkman LF & Glass T, 2000; King G & Williams DR, 1995). Another challenge in furthering the understanding of racial/ethnic cancer disparities is data. The availability of data on racial/ethnic minority groups other than African Americans is often quite limited. Thus, many studies have focused on Black-White disparities due to these data limitations, with a smaller body of evidence emerging more recently on Hispanics and Asians. This has also resulted in a discourse of disparities based on comparisons of Black and White communities with the assumption that much of the findings are generalizable to other racial/ethnic minorities (Krieger N, 2001; Gee GC, 2002; Kagawa-Singer M, 2001).

Purpose of study

Given the current discourse on disparities in cancer control as outlined above, the following study was conducted to address some of these emerging questions in the cancer disparities literature. The goal of this study is to assess the relationship between racism and cancer risk, taking into consideration both individual and area level effects as well as potential cross-level interactions. In addition, this relationship will be assessed for the five main aggregate racial/ethnic groups. Racism will be measured at both the individual and area level using measures of perceived racism and race-based residential segregation, respectively. Cancer risk will be measured using a set of primary (e.g., tobacco use, physical inactivity) and secondary (e.g., lack of early detection) cancer risk behaviors.

This study has three research aims:

1. To describe the prevalence of perceived racism and assess whether it varies across racial/ethnic groups.

2. To evaluate the relationship between perceived racism and behavioral cancer risk behavioral profiles.
3. To apply a multilevel framework to evaluate contextual effects that may further explain the relationship between racism and behavioral cancer risk profiles.

Study design and analyses

Using cross-sectional data primarily from the 2003 California Health Interview Survey and the 2000 US Census, this study draws from over 35,000 adult respondents representing the five main aggregate racial/ethnic groups in California. Descriptive investigations for Research Aim 1 were conducted using univariate and bivariate statistics to assess the prevalence of perceived racism for the total study sample as well as for each racial/ethnic group. Simple logistic regression equations were used to estimate associations between exposure to perceived racism and individual/community characteristics. For Research Aim 2, linear regression equations were utilized to estimate the individual level effects of perceived racism on behavioral cancer risk profiles. For Research Aim 3, multilevel linear regression equations were utilized to estimate fixed effects of segregation on cancer risk profiles as well as random effects at the county level.

Dissertation Outline

This dissertation is organized into several chapters. The first chapter provides the background literature review, focusing on primary and secondary cancer risk behaviors and racism (both perceived racism and race-based residential segregation). The second chapter goes on to describe study design and methods which includes information on the 2003 California Health Interview Survey and the issues related to using survey data as

well as a multilevel framework. The next three chapters provide detailed results for each of the research questions. The last chapter provides a brief summary of the study findings and concludes with a discussion of the interpretation and implications of these findings as well as strengths and limitations of the study.

Chapter 2: Background/Literature Review

This section presents relevant background literature for this study on the relationship between racism and cancer risk behavioral profiles. First, a discussion of cancer risk factors and a framework for understanding behavioral risk factors is presented. Next, the various conceptualizations of racism are presented from the social sciences literature. Then, the potential factors and mechanisms that may explain the association between racism and cancer risk are presented. This section concludes with a summary of the literature on racism and cancer risk and the research questions of this study.

Cancer control

Key components of cancer control

Cancer is the second leading cause of death in the US accounting for 1 in 4 deaths; for Americans under 85 years it is the leading cause of death (American Cancer Society, 2004; Brody J, 2005; American Cancer Society, 2005a). It has been estimated that 50-90% of these deaths can be prevented through cancer control efforts that reduce cancer risk behaviors such as smoking, physical inactivity, poor dietary habits, and the lack of participation in the early detection of breast, cervical and colorectal cancers (American Cancer Society, 2004; Satcher D, 2001; Kagawa-Singer M, 2001).

Below are two definitions of cancer control from leading health and cancer organizations:

- The World Health Organization (WHO): "a public health approach aimed at reducing causes and consequences of cancer by translating our knowledge into practice" (World Health Organization, 2005).

- The American Cancer Society: "a broad array of organized activities at the local, state, regional or national level that have a positive impact on reducing the human burden of cancer" and describes it as "[encompassing] prevention, detection, treatment and support to cancer patients, their families and their caregivers, and survivorship issues through the end of life" (American Cancer Society, 2005b).

These definitions describe the comprehensive scope of cancer control that not only ranges from primary to tertiary prevention, focused on addressing lifestyle and screening risk behaviors, but also includes quality of life issues, such as survivorship and palliative care.

Cancer Behavioral Risk Factors

The National Cancer Institute (NCI) offers the following definition for cancer prevention (National Cancer Institute, 2005a):

> "the reduction of cancer mortality via reduction in the incidence of cancer. This can be accomplished by avoiding a carcinogen or altering its metabolism; pursuing lifestyle or dietary practices that modify cancer-causing factors or genetic predispositions; and/or medical intervention (chemoprevention) to successfully treat pre-neoplastic lesions".

As such, cancer prevention involves addressing a wide range of risk factors including genetics, environmental factors, lifestyle behaviors, and medical interventions; these are described in Table 2. While specific pathways between these risk factors and specific cancers are still being identified and/or delineated, the collective body of evidence supports these factors as overarching cancer risk factors.

Table 2. Summary of factors that may contribute to cancer risk profiles.

Type of cancer risk factors	*Specific examples*
Genetics	-familial/inherited factors -genetic mutations
Hormonal/reproductive factors	-hormones and hormone receptors -reproductive factors
Infections	-herpes simple virus 2 -human papilloma virus -viruses/retroviruses -bacterial infections (e.g., H.pylori)
Medical conditions/treatments	-associated malignancies -anticancer drugs -immunosuppressives and other drugs -ionizing radiation
Early detection (lack of participation)	-breast cancer: mammography/CBE -cervical cancer: Pap test -colon cancer: FOBT, sigmoidoscopy, colonoscopy -prostate cancer: PSA
Lifestyle behaviors	-cigarette smoking -poor diet -physical inactivity -alcohol consumption -obesity (anthropometric measures)
Socio-cultural factors	-social class/position -immigration and acculturation
Environment (residential and occupational)	-air and water pollution -pesticides -solar radiation -occupation
Other	-peri-natal factors

Source: (American Cancer Society, 2004; National Cancer Institute, 2005a; Centers for Disease Control and Prevention, 2005; Haynes MA & Smeldey BD (eds.), 1999; Harras A et al., 1996).

This study focused on modifiable behavioral risk factors, including lifestyle and early detection behaviors, which contribute to the cancer burden in the United States. The Institute of Medicine's report, *Fulfilling the Potential of Cancer Prevention and Early Detection*, supports such prioritization (Curry SJ, Byers T, Hewit M (eds.), & Institute of Medicine, 2003)—p.1:

> "To save the most lives from cancer, health care providers, health plans, insurers, employers, policy makers, and researchers should be concentrating their resources on helping people to stop smoking, maintain a healthy weight and diet, exercise regularly, keep alcohol consumption at low to moderate levels, and get screened for breast, cervical, and colorectal cancer. The health benefits of such behavioral changes extend beyond cancer to cardiovascular disease and diabetes as well.

> Such efforts may also help alleviate the disproportionate burden of cancer borne by members of racial/ethnic minority groups."

These same priorities are also underscored by other cancer control agencies, such as the American Cancer Society, the Centers for Disease Control and Prevention, as well as cancer control research experts (Freeman HP, 2004; American Cancer Society, 2004; McDonald CJ, 2001; Kagawa-Singer M, 2001). In addition, expert reviews of such behaviors using evidence-based medicine approaches have recognized these behavioral risk factors and the opportunity for reducing the cancer burden by changing these behaviors towards the prevention spectrum. For example, according to evidence-based medicine guidelines, Pap test, fecal occult blood test (FOBT), and mammography have been proven as effective screening tools with a high grade of evidence (Hengstler P, Battegay E, Cornuz J, Bucher H, & Battegay M, 2002; The Agency for Healthcare Research and Quality, 2005). Those who are not participating in these screenings are increasing their risk for cancer by decreasing their chances of finding precancerous lesions and/or early stage malignancies which are most likely to be treated successfully. Similarly, with lifestyle behaviors, guidelines support reducing cancer risk through the reduction of these risk behaviors and the uptake of behaviors such as healthy diets, regular exercise, healthy weight, and avoiding tobacco use; however, the level of evidence from an evidence-based medicine framework is not as strong for this set of behaviors with the exception of the relationship between tobacco use and cancer (i.e., the type of studies or the strengths of the associations are not as high) (Hengstler P et al., 2002; The Agency for Healthcare Research and Quality, 2005).

Determinants of cancer risk behaviors

Both primary and secondary cancer risk behaviors have been widely studied in a variety of settings (schools, worksites, communities, clinics, health care systems) with a variety of populations (e.g., minority groups, low-income groups, youth/elderly, insured). The Health Belief Model is one of the most widely used health behavior theories in understanding these behaviors (Baker F, 1998; Womeodu RJ & Bailey JE, 1996; National Cancer Institute, Behavioral Research, & Cancer Control and Population Sciences, 2005). Other theories that have been applied to this set of research questions include the Social Learning Theory, the Transtheoretical Model (or Stages of Change Theory), Stress Theory, Social Network, Ecosocial theory, the Andersen Emerging Health Behavior Model, and the Attitude-Social Influence-Efficacy (Baker F, 1998; Freeman HP & Chu KC, 2005; Womeodu RJ & Bailey JE, 1996; Ogedegbe G et al., 2005; National Cancer Institute et al., 2005). These theories tend to focus on the individual's characteristics and processes that occur within the individual. In some cases attention is given to the roles of interpersonal relationships with family/friends and health care providers, the role of the health care system as well as that of the physical and social environments.

Building from these theories, the recognized constructs involved in reducing or avoiding the practice of cancer risk behaviors and in the uptake and maintenance of preventive cancer behaviors include a broad range of factors, not limited to individual factors but also including the fundamental causes as well. At the individual level, these include knowledge, attitudes, and beliefs regarding health and cancer, perceived susceptibility, perceived severity, perceived benefits, perceived barriers, previous behaviors and intentions, self-efficacy, motivation and readiness, fear/fatalism, culture,

cultural explanatory models, access to health care, coping mechanisms or skills, psychological resources, competing priorities, locus of control and demographic characteristics (e.g., age, gender, race/ethnicity, SES) (Freeman HP & Chu KC, 2005; Womeodu RJ & Bailey JE, 1996; Baker F, 1998; Ogedegbe G et al., 2005). Increased knowledge about cancer and the benefits of these behaviors is positively related to the uptake and maintenance of these behaviors. Other facilitators include recognition of one's susceptibility to a disease, belief, ability and support to overcome barriers to adopting and maintaining these behaviors, social support promoting these behaviors, lack of competing priorities. Barriers to the uptake and/or maintenance of these behaviors include lack of knowledge, lack of perceived susceptibility to a disease, fear, lack of trust in the ability or will of the health care system to assist you if you were to be diagnosed, and lack of resources and support to access health care systems including insurance, transportation, linguistic support, child care, time-off from work.

At the interpersonal level these include two sets of relationships: personal/social (e.g., family, friends, and community) and health care provider. Knowledge, attitudes, beliefs and practices of these entities and the nature of the relationship between these entities and the individual may influence an individual's cancer prevention behaviors (Womeodu RJ & Bailey JE, 1996; Ogedegbe G et al., 2005). For example, whether one family/friends/community support health promoting behaviors may influence the uptake of these behaviors; on the converse, lack of community support for such behaviors will prohibit the uptake of these behaviors. Relationships with providers and their interactions with the individual can influence health behaviors, particularly those regarding cancer screenings (Womeodu RJ & Bailey JE, 1996; Ogedegbe G et al., 2005).

With providers, good communication is known to facilitate uptake of health promoting behaviors as is trust in the provider. In addition, the provider's practices (e.g., recommendations), beliefs in the behaviors and regarding the patient's intention/ability to execute the behaviors may influence how the physician interacts with the individual regarding these behaviors. The provider's priorities may also influence this (priorities with respect to prevention but also priorities with regards to populations).

At the health care system level, there are several domains that may influence an individual's uptake/practice of cancer prevention behaviors including delivery of appropriate screenings, accessibility and acceptability of facilities, priorities (Womeodu RJ & Bailey JE, 1996; Ogedegbe G et al., 2005; Freeman HP & Chu KC, 2005). If a health care system does not follow or offer the full array of cancer screenings, this can limit an individual within that health care system from participating in timely early detection and thus reducing their risk for cancer mortality and/or incidence. In addition, if the health care system is not accessible to all its service population due to its location, lack of transportation, limited language skills this will also limit the opportunity for these persons to take advantage of cancer prevention behaviors. Further, poor community relations/acceptability of the system due to poor reputation or mistrust, history of racial profiling or discrimination and limited treatment of uninsured/underserved populations also can contribute to uptake of such behaviors. Finally, if the system does not prioritize prevention, including promotion of cancer prevention behaviors, individuals will be less likely to uptake these behaviors. Costs/reimbursements for these services may also be compromised shaping providers priorities and practices.

The environment plays a role in the uptake or practice of health behaviors. The physical environment may facilitate health promoting activities such as walking through availability of safe sidewalks, parks, open-spaces or may present barriers with unsafe environments, toxic exposures or other competing priorities or facilitating risk promoting behaviors such as sedentary lifestyle and poor dietary choices (Freeman HP & Chu KC, 2005). Sociopolitical environment may promote healthy behaviors through implementation of policies such as smoke-free zones in schools, workplaces, and social settings such as restaurants/bars. In addition, policies against advertising of smoking, alcohol consumption can also promote healthier behaviors by limiting cues for these behaviors or limiting access to these products. These types of interventions also set social norms regarding these behaviors which may also influence individual's behaviors (Ogedegbe G et al., 2005; Womeodu RJ & Bailey JE, 1996; Freeman HP & Chu KC, 2005).

Perceived racism

Racism has been a topic of research in the social sciences as it occurs in and affects individuals across many domains in life, e.g., housing, education, employment, criminal justice, civic participation and health (National Research Council, 2004; Smedley M, Stith AY, and Nelson AR, & (eds). Committee on Understaning and Eliminating Racial and Ethnic Disparities in Health Care. Board on Health Sciences Policy. Institute of Medicine of the National Academies, 2003; Rosenbaum S, Markus A, & Darnell J, 2000; Perez TE, 2001; Krieger N, 2000). In general, the scope of this literature includes the study of racist attitudes, beliefs, perceptions, behaviors, practices, and policies as well as the effect of racism on various social and health outcomes. As the focus of this study is exposure to racism in general and within health care, the background presented here will be limited to the prevalence of perceived racism and the consequence of this exposure on the individual's health and health behaviors.

Discrimination and racism

There are several definitions and conceptualizations of racism given the broad scope and multidisciplinary nature of the research conducted on it. A common conceptualization within sociology is of racism as an ideology, especially pivotal in setting up race relations in the U.S. (Kendall J & Hatton D, 2002):

> "Racism involves more than just race. Commonly described as a system of oppressive ethnic and race relations in which one social group benefits from dominating another, broader definitions depict racism as those beliefs, attitudes, and acts that are inherent in dominant culture and routinely are created and reinforced through everyday practices for the purpose of justifying unequal treatment of members of a group identified as inferior. As an ideology, racism is historically situated and deeply rooted in the socioeconomic and political realities of American society and serves to reify the belief that one group should have power and control over another group."

In the United States, racist ideology has played a role as far back as its history goes. Many historians describe racism, in modern history, as growing and flourishing during the time of European colonialism. Racism is considered to be a tool that was used for social ordering and social interaction, as a means to establish superiority and inferiority among population groups (Williams DR, 1997; Thomas SB, 2001). Racism persists in our societies today with the continued support of such ideologies (Kagawa-Singer M, 2001).

In anthropology, especially medical anthropology, Kagawa-Singer defines racism as the racialization of interactions, "the assertion of power, ego fulfillment, and status at the expense of others based on skin color (color-coded groups). Thus color-coded groups in a multicultural society are disadvantaged socially and are aware of their hierarchical status" (Kagawa-Singer M, 2001)—p.228-229. Racialization has been defined as "the social process which creates the conditions for groups to be recognized as races and which makes racism possible. Racialization involves the negative evaluation of particular somatic features and the assignation of individuals showing those features to a general category which is seen to reproduce itself biologically" (Bradby H, 2003)—p.11. Within her taxonomy of discrimination in the US, Krieger conceptualizes racism as the justifying ideology for a type of discrimination based on race/ethnicity between the dominant, White or Euro-Americans, and the subordinate, 'people of color', groups which results in a variety of inequalities (Krieger N, 2000).

Recently, the National Research Council brought together experts from across the social sciences to offer consensus recommendations on the use of racism as a research

construct. This group offers the following definition of racism which includes two components (National Research Council, 2004)—p.39:

> "(1) differential treatment on the basis of race that disadvantages a racial group and (2) treatment on the basis of inadequately justified factors other than race that disadvantages a racial group (differential effect)."

This definition of racism excludes attitudes and beliefs (e.g., prejudice and stereotypes) and focuses on behaviors and processes that result in differential treatment and differential effect (National Research Council, 2004). In addition, the National Research Council offers a taxonomy of racist acts which is described in detail in Table 3.

Table 3. Racism Taxonomy.

Intentional discrimination	"Sequential steps by which an individual behaves negatively toward members of another racial group: verbal antagonism, avoidance, segregation, physical attack, and extermination" (National Research Council, 2004)—p.57
subtle discrimination	"a set of often unconscious beliefs and associations that affect attitudes and behaviors of members of the ingroup toward members of the outgroup" (National Research Council, 2004)—p.59
statistical profiling	"use of overall beliefs about a group to make decisions about an individual from that group; the perceived group characteristics are assumed to apply to the individual" (National Research Council, 2004)—p.61
structural discrimination	Processes that "function in a way that leads to differential racial treatment or produces differential racial outcomes" (National Research Council, 2004)—p.63

It is worthy to note that this definition, although similar to that of the US legal system, has some key differences. The US legal system has defined discrimination as having two components: disparate treatment and disparate impact (National Research Council, 2004). The former is tied into the "constitutional requirement of equal protection under the law" (National Research Council, 2004)—p.50 as codified in Title VI of the 1964 Civil Rights Act, such that race should not be a motivating factor for

disparate treatment (National Research Council, 2004; Rosenbaum S et al., 2000; Perez TE, 2001). The latter is a broader notion of discrimination which makes unlawful racially neutral practices that result in an adverse impact on members of a protected group. These two address both intentional and structural discrimination as defined above by the National Research Council; however, there is little recourse for more subtle forms of discrimination within the legal system.

Within health-related research, there are still more variations on the conceptualizations of racism. Three common conceptualizations within the health literature include treating racism as a stressor, as being realized through patient/provider interactions, and as a social force or structure. As a stressor, racism is conceptualized as influencing an individual's health through psychological and physiological processes that may occur in response to the stressor (Williams DR, 1997; Ellison GL et al., 2001; Bird ST & Bogart LM, 2001). Racism has also been described as the 'biological expression of race relations' suggesting that exposure to racism can have deleterious effects on our biology through physical and psychological pathways (Krieger N, 2003). In the context of patient/provider interactions, racism is conceptualized as stemming from provider attitudes and behaviors and resulting in differential treatment that may lead to poor health outcomes for patients (Smedley M et al., 2003; Williams DR et al., 2003; Bird ST & Bogart LM, 2001).

Racism as a social force or structure is represented as a characteristic of society that can shape racial/ethnic minority communities' exposure to social and physical environments such as economic, social and health opportunities, and/or their interactions with other groups of individuals (Nazroo JY, 2003; Williams DR, 1997). Also within the

health literature, racialization, or the racial classification of persons has been conceptualized as a means to establishing social hierarchy, or relative ranking, in the US; the consequences include varying levels of access to social and economic resources across these groups and the setting up of class structures (Willis DP, 2001; Oppenheimer GM, 2001; Williams DR, 1999; Williams DR, 1997). Racism has also been conceptualized as a means to social exclusion which can result in both material deprivation as well as limited social and psychological resources (Karlsen S & Nazroo JY, 2002; Wilkinson R & Marmot M (eds), 1998).

Given these various conceptualizations of racism, a variety of measures have been developed and utilized in the literature. Previously, both Krieger and Williams et al in previous reviews of the literature were unable to identify a criterion measure for racism (Krieger N, 2000; Williams DR et al., 2003). More recently, in 2005, Krieger et al reported on a revised measure of perceived racism called the "Experiences of Discrimination" as a strong instrument with proven validity and reliability among working class African-Americans and Latinos (Krieger N, Smith K, Naishadham D, hartman C, & Barbeau EM, 2005). Table 4 and Table 5 below provide a sample of commonly used measures of racism, starting in Table 4 with the most common measure. These tables include the reported prevalence of racism as well as the study populations.

Table 4. Measure of perceived racism.

Q: Have you ever experienced discrimination, been prevented from doing something, or been harassed or made to feel inferior in any of the following six situations because of your race or color?												
	Krieger, 1990 (Krieger N, 1990)*		Krieger & Sydney, 1996 (Krieger N & Sydney S, 1996)**				Broman, 1996 (Broman CL, 1996-1997)***	Watson et al, 2002 (Watson JM, Scarinci IC, Klesges RC, Slawson D, & Beech BM, 2002)****‡		Kreiger et al, 2005 (Krieger N et al., 2005)++		
	Black	White	Black		White		Black	Black	White	Black	Latino	White
	Women	Women	Women	Men	Women	Men	Adults	Women	Women			
At school	35.30%	4.00%	32%	33%	10%	8%	23%	40%	15%	21%	9%	10%
Getting a job	49.00%	4.00%	45%	53%	5%	8%	29%	45%	10%	28%	20%	14%
At work	52.90%	4.00%	52%	55%	8%	6%	3%	50%	15%	19%	14%	12%
Getting housing	33.30%	2.00%	30%	32%	2%	1%	40%†	20%	0%	26%	11%	10%
Getting medical care	25.50%	0.00%	14%	13%	1%	1%		15%	4%	17%	14%	6%
On the street or in a public setting	N/A	N/A	59%	66%	23%	21%		N/A	N/A	32%	24%	15%
From the police or in the courts	15.70%	4.00%	27%	58%	2%	4%	14%	25%	5%	22%	18%	6%
Other								5%	0%			
Total Yes responses												
0	33.30%	84.00%	23%	16%	69%	70%						
1-2	25.50%	16.00%	29%	27%	26%	25%						
≥ 3	41.20%	0.00%	48%	57%	5%	4%						
Total (≥1)							59.90%	69%	29%			

*African-American and White women, 20-80 years, in Oakland, CA (via telephone survey)
**Black and White adults, 25-37 years, from Birmingham, AL, Chicago, IL, Minneapolis, MN, and Oakland, CA (via self-administered questionnaire)
***African-American adults living in non-institutionalized housing in Detroit, MI (via telephone survey); Q: refers to experiences in the past 3 yrs
† At home (vs. getting housing)
****Women, 18-39 years old (black and white) in Memphis, Tennessee
‡ percentages are rounded to the nearest 5th (e.g., 0%, 5%, or 10%)
++working class adults, 25-64 years in Greater Boston, MA via Audio-Computer Assisted Self-Interview

Table 5. Other common measures of racism

Authors	Question(s)	Study population	Prevalence of racism
Bennett et al, 2005 (Bennett GG, Yaus Wolin K, Robinson EL, Fowler S, & Edwards CL, 2005)	Indicate whether any of the following have happened to you within the last year while you were in and around campus: ethnic or racial harassment	Persons 17-53 years from historically Black colleges and universities in North Carolina	10.29% reported racial harassment
Karlsen et al, 2002 (Karlsen S & Nazroo JY, 2002)	In the last 12 months, have you been attacked for reasons to do with race or color? No; experience of verbal abuse; experience of physical attack on the person or the destruction or vandalism of his or her property	People of Caribbean, South Asian, and Chinese origin in the United Kingdom and Whites (via survey)	13% reported being attacked (10% verbal abuse; 3% physical attack)
Gee, 2002 (Gee GC, 2002)	Now, thinking over your whole life, have you ever been treated unfairly or badly (1) because of your race or ethnicity and (2) …because you speak with a different language or you speak with an accent?	Adult Chinese American residents in Southern California	21% reported perceived racism
Kessler et al, 1999 (Kessler RC, Mickelson KD, & Williams DR, 1999)	Lifetime perceived discrimination: -How many times in your life have you been discriminated against in each of the following ways because of such things as your race, ethnicity, gender, age, religion, physical appearance, sexual orientation, or other characteristics?	Adults, 25-74 years, (via national general population survey)	Of the total Sample: 37.1% Race/Ethnicity: -Non-Hispanic White: 21.1% -Non-Hispanic Black: 89.7% -Other: 76.6%

Table 5 (continued)

Authors	Question(s)	Study population	Prevalence of racism
Noh et al, 2003 (Noh S, Beiser M, Kaspar V, Hou F, & Rummens J, 1999)	When people insult other people, make fun of them, or treat them unfairly because they belong to a certain racial/ethnic group, this is called discrimination. This may happen to people who are not born in Canada, or speak another language, or look different. The next few questions are about this type of discrimination. 1) hit or handled roughly, 2) insulted or called names, 3) treated rudely, 4) treated unfairly 5) threatened 6) refused services in a store or restaurant or subjected to delays in services, and 7) excluded or ignored 8) was anyone in family ever been discriminated against in any way	Korean immigrants residing in Toronto, Ontario, Canada (via mail-in survey)	-<16.5%: they had never been discriminated against because of their racial/ethnic background -0%: experienced any form of discrimination all of the time - >40%: they had been insulted or called names, treated rudely or treated unfairly -20%-25%: experienced discrimination a few times or many times in terms of receipt of services -35%: members of their family had been discriminated against more than once -7%: experienced incidence of hitting or rough handling with 2.4% reported more than one such incident -24.2%: experienced being threatened at least once, and 14% reported more than one such episode.

Experience of perceived racism

Based on empirical evidence, prevalence of perceived racism varies by sociodemographic characteristics as well as geographic location. Findings from studies reported in Table 4 and Table 5 suggest that prevalence of perceived racism for African-Americans range 59% to 84%; for Hispanics/Latinos the prevalence is approximately 90%; for Asian Pacific Islanders the range is 7% to 40%; for Whites the range is 16% to 31%. No data was available for American Indian/Alaskan Natives.

These studies also attempted to identify predictors of racism (Gee GC, 2002; Blanchard J & Lurie N, 2004; Levin S, Sinclair S, Veniegas RC, & Taylor PL, 2002; Bennett GG et al., 2005; Kessler RC et al., 1999; Krieger N, 1990; Krieger N & Sydney S, 1996; Barnes LL et al., 2004). The experience of racism is more likely to be reported by the following groups:

- Age: younger vs. older (Kessler RC et al., 1999);
- Gender: males vs. females (Bennett GG et al., 2005; Krieger N & Sydney S, 1996); females vs. males (Levin S et al., 2002); similar (Kessler RC et al., 1999; Blanchard J & Lurie N, 2004);
- Race/ethnicity: minority racial/ethnic groups (African Americans) vs. Whites (Watson JM et al., 2002; Kessler RC et al., 1999; Krieger N, 1990; Barnes LL et al., 2004); African Americans vs. Hispanics vs. Whites (in that order) (Levin S et al., 2002); African Americans & Hispanics vs. Asians vs. Whites (in that order) (Blanchard J & Lurie N, 2004);
- Primary language: no difference between non-English vs. English (Blanchard J & Lurie N, 2004);

- Socioeconomic position indicators:
    - for income and education, there were mixed findings: no statistically significant trends were reported (Watson JM et al., 2002; Blanchard J & Lurie N, 2004); more educated vs. less educated (Gee GC, 2002);
    - For occupation, full-time vs. part-time (Bennett GG et al., 2005);
- Insurance status: uninsured vs. insured (Blanchard J & Lurie N, 2004).

Racism and health

In this section, the factors involved in the pathways between racism and cancer behaviors will be presented. The factors will be drawn from relevant empirical evidence as well as existing theories employed in the cancer control literature. While in recent years, focus on the relationship between racism and cancer control, and in particular cancer disparities, has been increasing, limited attention has been given to the impact of racism on cancer risk behaviors. Much of the literature has focused on cancer mortality, survival and treatment/follow-up services for breast, prostate, colorectal and lung cancers (Earle CC, Venditti LN, & Neumann PJ et al., 2000; Freeman HP, 1993; Lopez EDS, Eng E, Randall-David E, & Robinson N, 2005; Mandelblatt JS, Kerner JF, & Hadley J et al., 2002; Michaels D, 1983). Most studies have used cross-sectional or case-control study designs. In addition, some studies which have not directly measured racism, do attribute some of the unexplained variance in their outcomes to racism based on the assumption that all other relevant variables have been specified and accounted for within their models (Krieger N, 2000).

Due to the limited literature on racism and cancer control, the larger body of literature on racism and health will also be included to add to the understanding of the

relationship between racism and cancer risk. The main theories and frameworks that were drawn upon include the ecosocial theory, the theory of relative deprivation, the theory of allostatic load, the Andersen emerging Health Behavior Model, and contextual effects (Krieger N, 2000; Krieger N, 2001; Ellison GL et al., 2001; Diez-Roux AV, 2002; Bradley EH et al., 2002; Birt CM & Dion KL, 1987). In the following section, relevant factors identified from these theories and empirical studies have been organized and described as individual and area level factors and potential mediators/moderators.

Main pathways

1. Psychosocial stress theory

At the individual level, perceived racism can result in stress or emotional responses, directly as a response to the exposure or through the consequences of racism (e.g., limited socioeconomic opportunities) contributing to stress (Williams DR et al., 2003; Kendall J & Hatton D, 2002; Ellison GL et al., 2001). This exposure to stress may result directly in poor cancer health outcomes, ranging from tumor growth to negative health behaviors (Ellison GL et al., 2001). For example, an individual who perceives being discriminated against because of their race/ethnicity may then experience stress and then engage in unhealthy behaviors such as poor diet, smoking, alcohol or other substance use which are recognized cancer risk factors as discussed earlier.

Potential mediators of this psychosocial pathway include coping mechanisms, social and psychological resources and other stressors. Some of these responses to racism, such as internalized oppression or harmful use of psychoactive substances, can result in poor health outcomes. Other responses such as reflective coping, active resistance, and community organizing can buffer the negative health outcomes of racism (Krieger N, 2003; Krieger N, 2000). Some research indicates that certain social factors

(e.g., social support/social network) can mediate the relationship between racism and health behaviors (Gee GC, 2002; Krieger N, 2000). In contrast, for some individuals experiencing racism, social support or social networks can influence their choice of coping mechanisms and help them avoid unhealthy behaviors. These social factors may also reinforce positive healthy behaviors such as timely screening, exercise, and healthy eating.

2. Racism as social structure

In addition, perceived racism has been shown to operate through socioeconomic position shaping an individual's access to education, employment as well as income and wealth (Krieger N, 2003; Williams DR, 1999; Gee GC, 2002; Williams DR, 1997; Smedley M et al., 2003; Karlsen S & Nazroo JY, 2002; Hiatt RA, Klabunde C, Breen N, Swan J, & Ballard-Barbash R, 2002; Krieger N, 2000). These resources can then shape an individual's access to health insurance and primary health care services such as cancer screenings (Krieger N, 2003; Ward E et al., 2004; American Cancer Society, 2004; Krieger N, 2000). Racism can also directly result in differential access to health care, utilization, and treatment (Rao RS, Graubard BI, Breen N, & Gastwirth JL, 2004; Kagawa-Singer M, 2001). For example, racist ideology could directly affect whether someone is offered access to care or is able to use services. Racism can also limit one's access to income and education which could then limit one's ability to obtain health insurance coverage and thus limit one's access to appropriate and high-quality early detection (Ward E et al., 2004; American Cancer Society, 2004; Krieger N, 2000).

3. Immigration and acculturation status

There are several potential confounders or moderators that have been identified for the relationship between racism and cancer prevention within the reviewed literature. Immigration and acculturation have been documented in the literature as influencing screening utilization as well as other health behaviors (Ward E et al., 2004; American Cancer Society, 2004; Smedley M et al., 2003; Perez TE, 2001; Kagawa-Singer M, 2001). One explanation is the cultural and behavioral differences between recent immigrants and those who have resided in the US for a longer period of time (e.g., second, third, or fourth generations) (Fuller KE, 2003). Immigration status is hypothesized as being very important to Asian and Hispanic groups given that a significant proportion of them are foreign born (Williams DR, 1999; Gee GC, 2002). As these racial/ethnic aggregate groups are insensitive measures that are unable to capture the diversity within these socio-politically constructed groups, the inclusion of such concepts as immigration and acculturation may help tease some of this out (Willis DP, 2001; Centers for Disease Control and Prevention, 1993; Nazroo JY, 2003; Williams DR, 1999).

4. Other factors

Individual responses to racism may be mediated and/or moderated by sociodemographic factors including age, gender, as well as race/ethnicity (historical trajectories) (Hiatt RA et al., 2002; Nazroo JY, 2003; National Research Council, 2004). Additionally, length of residence and type of residence (e.g., urban/suburban/rural) are also important demographic factors (O'Campo P, 2003). Experts on discrimination also propose that the effect of racism will vary based on the context of the experience (National Research Council, 2004). For example, it will be dependent on the domain in

which it is occurring, who the actors or perpetrators of the racism are as well as who the targets or recipients are. In addition, type of discrimination will also influence the effect, i.e., verbal or physical attacks will have a different effect than discrimination manifested via socioeconomic disadvantage.

Segregation

Some researchers suggest that several of these varying conceptualizations are dimensions of a single concept of racism that includes institutional, interpersonal/individual, and internalized racism (Jones CP, 2000; Krieger N, 2003; Acevedo-Garcia D, Lochner KA, Osypuk TL, & Subramanian SV, 2003). Most conceptualizations recognize at least two dimensions of racism: interpersonal or individual-level interactions resulting in discriminatory practices and institutional processes that promote discrimination (Karlsen S & Nazroo JY, 2002; Williams DR, 1997). Internalized racism occurs when members of the minority group internalize the attitudes and/or standards of the dominant group (Jones CP, 2000). In addition, some researchers make a distinction between experienced and perceived; while others argue that racism is subjective and so it is impossible to separate these two forms (Karlsen S & Nazroo JY, 2002). Of these dimensions, there is consensus among researchers that the most critical to health is institutional racism (Williams DR, 1997; Nazroo JY, 2003; Smedley M et al., 2003; Williams DR et al., 2003; Carlson ED & Chamberlain RM, 2004; Jones CP, 2000). One well-recognized manifestation of institutional racism in the US is segregation (Schulz AJ, Williams DR, Israel BA, & Lempert LB, 2002; Williams DR, 1997; Williams DR & Collins C, 2001; Acevedo-Garcia D et al., 2003).

Race-based residential segregation

Segregation is defined as "the physical separation of the races in residential contexts" (Williams DR & Collins C, 2001)—p.405 and "the composition and spatial distribution of the population of an entire metropolitan area across its neighborhoods" (Acevedo-Garcia D et al., 2003)—p.215. The National Research Council defines segregation as occurring "when people actively exclude members of a disadvantaged group from the allocation of resources and from access to institutions" (National Research Council, 2004)—p.57. Segregation can occur in multiple domains including education, employment, health care and residential areas based on various factors such as age, gender, race/ethnicity, sexual orientation, etc. (Perez TE, 2001). Of these, the one that is of interest for this study is race-based residential segregation.

There are several measures of residential segregation that show distinct geographic patterns or spatial variation. Segregation has been measured at the Metropolitan Statistical Area, county, census tract block-group, and zip-code levels (Collins CA, 1999; Massey DS & Denton NA, 1988; Acevedo-Garcia D et al., 2003; Darden JT & Kamel SM, 2000; Fang J, Madhavan S, Bosworth W, & Alderman MH, 1998; Lewis Mumford Center & Logan J, 2001; Acevedo-Garcia D, 2001; Peterson & Krivo, 1999; Collins AC & Williams DR, 1999; Glaeser EL & Vigdor JL, 2001; Iceland J, Weinberg DH, & Steinmetz E, 2002). The most commonly used measures are index of dissimilarity and the index of isolation (Williams DR, 1999; Acevedo-Garcia D et al., 2003; Darden JT & Kamel SM, 2000; Collins AC & Williams DR, 1999; Lewis Mumford Center & Logan J, 2001; Glaeser EL & Vigdor JL, 2001); others include clustering, centralization and concentration (Acevedo-Garcia D et al., 2003; Massey DS

& Denton NA, 1988; Acevedo-Garcia D, 2001; Iceland J et al., 2002). These dimensions and their corresponding measures have been primarily studied in urban contexts (Massey DS & Denton NA, 1988; Acevedo-Garcia D et al., 2003; Williams DR & Collins C, 2001; Collins CA, 1999; Acevedo-Garcia D, 2001; Fang J et al., 1998; Peterson & Krivo, 1999; Collins AC & Williams DR, 1999; Lewis Mumford Center & Logan J, 2001; Iceland J et al., 2002) with limited inclusion of suburbs (Darden JT & Kamel SM, 2000; Glaeser EL & Vigdor JL, 2001).

In a seminal article on residential segregation, Massey and Denton reviewed the existing literature and evaluated 20 measures based on a five dimensional concept of residential segregation which they defined as "the degree to which two or more groups live separately from one another, in different parts of the urban environment" (Massey DS & Denton NA, 1988)—p.282. Table 6 lists these dimensions as well as definitions and common measures for each dimension. Massey and Denton recommend that residential segregation should be measured on all dimensions as each one has different social and behavioral implications. One caveat with using multiple dimensions is that even though these dimensions are conceptually distinct, empirically they tend to overlap (Massey DS & Denton NA, 1988). Evenness and exposure were the two dimensions that explained a majority of the variance when each of these dimensions were treated as independent to each other. However, when they allowed for correlation between the dimensions, they found that each of the dimensions accounted for at least 20% of the correlated variance.

In looking at non-African-American racial/ethnic minority groups' residential patterns, an alternate approach is to measure segregation based on neighborhood

composition (Acevedo-Garcia D et al., 2003; Logan JR & Zhang W, 2004). While racial/ethnic composition has been used as a proxy measure for segregation, Acevedo-Garcia argues that it not a valid measure of segregation as conceptualized above; even though this measure is linked to spatial distribution, it is limited to describing the within neighborhood characteristic of its population, whereas the residential segregation measures describe the distribution of groups across an area providing insight to how these distributions are established (Acevedo-Garcia D, 2001).

Table 6. The five dimensions of residential segregation.

Dimension	Description	Measure
Evenness	distribution of blacks and whites across neighborhoods in a given urban area, specifically the degree to which each neighborhood incorporates the same proportion of blacks and whites as the urban area overall (over/under-representation)	Dissimilarity Index
Exposure	average probability of contact between blacks and whites at the neighborhood level	P* indices (Isolation or Interaction)
Concentration	population density of the segregated group across the metropolitan area relative to the density of other groups	Relative Concentration Index
Centralization	degree to which black neighborhoods are located near the metropolitan area's central city as opposed to its suburbs (around urban core/central location)	Absolute Centralization Index
Clustering or 'ghettoization'	the degree to which black neighborhoods are contiguous to each other as opposed to dispersed across the metropolitan area (enclave/scattering)	Index of Spatial Proximity

Source: (Williams DR, 1999; Collins CA, 1999; Massey DS & Denton NA, 1988; Acevedo-Garcia D et al., 2003; Acevedo-Garcia D & Lochner KA, 2003).

Other experts suggest that once a community experiences residential segregation on more than one dimension that it then becomes a slightly different phenomenon labeled hypersegregation (Acevedo-Garcia D et al., 2003). Hypersegregation has also been

defined as "segregation in socioenvironmental dimensions such as recreational activities, church and other social gatherings" (Jackson SA, Anderson RT, Johnson NJ, & Sorlie PD, 2000)—p.615. African Americans have experienced such levels of segregation (both with respect to intensity and across multiple dimensions simultaneously), that they are considered to be the only group to have experienced this phenomenon in the US (Williams DR & Collins C, 2001; Smedley M et al., 2003; Jackson SA et al., 2000; Acevedo-Garcia D et al., 2003).

Historically, in the US, "residential segregation was imposed by legislation, supported by economic institutions, enshrined in the housing policies of federal government, enforced by the judicial system, and legitimized by the ideology of white supremacy (via churches and other cultural institutions)" (Williams DR & Collins C, 2001)—p.405. In addition, state governments also institutionalized race-based residential segregation. In California during the 1920s and 1930s, both Mexicans and Filipinos were racialized and there were state legislations segregating these communities and working towards their resettlement and repatriation (Abel EK, 2004). As a result of the Civil Rights Act of 1968, many of these explicit policies and processes legitimizing residential segregation are illegal, though studies of the housing and mortgage lending institutions shows discrimination still persists today and results in residential segregation (Williams DR & Collins C, 2001).

Studies have also revealed that segregation is not primarily a result of minority groups' residential preferences (Acevedo-Garcia D et al., 2003). In addition, the experience (prevalence and causes) of segregation are not the same or similar across US minority groups (Williams DR & Collins C, 2001). Logan and Zhang have identified two

types of neighborhoods that can be identified as ethnic neighborhoods: immigrant enclave and ethnic community. They suggest the former is the result of recent immigrants moving into neighborhoods in need of affordable housing, family ties, familiar culture, and work opportunities. These neighborhoods are often seen as starting points for these immigrants. The complementary neighborhood is the ethnic community which they define as being established in more desirable neighborhoods as a result of more recent waves of immigrants who have come to the US with a certain level of resources and human capital. Acevedo-Garcia, suggests looking within Hispanic and Asian groups to see if residential segregation is associated with immigration status (Acevedo-Garcia D et al., 2003).

Studies on segregation have predominantly focused on the experiences of racial/ethnic minority communities. There has been some focus on the segregation experiences of Whites, most commonly measured by the Dissimilarity Index and Isolation/Exposure/Interaction Indices (Fang J et al., 1998; Peterson & Krivo, 1999; Collins AC & Williams DR, 1999; Lewis Mumford Center & Logan J, 2001; Iceland J et al., 2002). The rationale to study the extent of segregation for Whites and the consequences includes further understanding of the nature of segregation (Fang J et al., 1998; Collins AC & Williams DR, 1999; Peterson & Krivo, 1999). One hypothesis is that although segregation contributes to material and social deprivation among minority racial/ethnic groups, for Whites it offers a health advantage (Fang J et al., 1998; Peterson & Krivo, 1999). A competing hypothesis is that the effect of segregation on health is negative for all groups, with that for Whites being much weaker compared to that for minority racial/ethnic groups (Collins AC & Williams DR, 1999).

Segregation and health

As described earlier, racism may operate via race-based residential segregation. Segregation can also impact health through multiple factors such as economic and social deprivation, physical environment, political environment as well as individual socioeconomic attainment (American Cancer Society, 2004; Krieger N, 2000; Macintyre S & Ellaway A, 2000; Acevedo-Garcia D & Lochner KA, 2003; Peterson & Krivo, 1999; Collins AC & Williams DR, 1999).

1. Material and social deprivation:

Associations between racially segregated areas and income and poverty levels are well documented; areas with higher indices of segregation experience lower income levels and higher poverty levels (Williams DR, 1999; Karlsen S & Nazroo JY, 2002; Acevedo-Garcia D et al., 2003; Collins AC & Williams DR, 1999). Residentially segregated areas also face more limited educational and employment opportunities. In addition, these communities tend to have fewer social networks or role models that could improve these opportunities. These forces also drive the types of services and resources available within the communities. For instance, in more residentially segregated areas, typically health care facilities are fewer in number and are also assessed to be of lower quality (Williams DR, 1999; Smedley M et al., 2003; Williams DR, 1997; Collins AC & Williams DR, 1999). These factors can limit access to preventive services such as cancer screenings. In addition, residents of these areas tend to have lower purchasing power, and thus higher costs reduce access to needed resources and services such as food, insurance, and housing (Williams DR, 1999). Other resources that may be affected include access to food, alcohol and infrastructure such as transportation. These

neighborhoods tend to have fewer grocery stores with nutritious and fresh foods and more access to liquor stores as well as fewer parks and recreational opportunities for exercise (Rao RS et al., 2004; American Cancer Society, 2004; Williams DR et al., 2003; LaVeist TA & Wallace JM, 2000). Poor transportation services in residentially segregated areas could also limit access to health care and other resources (Ward E et al., 2004; Collins AC & Williams DR, 1999).

2. Physical environment

Residentially segregated neighborhoods have been shown to be exposed to higher levels of chronic stressors and health hazards such as persistent noise, air and water pollution, as well as worse housing conditions (e.g., crowding) (Krieger N, 2003; Williams DR et al., 2003; Williams DR, 1997; Williams DR, 1999). Areas with high concentrations of minority groups and of poverty are more likely to have toxic waste facilities (Gee GC, 2002). African Americans and Hispanics are disproportionately represented among those who live near waste sites and exposed to toxins and environments with cancer causing agents (Satcher D, 2001). In addition to these environmental exposures, segregation can result in limited employment opportunities which can place people in occupational environments with higher exposures to carcinogens (Williams DR, 1997; Ward E et al., 2004). Proximity and constant exposure to toxic substances are risk factors for cancer (Harras A et al., 1996). In addition, daily exposure to such stressors could trigger coping mechanisms that result in worse health outcomes, such as smoking, alcohol and other substance use (Krieger N, 2000).

Race-based residential segregation may also operate through the physical environment to influence cancer risk factors such as tobacco use, poor nutrition, physical

inactivity, and obesity (Williams DR, 1999; Rao RS et al., 2004; American Cancer Society, 2004). In particular, poor and minority communities are disproportionately affected by targeted marketing by tobacco and alcohol companies (Gee GC, 2002). In addition, as described above, the physical environments of these communities may limit options for safe recreational physical activity (Krieger N, 2003; Williams DR, 1999).

3. Political environment

While few studies have empirically looked at the factors related to the political environment, recent studies and reviews have suggested that more attention needs to be paid to how residential segregation may contribute to health outcomes through political factors (Williams DR, 1999; Acevedo-Garcia D et al., 2003). LaVeist provided some evidence regarding the role of political empowerment in contributing to health; the primary hypothesis was that political empowerment facilitated distribution of resources that support community health (LaVeist TA, 1992). Other area-level political factors that have been recommended for further consideration include representation of metropolitan governance and political participation (Acevedo-Garcia D et al., 2003).

4. Negative and positive outcomes

As more recent studies have been able to include a broader range of racial/ethnic minorities, it has become obvious that one should not assume a 'one model fits all' conceptualization of such contextual effects (Gee GC, 2002). A few studies that have looked at residential segregation, using concentration/composition as the key indicator, across several racial/ethnic groups, found that for some groups the relationship between segregation and health is not a negative one. As segregation increases some positive health outcomes also increase (Gee GC, 2002; Acevedo-Garcia D et al., 2003; Kagawa-

Singer M, 2001). For example, for Hispanics, living in an area that is highly Hispanic may have benefits, if language and cultural barriers are reduced within the community and information is more easily disseminated, including health promoting information (Williams DR, 1999). In addition, researchers have hypothesized that the distribution of minority health care providers can mediate this relationship through better rapport, trust, and communication (Williams DR, 1999). Another example is from a study of an Asian ethnic group where the findings suggest that for some immigrant communities, more specifically for immigrant Chinese communities in Southern California, ethnic enclaves may provide positive outcomes through decreased exposure to stressors including discrimination (Gee GC, 2002).

Summary

Based on the literature review above, racism may contribute to cancer disparities, including those disparities of cancer risk behaviors between racial/ethnic groups. While there have been studies that have evaluated individual health behaviors, the effect of racism on primary and secondary behavioral cancer risk profiles has not been evaluated. In addition, much of this literature is focused on disparities between African-Americans and Whites, with increasing attention being paid to other racial/ethnic groups. The following constructs have been identified as important in furthering our understanding of the relationship between racism and health, and in particular between racism and cancer prevention:

- At the individual level: perceived racism, socioeconomic position, health care access, responses to racism, social support and immigration/assimilation status, cancer prevention;

- At the area level: race-based residential segregation, economic and social deprivation, physical environment, political environment, health care access.

Thus, the purpose of this study was to evaluate the relationship between racism and cancer risk profiles across multiple major racial/ethnic groups in the US, at the individual level as well as with a multilevel framework which will enable the assessment of contextual effects.

Conceptual/analytical framework

Based on the background provided above that identifies potential pathways and correlates through which racism may influence cancer risk, a conceptual model is provided to frame the research questions in this study. But first, the conceptualization of the exposures and outcomes of interest for this study are described.

Given the established priorities within cancer control, this study focused on the following sets of behaviors as comprising primary and secondary cancer risk:

- Primary behavioral cancer risk profiles: cigarette smoking, alcohol consumption, physical inactivity, obesity; and
- Secondary behavioral cancer risk profiles: lack of participation in screenings for cancers of the breast, cervix, colon and rectum, and prostate.

Racism is conceptualized as a form of discrimination based on race/ethnicity that can be defined as encompassing institutional, individual, and/or internalized racism. This study focused on the first two constructs; institutional racism is defined by the experience of residential segregation; individual level racism is defined by self-reported experiences of racism in general as well as within the health care setting. The individual dimension in this study is referred to as perceived racism because the experienced racism was

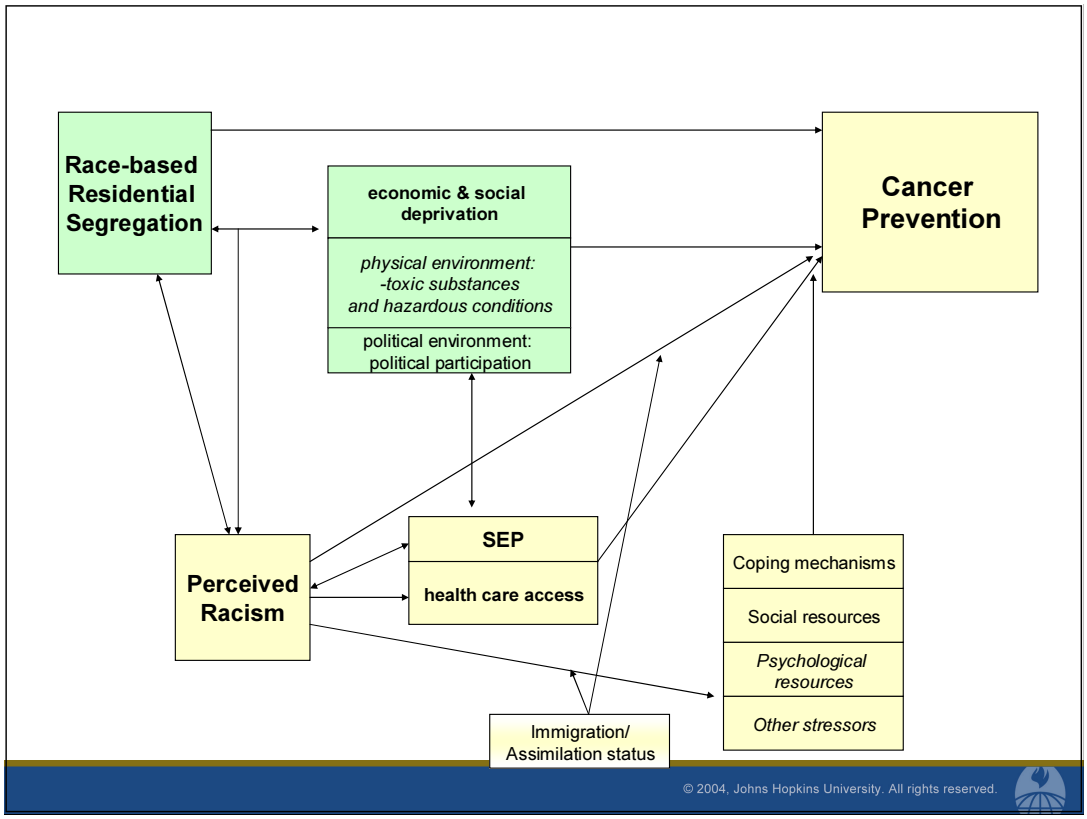
measured through self-reported data and thus is the individual's perception of the phenomenon. Race-based residential segregation is conceptualized as a multidimensional phenomenon. This study focused on two dimensions, evenness and exposure measured by the Dissimilarity Index and the Interaction Index, respectively. Areas that are residentially segregated on both measures will be treated as having experienced hypersegregation.

Figure 1 displays the conceptual model for the proposed study. The model includes area level variables across the top and individual level variables across the bottom, with the exception of the outcome, which is also at the individual level. Starting at the individual level, they suggest that perceived racism may directly and indirectly contribute to cancer risk. Indirectly, perceived racism may be mediated by a set of psychosocial mechanisms and resources and/or by shaping socioeconomic position and health care access. Immigration status is a potential moderator of the relationship between perceived racism and cancer risk. At the area-level, residential segregation contributes to cancer risk through several pathways which include other area level (e.g., social and economic deprivation, physical environment, etc.) and individual level variables (e.g., perceived racism). These pathways can also be mediated or moderated by individual level factors. The model also depicts the interaction between residential segregation and economic and social deprivation as well as residential segregation and perceived racism.

While ideally the full range of variables should be included in the study, due to practical constraints, including data availability, fiscal resources, and time constraints, a limited number of pathways and correlates were analyzed within this study. In Figure 1

those in dashed boxes and italicized text were not evaluated within this study. With respect to the two sets of cancer risk outcomes, primary and secondary risk, it is hypothesized that health care access may not play as important a role in primary risk profiles while the physical environment may not play as important a role in secondary risk profiles.

Figure 1. Analytical Framework of perceived racism and cancer risk profiles.



Research aims and questions

Research aims

This study has three research aims:

1. To describe the prevalence of perceived racism and assess whether it varies across racial/ethnic groups.
2. To evaluate the relationship between perceived racism and behavioral cancer risk profiles.
3. To apply a multi-level framework to evaluate contextual effects that may further explain the relationship between racism and behavioral cancer risk profiles.

Research questions (RQs)

RQ1: What is the prevalence of perceived racism and does it vary across subgroups?

1.1. What is the prevalence of perceived racism?

1.2. Do adults who were exposed to perceived racism share a set of individual and community characteristics?

RQ2: Is there an association between perceived racism and behavioral cancer risk profiles?

2.1. What is the relationship between perceived racism and primary risk profile?

2.2. What is the relationship between perceived racism and secondary risk profile?

2.3. What are the potential moderators/mediators/confounders of these relationships?

i.. Socioeconomic position

ii. Health care access

iii. Psychosocial factors and resources (e.g., coping mechanisms, social support)

iv. Perceived neighborhood resources

v. Immigration/assimilation status

2.4. Does perceived racism have the same effect on cancer behavioral risk profiles across aggregate racial/ethnic groups?

RQ3: Are there any contextual effects that may further explain the relationship between perceived racism and behavioral cancer risk profiles?

3.1. Does race-based residential segregation explain any additional variance of primary and secondary cancer behavioral risk profiles?

3.2. Are there any county level random effects (e.g., variation between counties)?

Study setting

California demographics

California is one of the nation's most racially/ethnically diverse states and is the nation's most populous state with over 36 million residents in 2004. As of 2000, racial/ethnic minorities collectively surpassed the White population, comprising 51% of the state's population, and thus coining the term 'emerging majority'. California's population is 32% Hispanic, 11% Asian, 7% African American and 1% Native American (U.S. Census Bureau, 2000). While the diversity of the state is not currently representative of the nation's, it is anticipated that the nation's racial/ethnic composition will follow California's within the next 50 years. California has the fastest growing Latino population and the largest Asian population in the country.

California is divided into 58 counties, of which eight counties report over one million residents (U.S. Census Bureau, 2000). In addition, 15 counties have over 50% of their population identifying as belonging to a racial/ethnic minority group (see Appendix A for data on racial/ethnic groups by county). For the most part, these counties are located in the southern region and the bay area surrounding San Francisco and Sacramento. The top three industries in California are international trade, entertainment and tourism, and agriculture (State of California, 2005). In addition to the state government, California has local governments at county and city levels as well as for tribes (State of California, 2005).

Social inequalities have been documented across racial/ethnic groups in California (California Department of Finance & Demographic Research Unit, 2005). For example, the median annual family income in 2002 for all Californians was $54,000; the

median incomes by race/ethnicity were $69,400 for Whites, $35,700 for Hispanics, $63,800 for Asians, and $44,000 for African Americans. In addition, approximately 13.4% of Californians are below the poverty level; by race/ethnicity, the percent below poverty level is 8.4% for Whites, 20.80% for Hispanics, 9.7% for Asians, and 18.6% for African Americans. (Data on income were not available for Native Americans.)

California cancer disparities

In California, the major cancers, with respect to incidence and mortality, across all racial/ethnic groups are lung and bronchus, colon and rectum, and prostate cancers for men; and breast, lung and bronchus, colon and rectum and cervical cancers for women (Cockburn M & Deapen D (eds), 2004). For some groups, stomach and ovarian cancers as well as leukemia play a major role (see Appendix B for data by racial/ethnic groups). These major cancers in California are also the major cancers for the US population (American Cancer Society, 2004). Racial/ethnic cancer disparities exist in California (Cockburn M & Deapen D (eds), 2004; American Cancer Society, California Division and Public Health Institute, & California Cancer Registry., 2004; California Department of Health Services Tobacco Control Section, 2004; Wilson C, 2003). For example, 2001 cancer death rates by race/ethnicity and age vary in California as shown in Table 7 (Wilson C, 2003). Hispanics between 15-34 years experience higher rates, while those between 25+ experience lower rates than other racial/ethnic groups. African Americans experience the highest mortality rates for ages 25+. Asians experience the lowest rate across all age groups. Some of these trends are also seen at the national level (American Cancer Society, 2004).

Table 7. 2001 Cancer death rates per 100,000 by race/ethnicity and age in California.

	Age							
Race/Ethnicity	15-24	25-34	35-44	45-54	55-64	65-74	75-84	85+
Asian/Other	3.8	9.0	30.6	93.8	228.5	481.2	875.1	1,076.2
Black	1.9	11.0	49.5	177.6	487.7	1,047.6	1,509.3	2,044.9
Hispanic	6.3	10.1	25.0	80.2	197.8	472.5	816.1	877.5
White	3.8	9.7	31.7	115.1	324.7	762.4	1,308.8	1,750.5

Source: (Wilson C, 2003).

Cancer disparities also exist for cancer risk and protective behaviors in California (American Cancer Society et al., 2004; California Department of Health Services Tobacco Control Section, 2004). For example, breast and cervical cancer screening rates vary by race/ethnicity. For breast cancer, White women have the highest proportion of those who have been screened recently (by mammography) at 63.5%, with Blacks reporting the second highest at 56.9% (American Cancer Society et al., 2004). Hispanic and Asian women have the lowest percentages at 54.6% and 52.6%, respectively. For cervical cancer, Black women have the highest percentage for recent Pap smears at 89%. White and Hispanic women have similar percentages (88% and 84%, respectively) with Asian women reporting at only 75%. Another example of disparities in cancer risk factors is smoking prevalence (California Department of Health Services Tobacco Control Section, 2004). It is highest for Blacks (19%) followed by Whites (17.3%). Hispanics and Asians have lower rates, 13.4% and 12.1%, respectively. Trend data for smoking prevalence from 1990-2002 indicates that Blacks experienced the largest decline in smoking prevalence over the 12-year period, followed by Whites, Hispanics and Asians.

Sociopolitical context in California

It is also important to recognize the political and social climate of California, especially just prior to the 2003 CHIS. First, affirmative action policies of the Regents of

the University of California were challenged during the late 1990s resulting in legislation that prohibited the consideration of race and other sociodemographic factors in admission and employment practices (The Regents of the University of California, 2005). Following this debate, California was faced with a vote on Proposition 54 Racial Privacy Initiative, which called for the prohibition on collecting or using data about an individual's race by state, county and local governments (The California Endowment, 2005). These issues have brought racial/ethnic identity and issues of racism into the forefront of public debate. In addition, California is also recognized as one of the leading tobacco control states with progressive policies. It was the first state to implement a comprehensive tobacco control program under the California Tobacco Tax and Health Promotion Act in 1988 (California Department of Health Services Tobacco Control Section, 2004). Current program priorities include reduction of exposure to secondhand smoke and the availability of tobacco products, countering the influence of the tobacco industry, and provision of smoking cessation services.

The next chapter provides detailed information on the study design, including the 2003 California Health Interview Survey, and the research design and analytical approach to this study.

Chapter 3: Research Design and Methods

Using cross-sectional data primarily from the 2003 California Health Interview Survey and the 2000 US Census, this study draws from over 35,000 adult respondents representing the five main aggregate racial/ethnic groups in California. The goal of this study is to assess the relationship between racism and primary and secondary cancer risk behaviors, taking into account both individual and contextual effects. In addition, this relationship will be assessed for the five main aggregate racial/ethnic groups. Racism was measured at both the individual and area level using measures of perceived racism and race-based residential segregation, respectively. Cancer risk behavioral profiles were measured using a set of primary (e.g., tobacco use, physical inactivity) and secondary (e.g., lack of early detection) risk behaviors.

Descriptive analyses for Research Question 1 were conducted using univariate and bivariate statistics. For Research Question 2 and Research Question 3, linear regression as well as multilevel (or hierarchical linear) modeling were utilized for the individual-level and multilevel analyses, respectively. This chapter begins with a brief overview of the study design and then provides descriptions of the data sources, study population, study variables, and analytical approach that guided this study. It concludes with a discussion of methodological issues that are of particular relevance to this study such as survey data and multilevel modeling.

Overview of study design

This is an observational cross-sectional study of California residents, who were at least 18 years of age, based on secondary data analysis of the 2003 California Health

Interview, Adult Survey (CHIS) (California Health Interview Survey, 2005e). The analysis also utilizes area-level data from the 2000 US Census, the Area Resource File, and USDA Economic Research Service (U.S. Census Bureau, 2005; Census CD 2000 Long Form, 2002; Area Resource File (ARF), 2001; United States Department of Agriculture, 2006). The 2003 CHIS dataset was chosen because it is one of the few surveys that collects data on perceived racism as well as cancer prevention behaviors and captures relatively large samples for all the major racial/ethnic groups. Approximately 42,000 adults were sampled through a random-digit dial telephone survey methodology within a one-year period. The sample distribution by race/ethnicity for 2003 CHIS is shown in Table 8.

Table 8. 2003 CHIS sample by aggregate racial/ethnic group.

Adult (ages 18+)	*Frequency*	*Percentage*
Hispanic/Latino*	8,770	20.86%
Non-Hispanic American Indian/Native Alaskan	349	0.83%
Non-Hispanic Asian & Pacific Islander**	3,918	9.32%
Non-Hispanic African American	2,550	6.07%
Non-Hispanic White	25,229	60.01%
Non-Hispanic Other single race	106	0.25%
Non-Hispanic More than one race	1,122	2.67%
Total	42,044	100.00%

Source: (California Health Interview Survey, 2005e).
*Hispanic ethnic groups with ≥ 200 adults include: Mexican, Salvadoran, Guatemalan
**Asian ethnic groups with ≥ 200 adults include: Chinese, Japanese, Korean, Filipino, South Asian, Vietnamese

Data sources

Individual data: 2003 CHIS Adult Survey

The individual-level data for this study was obtained from the California Health Interview Survey (CHIS) which is managed by the UCLA Center for Health Policy Research in collaboration with California Department of Health Services and Public Health Institute (California Health Interview Survey, 2005e). The CHIS is a population-based, random-digit dial telephone survey. It was designed as a series of biennial surveys

implemented since 2001 to provide health planners, policy makers, county governments, foundations and researchers, advocacy groups and communities information with which to better understand the health and health care needs of Californians. The three main components of the survey include the Adult Survey, the Adolescent Survey and the Child Survey. This study utilized data from the Adult Survey. The key content areas in the 2003 adult survey include health status, health conditions, health behaviors, women's health, cancer history and prevention, dental health, access to and use of health care, health insurance, employment, income, public program eligibility, food insecurity/hunger, neighborhood and housing, and respondent characteristics/demographics. Much of the data from the CHIS is made publicly available without identifiers (e.g., county and zip code) or other sensitive data (e.g., sexual behavior). Funding sources for the CHIS include: California Department of Health Services, The California Endowment, National Cancer Institute, Centers for Disease Control and Prevention, Robert Wood Johnson Foundation, California Office of Patient Advocate, Kaiser Permanente, L.A. Care Health Plan, and Alameda County Health Care Agency.

The 2003 California Health Interview Adult Survey (2003 CHIS) data was collected from telephone interviews which were conducted in five languages including English, Spanish, Chinese (Mandarin and Cantonese dialects), Vietnamese and Korean (California Health Interview Survey, 2005f). The data was collected between August 2003 and February 2004. For adults over the age of 65 who were too frail and ill to respond directly, proxy interviewees were recruited. The interviews were administered using a computer-assisted telephone interviewing system. The average interview took 33

minutes with those conducted in languages other than English taking more time. Eleven percent of the interviews were conducted in a language other than English.

The 2003 CHIS had comparable response rates to other telephone research surveys such as the California Behavioral Risk Factor Surveillance System survey (California Health Interview Survey, 2005c). The screener response rate, which is defined as the proportion of eligible residential households in which a screener interview was completed, was 55.9%. The adult extended interview response rate, which is defined as the proportion of completed interviews among those eligible, was 60%; interviews were counted as completed if at least 80% of the questionnaire was completed. The overall response rate was 33.5% and is defined as the product of the screener rate multiplied and the extended interview rate.

The 2003 California Health Interview, Adult Survey (CHIS) interviewed one adult, defined as 18 years and older, that was randomly selected per household sampled (California Health Interview Survey, 2005a). The 2003 CHIS respondents were sampled from all 58 counties in California; these counties were stratified into 41 strata based on county population density as well as planning purposes with sample sizes varying from 400 to 1,000+ with the majority having at least 500 (see Appendix C for the full sampling frame) (California Health Interview Survey, 2005a). Within each stratum, telephone numbers were sampled using a random-digit dial (RDD) method. In 2003, Alameda and Los Angeles counties were oversampled with the former resulting in oversampling for Latinos, Blacks and Asians. Two Asian ethnic subgroups, Vietnamese and Koreans, were also oversampled. The total adult sample size is 42,044.

As 2003 CHIS is a telephone survey, the sample was first weighted to account for the differential probabilities of entering the sample and then adjusted to more accurately represent the non-institutionalized population. The objective of the 2003 sample scheme was to provide population-based estimates for most counties in California as well as for all major racial/ethnic groups and several racial/ethnic subgroups (California Health Interview Survey, 2005a). The following were the sample weighting objectives (California Health Interview Survey, 2005e)—p.9:

- "to compensate for differential probabilities of selection for households and persons,
- to reduce biases occurring because non-respondents may have different characteristics than respondents,
- to adjust for under-coverage in the sampling frames and in the conduct of the survey, and
- to reduce the variance of the estimates by using auxiliary information."

The 2003 CHIS data were imputed for variables involved in weighting as well as a few additional variables with missing responses. The two techniques utilized for imputations included random selection and hotdeck imputation without replacement. Detailed information regarding the imputation techniques utilized has been made available by CHIS in their methodology document on weighting and variance estimation (California Health Interview Survey, 2005d).

Geocoding of 2003 CHIS respondents to the geographic identifier variables (e.g., county, census tract) were outsourced to Mapping Analytics (California Health Interview Survey, 2005b). First, county and address were verified at the end of the telephone interview for most respondents. Those who refused to verify their street addresses were asked to provide their street name and closest cross streets. This data was given to Mapping Analytics to geocode the respondents to their respect geographic levels. For this study, a database of county characteristics unavailable in CHIS, such as segregation, health care access and poverty, was compiled (from databases described below) and

given to UCLA Data Access Center. The county level dataset was merged with the 2003 CHIS dataset created for this study using self-reported county in CHIS as the merging variable by CHIS staff.

County level data sources

County level data for this analysis were primarily obtained from the US Census Bureau. In addition, data for county-level correlates, including health professional shortage area (HPSA) for primary care and the rural/urban continuum, were obtained from the Area Resource File and the United States Department of Agriculture Economic Research Service. These area-level variables were downloaded from their respective sources into a separate database which was then merged with the 2003 CHIS dataset that has been built for this study.

United States Census, 2000

The 2000 Census Summary File 1A was the source for county-level and census tract-level population counts by race/ethnicity (U.S. Census Bureau, 2005). From these two sets of variables, the residential segregation measures were created (a more detailed description of this is provided in the study variables section later in this chapter) using validated measures of race-based residential segregation (this is described in more detail in the section on Specification of Study Variables which follows below) (Massey DS & Denton NA, 1988; Massey DS, White, MJ, & Phua VC, 1996; Iceland J et al., 2002). In addition, racial/ethnic composition was also calculated based on this data. Proportion at or below 100% of the Federal Poverty Line (FPL) was created from variables on proportion of county residents at various levels of the FPL. This data was obtained from

the 2000 US Census Long Form via GeoLytics Compact Disc (Census CD 2000 Long Form, 2002).

Area Resource File, 2001

Counties data on health professionals shortage areas were obtained from the 2001 Area Resource File, physician shortage supply (Area Resource File (ARF), 2001). The Area Resource File is a county-level dataset of over 6,000 health care related characteristics including information about the number and specialty of health professions, health facilities, measures of resource scarcity, geographic identifiers, and socioeconomic characteristics. The data from the Area Resource File is compiled from a variety of health care organizations such as the American Hospital Association, the American Medical Association, the American Dental Association, the American Osteopathic Association, the Bureau of the Census, the Centers for Medicare and Medicaid Services, Bureau of Labor Statistics, and the Veteran's Administration.

USDA Economic Research Service

Rural/Urban continuum data was obtained from the United States Department of Agriculture (USDA), Economic Research Service. The Economic Research Service (ERS) is a division of the USDA which is focused on providing information and conducting research to the public and policy makers on issues relevant to food, farming, natural resources and rural development (United States Department of Agriculture, 2006). In this role, the ERS manages the Rural/urban Continuum Codes data and makes the data publicly available.

Study population

The study population will include all 2003 CHIS adult respondents who do not meet the exclusion criteria. Four main exclusion criteria were established for this study on the role of perceived racism on cancer prevention behavioral risk profiles: proxy interview, prior cancer diagnosis, pregnancy, and belonging to 'some other' or 'multi-racial' race/ethnic groups.

The first exclusion criterion is a proxy interview (n=171). If the CHIS interview was conducted with a proxy, then the record is excluded from this study because the proxy interviews did not include the full set of CHIS questions. The proxy interviews did not include questions that would compromise the validity of the response as a proxy was providing them on behalf of the intended participant/respondent. These included questions on variables critical to this study's research questions, include the main exposure of interest, perceived racism, and several cancer prevention behaviors on which the outcome is based as well as several correlates (e.g., smoking, walking, alcohol use and employment status, park/open space in neighborhood, social cohesion, respectively). If these proxy interviews were not excluded based on this exclusion criterion, they would be dropped out of the study in the regression analyses due to missing responses.

The second exclusion criterion is prior cancer diagnosis (n=4,727). All 2003 CHIS respondents with a previous cancer diagnosis are excluded from this study because their diagnosis may influence their cancer prevention behaviors differentially compared to those without a cancer diagnosis. A recent study that assessed health behaviors among both adult cancer patients as well as survivors of childhood cancers showed higher prevalence rates of protective health behaviors compared to the general population (Pinto

BM & Trunzo JJ, 2005). Although cancer survivors are an important group to study, including them within the general population would not do justice for understanding how perceived racism may influence cancer prevention within this population. A separate study should be conducted for this special population considering additional explanatory variables such as type of cancer, prognosis, and treatment. Similarly, the third exclusion criterion is pregnancy (n=436). All women who are identified as being pregnant at the time of the interview are excluded as their pregnancy status may influence their cancer prevention behaviors.

The fourth main exclusion criterion is belonging to 'some other' race (n=106) or '2 or more races' (n=1,410). These groups were excluded from this study primarily because segregation measures for them are more challenging to define. In addition to the criteria described above, respondents with missing responses for study variables have been excluded. The following variables had a significant number of missing responses: satisfaction with physician (n=206), delay in accessing health care (n=239) and census tract (n=3).

Specification of study variables

This section begins with a description of the study outcome variables. Next descriptions of the study exposure variables are provided and then it concludes with a description of study correlates. A full list of study variables is provided in Appendix D. While most variables were utilized in their original/raw format or derived formats, some variables were recoded or created based on these original/raw and derived variables.

Outcomes: primary and secondary behavioral cancer risk profiles

Cancer risk behavioral profiles, the study outcome of interest, are conceptualized as comprised of primary and secondary risk behaviors in cancer control. For this study, these profiles were operationalized as a set of indices of primary risk behaviors and secondary risk behaviors representing cancer risk profiles. The primary risk index included smoking, alcohol use, physical inactivity, and Body Mass Index (BMI). BMI is included as a proxy measure for diet and physical activity as no dietary questions are included in CHIS and the questions regarding physical activity was limited to walking. Secondary risk index included age and gender-specific screening behaviors for following cancers:

- Males
    - 18-49 years: (no screening);
    - ≥ 50 years: colorectal and prostate cancers;
- Females
    - 18-39 years: cervical cancer;
    - 40-49 years: cervical, breast cancers;
    - ≥ 50 years: cervical, breast and colorectal cancers.

These groups were primarily determined using evidence-based medicine screening guidelines for these cancers (The Agency for Healthcare Research and Quality, 2005; American Cancer Society, 2005a).

First, all variables were recoded so that the order of the responses started with least risk with increasing values representing increasing risk. Two primary risk variables, smoking and BMI, were recoded from derived CHIS variables. Smoking was recoded so

that the order of responses started with least risky status and ended with highest risk (e.g., never smoked=1, former smoker=2 and current smoker=3). BMI was recoded so that the underweight and normal categories were collapsed into one category. The two remaining primary risk behaviors, walking and alcohol consumption were computed by combining original CHIS variables. For walking, a new variable was created combining information from the two derived CHIS variables regarding walking for transportation and leisure (e.g., walking for both transportation and leisure=1, walking for either transportation or leisure=2, and not walking for neither=3). In addition, those who reported being unable to walk were coded as 0. Alcohol consumption is also a new variable built from two original CHIS variables. A code of 1 was given to those who have had no drinks in the past 30 days. Codes of 2 or 3 were assigned to those who reported drinking alcohol in the past 30 days with the former reporting one to two drinks per occasion and the latter reporting three or more drinks per occasion.

The set of secondary prevention behaviors were recoded to match United States Preventive Services Task Force (USPSTF) starting ages for screening recommendations (e.g., 18 years for cervical cancer, 40 years for mammography, 50 years for colorectal cancer) as CHIS variables used different age criteria (The Agency for Healthcare Research and Quality, 2005; California Health Interview Survey, 2005e). In addition, prostate cancer screenings were included for males 50 years or older based on recommendations from the American Cancer Society (American Cancer Society, 2005a). Each of these variables were coded such that the response categories all followed the same direction (e.g., recently screened=1, ever screened but not recently=2, and never screened=3). Therefore, a higher score indicates poorer screening behavior. Table 9

outlines the screening method, time interval and the study sample for each of the screening behaviors.

Table 9. Secondary risk profile: screening recommendations (age and time intervals) and study sample by cancer site.

Type of cancer	Screening method (starting age)	Time interval	Study sample size (Total=26,172)
Cervical Cancer	Pap Smear (18 years)	3 years	20,212
Breast Cancer	Mammography (40 years)	2 years	13,252
Colorectal Cancer	FOBT, Sigmoidoscopy, or Colonoscopy (50 years)	5 years	14,813
Prostate Cancer	Prostate-Specific Antigen Test (50 years)	1 year	5,960

Next, the two risk indices were created to assess primary and secondary cancer risk behavioral profiles for each respondent by averaging the respective behaviors for each index. For respondents who reported that they were unable to walk, their primary risk index was averaged across the other three behaviors. Secondary risk index was computed for age and gender specific groups. These indices are continuous variables with a range of (1, 3) with 1 representing the lowest cancer risk and 3, the highest risk.

- Primary Risk Index
  - General population = ((BMI + walking + smoking + alcohol use)/4)
  - For those unable to walk = ((BMI + smoking + alcohol use)/3)
- Secondary Risk Index
  - Females 18-39 years = (cervical cancer screening)
  - Females 40-49 years = (cervical + breast cancers screenings)
  - Females ≥ 50 years = (cervical + breast + colorectal cancers screenings)
  - Males ≥ 50 years = (colorectal + prostate cancers screenings)

For primary risk profiles, someone with a score of 1 is underweight/normal, walks at least 20 minutes per week, never smoked, and did not drink alcoholic beverages; someone with a score of 3 is obese, does not walk for transportation nor leisure/exercise, was a current smoker at the time of the interview, and had at least 3 alcoholic beverages in one sitting. Similarly, for secondary risk profiles, someone with a score of 1 was recently

screened for all age and gender appropriate cancer screenings; someone with a score of 3 was never screened for all age and gender appropriate cancer screenings.

Table 10. Interpretation of scores for primary and secondary risk profiles.

Number of high risk behaviors	Primary Risk	Secondary Risk for Males*	Secondary Risk for Females*
0	1	1	1
1	1.5	2	1.67
2	2	3	2.33
3	2.5		3
4	3		

*these are examples for those 50 years and older; for men a total of 2 screenings were averaged and for women a total of 3 screenings were averaged

Exposure variables: racism

Racism is the study exposure of interest. The two dimensions of racism are included in this study, perceived racism representing the individual dimension and race-based residential segregation representing the institutional one.

Perceived racism

The perceived racism variables, the main exposure of interest, were obtained from 2 sections of the CHIS questionnaire, demographic information and access to and use of health care. First, the respondent's experience with racism was assessed globally or in general and then more specifically within the health care context with the following questions (California Health Interview Survey, 2005e):

- Thinking about your race or ethnicity, how often have you felt treated badly or unfairly because of your race or ethnicity?
- Was there ever a time when you would have gotten better medical care if you had belonged to a different race or ethnic group? Think about the last time this happened, how long ago was that?

Both 2003 CHIS perceived racism variables were recoded. The first, perceived racism in general, was recoded from five response categories into three, collapsing the last three

frequency groups into one category (e.g., never=1, rarely=2, and sometimes/often/all the time=3), to ensure ample sample sizes for each analysis category (especially when conducting analyses across racial/ethnic groups). The second measure of racism, perceived racism in health care, was recoded so that the order of the response categories matches the ordering within perceived racism in general (e.g., no=1, yes=2). In addition to these variables for perceived racism, two additional variables were created based on the original CHIS variables. The first is a variable that captures any exposure to racism (across either contexts) and the second is a variable that combines the exposure in both contexts categorizing respondents as having no exposure to perceived racism, exposure in general context only, exposure in health care context only, and exposures in both contexts.

Cross-tabulations of the two specific perceived racism measures (in general and in health care are presented in Table 11 to assess whether these variables are nested as expected (with those who responded yes to perceived racism in health care coming from the group that reported having experienced racism in general). It is evident from the distributions presented that these variables are not nested. There is a group of respondents who reported never to perceived racism in general and yes to perceived racism in health care (n=471 for the total study sample). This group also varies by race/ethnicity with a range of 7.61% among Latinos to 1.41% among Whites. Due to this incongruity in the dataset, each of these measures of perceived racism was treated as independent measures of perceived racism.

Table 11. Cross-tabulations of perceived racism in general and perceived racism in health care for the total sample and across racial/ethnic groups.

	Racism in Health Care				
	Total	No		Yes	
Racism in General	*SS**	*SS*	*%*	*SS*	*%*
Total Study Sample					
Total	35203	33082	92.71	2121	7.29
Never	18082	17611	96.34	471	3.66
Rarely	9895	9461	95.11	434	4.89
Sometimes/Often/ All the time	7226	6010	81.93	1216	18.07
Latinos					
Total	7901	6942	87.11	959	12.89
Never	3509	3283	92.38	226	7.62
Rarely	2022	1856	91.6	166	8.4
Sometimes/Often/ All the time	2370	1803	75.19	567	24.81
APIs					
Total	3646	3366	92.78	280	7.22
Never	1261	1203	95.23	58	4.77
Rarely	1258	1179	94.06	79	5.94
Sometimes/Often/ All the time	1127	984	88.27	143	11.73
AI/ANs					
Total	306	275	90.46	31	9.54
Never	116	111	96.15	5	3.85
Rarely	82	79	97.62	3	2.38
Sometimes/Often/ All the time	108	85	78.09	23	21.91
African-Americans					
Total	2361	2042	87.19	319	12.81
Never	318	306	97.49	12	2.51
Rarely	673	633	93.35	40	6.65
Sometimes/Often/ All the time	1370	1103	81.2	267	18.8
Whites					
Total	20989	20457	97.27	532	2.73
Never	12878	12708	98.59	170	1.41
Rarely	5860	5714	97.56	146	2.44
Sometimes/Often/ All the time	2251	2035	89.86	216	10.14

SS=unweighted sample size; %= row percentages from design-based analyses in SAS-Callable SUDAAN.

Race-based Residential Segregation

Race-based segregation was measured using two indices, the Dissimilarity Index and Interaction Index. Segregation was measured at the county level with census tract as the unit of analysis. The formulas used to create each measure are described in Table 12. For all measures, the indices assumed a two group comparison, the minority group of

interest and the non-Hispanic White population (Massey DS & Denton NA, 1988). For indices measuring segregation for non-Hispanic Whites, the total minority population was the reference group. It is standard practice to restricted segregation measures to the two group case such that their indices calculated the various measures of residential segregation as if Whites and the minority of interest were the only two groups present (Massey DS & Denton NA, 1988; Iceland J et al., 2002). As a result, the segregation measures are race-specific variables.

The two segregation measures chosen for this study will measure two dimensions of race-based residential segregation, evenness and exposure. The Dissimilarity Index, which is a measure of evenness, may be interpreted as measuring whether the proportion of a racial/ethnic group with respect to another reference group at the county level is uniformly distributed among census tracts within the county. For example, if the proportion of African-Americans within a county is ten percent, then for this county to have low segregation, most of its census tracts would need to have their proportions of African-Americans approximate ten percent. The Interaction Index, which is a measure of exposure, is interpreted as the probability of contact or interaction between two groups. For example, a county with a Interaction Index of 0 for African-Americans with Whites as the reference group is interpreted as there is no probability of people from these two groups interacting with each other within this area; an index of 1 is interpreted as the probability of interaction between persons from these groups being 100%. Thus, unlike the Dissimilarity Index, a high score on the Interaction Index indicates lower levels of segregation and a low score indicates higher levels of segregation. The segregation measures were created as continuous variables ranging from 0.00-1.00 and were recoded

to form categorical variables created with criteria established by others to classify counties as low, moderate or highly segregated as shown in Table 12 (Glaeser EL & Vigdor JL, 2001; Acevedo-Garcia D, 2001; Lewis Mumford Center & Logan J, 2001).

Previously established cut-off points were adopted in creating categorical segregation measures (Glaeser EL & Vigdor JL, 2001; Acevedo-Garcia D, 2001; Lewis Mumford Center & Logan J, 2001). For the Dissimilarity Index, counties with an index of 0.00 – 0.30 were classified as having low segregation; counties with an index of 0.31-0.59 were classified as having moderate segregation; counties with an index of 0.60-1.00 were classified as having high segregation. For the Interaction Index, counties with an index of 0.00-0.40 were classified as having high segregation; counties with an index of 0.41-0.69 were classified as having moderate segregation; counties with an index of 0.70-1.00 were classified as having low segregation. Categorical values for the Dissimilarity and Interaction Indices were coded differently to account for the fact that these measures have different interpretations with the former going from low to high segregation and the latter going from high to low segregation.

Table 12. Segregation Measures.

Race-based residential segregation measure	Formula*	Coding
Dissimilarity Index	$\sum_{i=1}^{n} [t_i (p_i - P)] / [2TP(1-P)]$	0.00-0.30 low segregation, 0.31-0.59 moderate segregation, 0.60-1.00 high segregation
Interaction Index	$\sum_{i=1}^{n} [(x_i)/X] \times [(y_i)/(t_i)]$	1.00-0.70 low segregation, 0.69-0.41 moderate segregation, 0.40-0.00 high segregation
Hypersegregation	Dissimilarity Index = high (≥ 0.60); Interaction Index = high (≤ 0.40)	No Yes

Source: (Iceland J et al., 2002)—p.122.

*n=number of census tracts within the county; t_i =the total population of census tract i; p_i =proportion of population that is minority in census tract i; P=proportion of population that is minority in the county ; T= total population of the county; x_i =minority population of census tract i; y_i =the majority population of census tract i.

A third segregation variable was created to assess hypersegregation. This variable was defined as having high segregation for both Dissimilarity Index and Exposure Index.

Correlates

There are two sets of correlates involved in the analyses for this study. The first set is measured within the 2003 CHIS and make up the following research constructs at the individual level: demographic characteristics, socioeconomic characteristics, access to health care, psychosocial factors, perceptions of neighborhood resources and immigration/acculturation factors. The second includes county level correlates of socioeconomic, health care and rural/urban characteristics. Appendix D describes the construction of these variables from 2003 CHIS and their respective datasets.

Individual level correlates

Socioeconomic Characteristics

The socioeconomic variables in this study include measures of educational achievement employment status, poverty level (income) and home ownership. Educational achievement and employment status were recoded from derived CHIS variable to include fewer categories while poverty level was recoded from a derived continuous variable into a categorical variable with 5 levels. The 2000 Federal Poverty Line (FPL) was defined at an annual income of $8,794 for an individual or household of 1, $11,239 for a household of 2, $13,738 for a household of 3 and $17,603 for a household of 4 (U.S. Census Bureau, 2002). Thus, in this study, a single resident household classified as being at 0-99% of the FPL, had an annual income less than $8,794, 100-199% was $8,794-$17,500, 200-299% was $17,588-26,294, 300-399% was $26,382-$35,088 and at least 400% was $35,176.

Access to Health Care

This subset of correlates includes measures of insurance status, usual source of care, utilization and satisfaction with health care services. These variables are from the access to and use of health care section of the 2003 CHIS questionnaire. Three variables were recoded for this study. Problem with provider, problem with accessing services, were recoded to have fewer categories. In addition, the satisfaction with health care services variable was recoded from a continuous variable into a categorical variable to include those with missing responses.

Psychosocial Factors

This subset of correlates includes measures of social support/resources, coping mechanisms, and competing priorities. Among the social support/resources variables, a new variable was computed for average social resources/support by averaging across a subset of original 2003 CHIS variables on availability of someone to help with a variety of tasks/situations (e.g., when sick, to help with a problem). Among the coping mechanisms, heavy cigarette smoking was created from recoding a derived variable on number of cigarettes smoked per day into fewer categories (e.g., none, less than one pack/20 cigarettes, and one pack/20 cigarettes or more). Among the competing priorities, food insecurity was recoded so that it was no longer limited to respondents at or below 200% of the federal poverty line.

Immigration and Acculturation Factors

For this subset of correlates, a set of six variables on immigration and acculturation were initially considered. However, three were highly correlated with each other and some of the other variables in this subset (as would be expected), and thus were

dropped to avoid the problem of multi-collinearity in regression models. The variables that were dropped included country of birth, English proficiency, and percent life in the US. The final study variables in this subset included citizenship/immigration status, language spoken at home, and length of residency in the US. Language at home was recoded into fewer categories without specifying which non-English language is spoken at home. Length of residency in the US was recoded into a categorical variable from a continuous one to include all respondents and not just those who were born outside the US. Those who were born in the US were assigned to the at least 15 years category.

Neighborhood Resources

This subset includes measures the respondents' perceptions of neighborhood resources (e.g., neighborhood watch program, safe park or open space within watching distance and social cohesion). For social cohesion, 3 of the 6 items were reverse coded and then averaged to get a score for social cohesion. Thus, now as the score increases, perceived social cohesion increases. In addition, safe park/open space was created using information based on questions regarding safety throughout the day and to include those without a park.

Demographic Characteristics

This subset includes age, gender and race/ethnicity. Age was recoded into a variable with 5 categories (from a continuous variable) to reflect groups that are more meaningful for cancer prevention/screening messages (e.g., 18-22 representing college students/young adults, 23-39 representing transition into adulthood, 40-49 representing screening for breast cancer (and potentially colorectal and prostate cancers), 50-64 representing recommended screening age, 65-102 representing adults with potential

access to Medicare). For race and ethnicity, a new variable combining the two, race/ethnicity, was created primarily based on OMB definitions using the following categories: Non-Hispanic Asian Pacific Islanders, Non-Hispanic American Indians/Alaska Natives, Non-Hispanic African-Americans, Non-Hispanic Whites and Latinos (Tabulation Working Group & Interagency Committee for the Review of Standards for Data on Race and Ethnicity, 2000). In addition, there are two other race/ethnicity categories which were excluded from this study, Non-Hispanic 'some other' race and '2 or more' races. All groups that are identified as Non-Hispanic are comprised of individuals who identified with only that race and Latinos are comprised of individuals who identified as Hispanic/Latino for ethnicity and a single race. No distinction will be made between race and ethnic groups as the aggregate groups listed above are treated as racial groups in disparities research (Fuller KE, 2003).

Area-level correlates

Two of the three area level correlates were used in their original form. An area is designated as a Health Professionals Shortage Area for primary care based on three criteria: (1) the area is appropriate level for delivering primary medical care, (2) the ratio of population to full-time primary care providers is at least 1:3500 and (3) providers in neighboring areas are over-utilized or inaccessible to the population within the area being evaluated (Area Resource File (ARF), 2001). This measure is a categorical variable which classifies counties as not having any areas within its boundaries that are classified as having a shortage, as the entire area within the county is designated as having a shortage, or as having one or more areas within the county that is designated as having a shortage area. The rural/urban continuum was the measure chosen to represent this

geographic characteristic as it includes a gradient of metropolitan, urban and rural areas based on proximity to metropolitan centers and population size. The socioeconomic characteristic was measured as the proportion of residents at or below 100% of the Federal Poverty Line (FPL) relative to the other counties in California. This variable was a generated by categorizing counties with respect to their proportions into three bins, representing low (≤11.48%), moderate (11.49%-17.58%) and high (≥17.59%) relative proportions of residents at or below the FPL.

Analytic approach/statistical methods

Exploratory data analyses

First, assessments of the univariate distributions for all variables of interest from the 2003 CHIS using histographs or bar graphs as well as summary statistics (e.g., means, medians, or percentages) were conducted. Variables with missing responses were identified. Next, bivariate analyses between outcomes of interest and exposure variables as well as outcome and correlate variables were carried out. Based on these findings, variables were recoded. In addition, tests of Pearson's and Spearman's Rank correlations, as appropriate, between outcome variables and within each subset of correlates to identify pairs of variables that were collinear with each other using criteria of ≥ 0.90 (Ender P, 2006). Third, bivariate analyses (with chi-squared tests) between variables used in establishing the exclusion critieria and outcome, exposure and other key sociodemographic variables were conducted to assess how different these participants are from the total CHIS population and also from the inclusion group. Analyses were conducted with and without accounting for the complex survey design (i.e., using weights and replication methods for estimating variances).

Research question one (RQ1)

RQ1 (What is the prevalence of perceived racism? What are the common characteristics of those who report being exposed to racism?) is an exploratory/descriptive research question aimed at describing the experience of perceived racism. Once the study inclusion/exclusion criteria were established, univariate analyses were carried out to assess distributions of perceived racism variables. In addition, race/ethnicity stratified analyses were conducted. Next, bivariate analyses were conducted between perceived racism variables and all other study variables to assess individual and community characteristics of those who report having experienced racism. For these analyses, Chi-square tests were used to assess differences between groups. Finally, simple logistic regressions were carried out to identify those who are more likely to report experiencing any racism. These analyses were also stratified by race/ethnicity to assess any differences between racial/ethnic groups.

Research questions two and three (RQ2 & RQ3)

Individual-level statistical modeling

First, simple linear regression models for each outcome and predictor variable combinations (including exposure and correlates) were conducted. P-values of ≤ 0.25 was established as criteria for including variables in subset modeling to identify best subsets which will be included in building full model (Hosmer DW & Lemeshow S, 2000). Subset models for each combination of outcome and exposure variables were manually built using Stepwise Linear Regression, Forward approach to allow for some flexibility in judgment for maintaining marginally significant and theoretically important

variables in the models. Once these best subsets were developed, then final main effects modeling was conducted by adding one subset at a time to the simple linear regression model of the outcome on exposure, starting with demographics, socioeconomic characteristics, access to health care, psychosocial factors, neighborhood resources, and immigration/acculturation factors. As each subset was added, variables that were not statistically significant at a p-value of 0.05 from the Adjusted Wald F test were dropped out of the model, unless the variable was considered to be conceptually critical (e.g., race/ethnicity). Once main effects models for each exposure were built, interaction terms were tested based on theory and modeling output. Then for each outcome, one model was built that included both exposure variables of interest. These models were identified as final main effects models. The final main effects model was then stratified by race/ethnicity to assess how the model fits the data for each aggregate racial/ethnic group (to identify any difference by race/ethnicity).

Potential moderators and confounders

A set of theoretical moderators were identified and systematically tested. First these variables were tested for significant interactions in models with exposure and outcome variables. Those moderators that had significant interaction terms with the exposures were added to the main effects model and evaluated for significance. Confounders were identified as variables that met the following criteria: (1) change in coefficients for perceived racism from the simple linear regressions with the addition of potential confounders in the subset analyses; (2) established association with perceived racism; and (3) not hypothesized to be in the pathway between the exposure and outcome variables.

Multilevel statistical modeling

As segregation is a race/ethnicity-specific construct, multi-level analyses was conducted with separate models for each race/ethnicity. Multilevel modeling was utilized as the research questions aimed to assess the effect of area-level variables and individual variables on individual-level outcomes. Alternatively, generalized estimating equation (GEE) could have been utilized to account for the nesting of individuals within areas, however, with this method it would not have been possible to partition the variance and specify the source of the variance at the various levels in the models. In addition, these models will enable the modeling of both fixed and random effects, such that in addition to the fixed effects that can be assess using analyses with only one level, with multi-level modeling assessments can be made for county-specific intercepts and slopes. In addition to taking into account contextual effects, multi-level modeling allows for testing cross-level interactions; in this case, it will be possible to test if the effect of perceived racism on cancer risk profiles varies by county.

First, the Intraclass Correlation Coefficient was calculated for each of the two cancer risk behavioral profiles to identify models with county-level variation with fully unconditional or empty models (Luke DA, 2004; Snijders T & Bosker R, 1999). For those without any variation at the county-level (ICC=0), no further analyses were conducted as this indicates there is no un-modeled variability at the county level. For those with variation at the county-level, multi-level models were built by adding segregation measures and other area-level correlates to the individual-level fixed effects models from RQ2. At each stage, evidence for random intercepts at the county-level was assessed.

Software packages

Three different statistical software packages were utilized in conducting this study. The exploratory data analyses were primarily conducted using SPSS (version 13) first with unweighted data and then with weighted data to identify any differences in results. Next, SAS-Callable SUDAAN (version 9) was utilized to conduct additional exploratory data analyses and all analyses for research questions one and two. This software package was utilized as it allows for analyses that account for the complex survey design. All analyses were conducted using the following design options as recommended by CHIS data managers at the Data Access Center at UCLA. Multi-level analyses were conducted in STATA (version 10) without accounting for the complex survey design.

Methodological issues

Complex survey design *(weighted analyses and variance estimates)*

When working with survey data such as the 2003 CHIS dataset, it is important to understand the sampling framework because often simple random sampling techniques are not used exclusively. Thus analyses need to be able to account for the study design; otherwise, the independence assumption could be violated for the cases where a more complex sampling scheme was utilized (Lee ES & Forthofer RN, 2006). There are two critical aspects to survey data analyses. The first is to adjust for the differential selection of observations through the use of weights. The second is to assess the precision gained or lost from the complex survey design through the design effect. Using SUDAAN for the individual-level analyses helps address both these issues. For this study, replicate weights were utilized in conjunction with the Jackknife Repeated Replication method for

variance estimation. The Jackknife Repeated Replication method is one of these methods through which the mean is computed by dropping one observation each time and then computing the grand mean across those means (Korn EL & Gaubard BI, 1999). The variance is then estimated from the variability among the pseudo means each with (n-1) observations. This method is more precise when a large number of units are available to form replications and the replication out number the primary sampling units; it is more commonly used with stratified design.

Comparison of 2003 CHIS data with external sources

Table 13 demonstrates the reliability of these measures within 2003 CHIS as they are similar to those measured by two other external sources. For the most part, primary risk behaviors between 2003 CHIS and the Kaiser Foundation State Facts program as well as the Behavioral Risk Factor Surveillance System (BRFSS) are within five percent of each other. For the screening behaviors, prevalence data for breast and cervical cancer screenings seem to be the same; differences in colorectal and prostate cancer screenings may be attributed to differences in questions regarding screening modalities and time intervals.

Table 13. Comparison of 2003 CHIS cancer risk behaviors prevalence with external sources.

Cancer Risk Behaviors	2003 CHIS	Kaiser Foundation State Facts[a]	BRFSS[b]
Primary Risk			
BMI	35% overweight; 20% obese	21% (obese, 2001); 54.6% (overweight and obese, 2002)	36.2% overweight; 23.2% obese (2003)
Walking/Exercise	72% participated in some form of walking	77.2% (any activity in past month, 2004)	77.7% (any physical activity in past month, 2003)
Smoking	17% are current smokers	14% (smokers, 2004)	16.8% (current smokers, 2003)
Alcohol Consumption	57% reported drinking (1+drinks within past 30 days)		59.9% (1+drinks w/in 30 days, 2003); 15.9% (binge, 2003)
Secondary Risk			
Cervical Cancer Screening (women 18+ w/in 3 yrs)	83%	85% (2004)	84.7% (2004)
Breast Cancer Screening (women 40+ w/in 2 yrs)	76%	77% (2004)	76.5% (2002, 2004)
Colorectal Cancer Screening (adults 50+, FOBT w/in 2yrs) (adults 50+, sigmoidoscopy/ colonoscopy ever)	52%		27.9% (2002); 23.3% (2004) 50.7% (2002); 53.8% (2004)
Prostate Cancer Screening (males 40+ w/in 1-2 years)	41%		49.5% (2002) 51.5% (2004)

a. (The Henry J. Kaiser Family Foundation , 2006)
b. (Centers for Disease Prevention and Control, 2006)

Human subjects research

A certificate of exempt status for this study form the Institutional Review Board at the Johns Hopkins University Bloomberg School of Public Health is on file at the Office for Research Subjects, Committee on Humans. This study poses minimal risk to the subjects who participated in the 2003 California Health Interview, Adult Survey as no further benefits or harms are expected from this secondary data analyses.

Chapter 4: Exploratory Data Analyses

2003 CHIS

The 2003 California Health Interview Survey, Adult component (2003 CHIS) has a total sample of 42,044 respondents between the ages of 18 and 102 years. Table 14 displays means and/or proportions, as appropriate, of cancer risk profiles, perceived racism, and sociodemographic and health characteristics of the total 2003 CHIS population, as well as comparisons for these characteristics between study inclusion (n=35,203) and exclusion groups (n=6,841). For continuous variables, the statistic shown is the mean with a 95% confidence interval; for categorical variables, the percentage for each category is shown with a 95% confidence interval. As described in the chapter on Study Design and Methods, in order to account for the correlation among respondents based on the complicated survey design, these analyses were conducted using weighted data with Jackknife Replications to estimate the standard errors. Thus, the tables presented in this section include estimates (e.g., means and proportions) as well as their respective confidence intervals.

Cancer risk profiles and behaviors

As described in the previous chapter, risk profiles were developed as indices of primary risk behaviors (e.g., smoking, alcohol consumption, physical inactivity and BMI) and secondary risk behaviors (e.g., failure to participate in screening for cervical, breast, colorectal and prostate cancers). For the total 2003 CHIS sample, the mean primary

Table 14. Distributions of cancer risk profiles and selected sociodemographic and health characteristics for 2003 CHIS respondents and by study inclusion/exclusion groups.

Characteristics	Total CHIS Sample, N=42,044 Mean/Percentage (95% CI)	Inclusion, N=35,203 Mean/Percentage (95% CI)	Exclusion, N=6,841 Mean/Percentage (95% CI)
Cancer Risk Profiles and Risk Behaviors			
Primary Risk Profile**	**1.77 (1.76-1.77)**	**1.77 (1.76-1.77)**	**1.76 (1.75-1.78)**
Secondary Risk Profile**			
Overall population (n=32,315)	**1.47 (1.46-1.48)**	**1.48 (1.47-1.50)**	**1.37 (1.37-1.41)**
Females, 18-39 (n=7,938)	1.26 (1.25-1.28)	1.28 (1.26-1.30)	1.14 (1.10-1.19)
Females, 40-49 (n=5,023)	1.32 (1.30-1.34)	1.32 (1.30-1.35)	1.3 (1.25-1.36)
Females, ≥ 50 (n=11,606)	1.43 (1.42-1.44)	1.45 (1.43-1.46)	1.38 (1.35-1.40)
Males, ≥ 50 (n=7,748)	1.88 (1.86-1.90)	1.95 (1.93-1.98)	1.61 (1.57-1.65)
BMI (%)‡			
Underweight/Normal	44.44 (43.74-45.15)	44.31 (43.60-45.03)	45.3 (43.58-47.03)
Overweight	35.15 (34.53-35.77)	35.12 (34.42-35.81)	35.39 (33.89-36.92)
Obese	20.41 (19.90-20.93)	20.57 (20.02-21.13)	19.31 (18.06-20.63)
Walking (%)**			
Missing (Proxy)	0.50 (0.42-0.60)	--	3.84 (3.21-4.58)
Unable to walk	0.56 (0.48-0.65)	0.48 (0.40-0.56)	1.11 (0.81-1.42)
Walk for transportation and fun/exercise	26.32 (25.70-26.94)	26.68 (25.99-27.37)	23.91 (22.42-25.45)
Walk for transportation or fun/exercise	45.93 (45.35-46.51)	46.26 (45.59-46.92)	43.74 (42.14-45.36)
Did not walk for at least 10 minutes	26.70 (26.13-27.27)	26.59 (25.98-27.21)	27.4 (25.99-28.85)
Smoking (%)**			
Missing (Proxy)	0.50 (0.42-0.60)	--	3.84 (3.21-4.58)
Never	59.24 (58.59-59.89)	60.62 (59.93-61.30)	50.06 (48.58-51.54)
Former	23.82 (23.22-24.43)	22.75 (22.13-23.38)	30.97 (29.55-32.42)
Current	16.44 (15.91-16.99)	16.64 (16.07-17.22)	15.13 (13.91-16.44)

Table 14 (continued)

Characteristics	Total CHIS Sample, N=42,044 Mean/Percentage (95% CI)	Inclusion, N=35,203 Mean/Percentage (95% CI)	Exclusion, N=6,841 Mean/Percentage (95% CI)
Alcohol Consumption (%)**			
Missing (Proxy)	0.5 (0.42-0.60)	--	3.84 (3.21-4.58)
0 drinks	42.39 (41.77-43.00)	42.00 (41.35-42.64)	44.98 (43.48-46.48)
1-2 drinks	41.23 (40.60-41.86)	41.24 (40.57-41.91)	41.14 (39.69-42.60)
3 or more drinks	15.89 (15.42-16.37)	16.76 (16.25-17.29)	10.04 (8.98-11.21)
Pap Smear (%)**	*N=24,567*	*N=20,212*	*N=4,355*
Recent	83.23 (82.62-83.83)	83.28 (82.60-83.94)	82.96 (81.35-84.46)
Ever, but not recent	9.92 (4.49-10.38)	9.29 (8.81-9.79)	13.5 (12.32-14.77)
Never	6.84 (6.41-7.31)	7.43 (6.89-8.00)	3.54 (2.75-4.54)
Mammography (%)**	*N=16,629*	*N=13,252*	*N=3,377*
Recent	76.08 (75.17-76.98)	75.62 (74.55-76.66)	78.2 (76.24-80.05)
Ever, but not recent	14.17 (13.45-14.92)	13.98 (13.19-14.81)	15.04 (13.39-16.85)
Never	9.75 (9.13-10.40)	10.4 (9.66-11.18)	6.76 (5.73-7.96)
Colorectal Cancer Screening (%)**	*N=19,354*	*N=14,813*	*N=4,541*
Recent	52.24 (51.17-53.31)	50.03 (48.79-51.26)	60.45 (58.63-62.25)
Ever, but not recent	17.97 (17.25-18.72)	17.65 (16.86-18.47)	19.17 (17.70-20.73)
Never	29.79 (28.90-30.70)	32.32 (31.23-33.43)	20.38 (18.88-21.97)
PSA (%)**	*N=7,748*	*N=5,960*	*N=1,788*
Recent	41.35 (39.79-42.94)	37.34 (35.68-39.04)	56.4 (52.88-59.86)
Ever, but not recent	16.84 (15.78-17.95)	15.96 (14.85-17.14)	20.12 (17.41-23.13)
Never	41.81 (40.32-43.31)	46.69 (44.84-48.55)	23.48 (21.26-25.85)

Table 14 (continued)

Characteristics	Total CHIS Sample, N=42,044 Mean/Percentage (95% CI)	Inclusion, N=35,203 Mean/Percentage (95% CI)	Exclusion, N=6,841 Mean/Percentage (95% CI)
Any Perceived Racism(%)**			
Missing (Proxy)	0.50 (0.42-0.60)	--	3.84 (3.21-4.58)
No	47.58 (47.29-48.47)	46.95 (46.30-47.61)	54.08 (52.62-55.54)
Yes	**51.62 (51.04-52.19)**	**53.05 (52.39-53.70)**	**42.08 (40.53-43.64)**
Perceived Racism Index(%)**			
Missing (Proxy)	0.50 (0.42-0.60)	--	3.84 (3.21-4.58)
none	47.88 (47.29-48.47)	46.95 (46.30-47.61)	54.08 (52.62-55.54)
general only	44.59 (44.01-45.18)	45.76 (45.09-46.43)	36.81 (35.21-38.45)
health care only	1.77 (1.59-1.98)	1.78 (1.60-1.99)	1.70 (1.23-2.33)
both (general + health care)	5.25 (4.97-5.55)	5.50 (5.18-5.84)	3.57 (3.02-4.21)
Perceived Racism, General (%)**			
Missing (Proxy)	0.50 (0.42-0.60)	--	3.84 (3.21-4.58)
Never	49.66 (49.06-50.25)	48.74 (48.07-49.41)	55.78 (54.21-57.34)
Rarely	**27.72 (27.21-28.24)**	**28.54 (27.94-29.14)**	**22.27 (21.06-23.53)**
Sometimes/often/all the time	**22.12 (21.68-22.58)**	**22.73 (22.22-23.24)**	**18.11 (16.74-19.56)**
Perceived Racism, Health Care (%)**			
Missing (Proxy)	0.50 (0.42-0.60)	--	3.84 (3.21-4.58)
No	92.48 (92.12-92.82)	92.71 (92.33-93.08)	90.90 (89.83-91.87)
Yes	**7.02 (6.69-7.37)**	**7.29 (6.92-7.67)**	**5.26 (4.52-6.11)**
Sociodemographic & Health Characteristics			
Age (years) (%)**			
18-22	9.80 (9.56-10.04)	10.40 (10.10-10.71)	5.78 (4.89-6.81)
23-39	34.36 (34.12-34.61)	36.24 (35.89-36.59)	21.85 (20.64-23.11)
40-49	20.67 (20.67-20.67)	21.5 (21.34-21.67)	15.13 (14.07-16.25)
50-64	20.44 (20.44-20.44)	19.93 (19.75-20.11)	23.84 (22.65-25.08)

Table 14 (continued)

Characteristics	Total CHIS Sample, N=42,044 Mean/Percentage (95% CI)	Inclusion, N=35,203 Mean/Percentage (95% CI)	Exclusion, N=6,841 Mean/Percentage (95% CI)
65-102	14.73 (14.73-14.73)	11.93 (11.74-12.13)	33.40 (32.12-34.71)
Continuous**	44.39 (44.37-44.42)	42.99 (42.90-43.08)	53.75 (53.17-54.32)
Gender (%)**			
Male	49.01 (49.01-49.01)	50.19 (49.97-50.41)	41.12 (39.64-42.62)
Female	50.99 (50.99-50.99)	49.81 (49.59-50.03)	58.88 (57.38-60.36)
Race/Ethnicity[c] (%)			
Latino	29.97 (29.86-30.09)	32.21 (32.01-32.41)	15.00 (13.76-16.33)
NH API	11.94 (11.92-11.95)	12.83 (12.72-12.94)	5.97 (5.23-6.81)
NH AIAN	0.71 (0.71-0.71)	0.74 (0.71-0.76)	0.55 (0.41-0.74)
NH Black	6.09 (6.07-6.11)	6.52 (6.44-6.60)	3.26 (2.74-3.87)
NH White	48.81 (48.74-48.88)	47.7 (47.47-47.94)	56.19 (54.63-57.73)
NH Other Race	0.22 (0.17-0.29)	--	1.71 (1.32-2.21)
2+ races	2.26 (2.14-2.38)	--	17.32 (16.40-18.27)
Marital Status (%)**			
Married	54.75 (54.12-55.38)	54.44 (53.81-55.08)	56.82 (55.03-58.60)
Other[a]	23.18 (22.70-23.67)	22.3 (21.82-22.78)	29.11 (27.44-30.85)
Never Married	22.06 (21.57-22.56)	23.26 (22.69-23.84)	14.06 (12.79-15.45)
Education (%)*			
Less than High School	20.32 (20.08-20.57)	20.64 (20.28-21.00)	18.21 (16.69-19.84)
High School Diploma or GED	23.75 (23.43-24.07)	23.92 (23.53-24.32)	22.58 (21.09-24.14)
Some college	25.23 (24.77-25.70)	24.99 (24.47-25.51)	26.87 (25.50-28.28)
BA/BS	18.54 (18.11-18.97)	18.61 (18.13-19.10)	18.02 (16.77-19.34)
Graduate School	12.16 (11.84-12.49)	11.84 (11.50-12.18)	14.32 (13.22-15.50)

Table 14 (continued)

Characteristics	Total CHIS Sample, N=42,044 Mean/Percentage (95% CI)	Inclusion, N=35,203 Mean/Percentage (95% CI)	Exclusion, N=6,841 Mean/Percentage (95% CI)
Employment Status (%)			
Missing (Proxy)	0.50 (0.42-0.60)	--	3.84 (3.21-4.58)
Employed	55.23 (54.65-55.81)	57.59 (56.96-58.23)	39.43 (37.76-41.11)
Employed, but not working	6.83 (6.51-7.17)	6.93 (6.59-7.29)	6.14 (5.43-6.95)
Unemployed	37.44 (36.89-37.99)	35.47 (34.87-36.08)	50.59 (48.96-52.22)
Household Income (%)‡			
$0-29,999	34.32 (33.74-34.91)	34.32 (33.69-34.96)	34.30 (32.64-36.00)
$30,000-69,999	32.61 (31.99-33.24)	32.43 (31.76-33.11)	33.83 (32.43-35.27)
≥$70,000	33.07 (32.58-33.55)	33.25 (32.72-33.78)	31.86 (30.29-33.48)
*Continuous***	62159 (61493-62825)	62273 (61501-63046)	61392 (58753-64031)
*Adjusted Household Income***	27419 (27084-27754)	30056 (28667-31445)	27025 (26657-27392)
Poverty Level as % of FPL (%)*			
0-99	15.04 (14.54-15.55)	15.48 (14.93-16.04)	12.12 (10.84-13.52)
100-199	18.91 (18.34-19.49)	18.99 (18.40-19.60)	18.34 (16.94-19.82)
200-299	13.98 (13.55-14.43)	13.77 (13.34-14.21)	15.43 (14.30-16.62)
300-399	10.26 (9.88-10.65)	10.32 (9.89-10.75)	9.86 (8.90-10.92)
≥ 400	41.81 (41.32-42.30)	41.44 (40.89-42.00)	44.26 (42.55-45.98)
General Health Condition[b]**	2.53 (2.51-2.54)	2.50 (2.48-2.51)	2.72 (2.68-2.75)
Insurance Coverage (%)			
Yes	83.41 (82.97-83.83)	82.47 (81.99-82.94)	89.68 (88.54-90.72)
No	16.59 (16.17-17.03)	17.53 (17.06-18.01)	10.32 (9.28-11.46)

*p-value <0.05; **p-value <0.0001; ‡p-value ≥ 0.05; note p-values are from Chi-square tests for overall comparison of distributions for inclusion and exclusion groups.
Design-based analyses were conducted in SUDAAN using raked weights and Jackknife Repeated Replication method.
Cancer risk profiles were measured with indices of primary and secondary risk behaviors, each with a range of 1=lowest cancer risk to 3=highest cancer risk
adjusted for number of persons in household. a-Widowed/Separated/Divorced/Living with partner; b-self-reported health status (1-5), 1=excellent, 5=poor; c-NH is Non-Hispanic

behavioral cancer risk profile is 1.77 (with a range of 1.00-3.00). For the total 2003 CHIS sample, the mean secondary cancer risk behavioral profile is 1.47 (with a range of 1.00-3.00). Distributions for the total 2003 CHIS sample are also presented for each risk behavior that contributed to the risk profiles in Table 14. For Body Mass Index, approximately 45% of the population reported being underweight or normal weight, with 35% overweight and 20% obese. For walking, approximately, a quarter of the population reported walking at least 10 minutes for both transportation and fun/exercise, half reported walking for either transportation or fun/exercise and another quarter reported not having walked for either of these reasons. For smoking, 60% of the population reported never smoking, with just under 25% reported smoking formerly and 16% reported being current smokers. For alcohol consumption, about 40% reported not drinking alcohol in the last 30 days, with another 40% reporting having had 1-2 drinks per occasion and 16% reported having 3 or more drinks per occasion. Over 80% of females 18 years and older reported being up-to-date with Pap Smears, with almost 10% being ever screened though not recently, and 7% never screened. Over 75% of females 40 years and older reported being up-to-date with mammograms, with 14% being ever screened though not recently, and almost 10% never screened. Over 50% of persons 50 years and older were up-to-date with colorectal cancer screening, with almost 18% having reported ever screened though not recently, and 30% never screened. Over 40% of males 50 years and older reported being up-to-date with prostate cancer screening, with 17% being ever screened though not recently, and over 40% being never screened. Overall, the inclusion group had average risk profiles and proportions more similar to the total 2003 CHIS sample, while those for the inclusion group were different.

Compared to the inclusion group, the exclusion group has lower mean risk profiles, i.e., exhibited less cancer-related risk. The difference in mean primary cancer risk behavioral profile between the two groups is 0.01 (the inclusion group = 1.77; the exclusion group = 1.76). The difference in secondary cancer risk behavioral profile between the two groups is 0.11 (the inclusion group = 1.48; the exclusion group = 1.37). Comparing the univariate distributions for each cancer risk behavior used in building the profiles, by inclusion and exclusion group, demonstrate that there no statistically significant differences for Body Mass Index (BMI), but there are statistically significant differences for all other risk behaviors. For primary risk behaviors, it appears that those in the exclusion group were more likely to be physically inactive, based on walking, and less likely to participate in smoking and high-volume alcohol consumption. For walking, those in the exclusion group have a higher proportion of those unable to walk (1.11% vs. 0.48%) and slightly lower proportions of those who were walking for transportation and/or fun/exercise (43.74% vs. 46.26%). For smoking, the exclusion group has a lower proportion of persons who had never smoked (50.06% vs. 60.62%) and a higher proportion of persons who were former smokers (30.97% vs. 22.75%). The difference between proportion of smokers in the exclusion group and inclusion group is marginal (15.13% vs. 16.64%). For alcohol consumption, the exclusion group has a higher proportion of persons who did not drink (44.98% vs. 42.00%) and a lower proportion of those had 3 or more drinks at one sitting (10.04% vs. 16.76%).

For secondary risk behaviors, across all four cancer screenings assessed, the exclusion group has a lower proportion of respondents who have never been screened and a higher proportion of respondents who have ever been screened though not recently. For

cervical cancer, both groups have similar proportions of respondents who have been screened recently with a Pap Smear (82.96% vs. 83.28%); the exclusion group has a higher proportion of those who were ever screened (13.50% vs. 9.29%) and a lower proportion of those who were never screened (3.54% vs. 7.43%). For breast cancer, the exclusion group had a slightly higher proportion of respondents who had been recently screened with mammography (78.20% vs. 75.62%) as well as of those who had ever been screened (15.04% vs. 13.98%); the exclusion group had a lower proportion of respondents who had never been screened (6.76% vs. 10.40%). For both colorectal and prostate cancer screenings, the exclusion group had a higher proportion of those who had been recently screened, by almost 10% (60.45% vs. 50.03%) and 20% (56.40% vs. 37.34%), respectively. The difference for proportions of never screened for these two cancers was almost 10% (20.38% vs. 32.32%) and 20% (23.48% vs. 46.69%), respectively. There was little difference among those who had ever been screened for colorectal cancer (19.17% vs. 17.65%); the exclusion group had a higher proportion of those who had ever been screened for prostate cancer (20.12% vs. 15.96%).

Perceived racism in general and in health care contexts

As discussed previously, there are four measures of perceived racism. The first is a binary variable that assesses whether respondent had experienced racism (either in general and/or in health care). The second is an index that captures perceived racism in both contexts (i.e., the response groups are none, in general only, in health care only, and both in general and in health care). The last two variables measure perceived racism in general and in health care. As presented in Table 14, among the 2003 CHIS total sample over 50% of its respondents reported having experienced racism. Looking across both

measures of racism, in general and in health care, just under 50% of the population reported no experiences of racism, 45% reported having experienced racism in general, 2% in health care, and 5% in both general and in health care. For perceived racism in general, 50% reported never experiencing racism, slightly over 25% reported rarely experiencing racism and slightly less than 25% reported more frequent experiences of racism. For perceived racism in health care, 7% reported having experienced racism in this setting. There is little difference between the total 2003 CHIS sample and this study's sample (or inclusion group).

Compared to the inclusion group, the exclusion group has a higher proportion of persons who had no exposure to racism (54.08% vs. 46.95%) and a lower proportion of persons who had been exposed to racism (42.08% vs. 53.05%). For the perceived racism index, the exclusion group has a lower proportion of respondents who had been exposed to racism in general (36.81% vs. 45.76%), a similar proportion of persons who had been exposed to racism in health care only (1.70% vs. 1.78%), and a lower proportion of persons who had been exposed to racism in general and in health care (3.57% vs. 5.50%) compared to the inclusion group. For perceived racism in general, the exclusion group has a higher proportion of persons who had never experienced racism (55.78% vs. 48.74%) and lower proportions of persons who had experienced racism rarely (22.27% vs. 28.54%) and sometimes, often or all the time (18.11% vs. 22.73%) compared to the inclusion group. For perceived racism in health care, the exclusion group has slightly lower proportions of both those who never experienced racism in health care (90.90% vs. 92.71%) and those that had experienced racism in health care (5.26% vs. 7.29%); the exclusion group includes those persons who had missing responses to this question

(3.84% vs. 0%). In summary, across all the measures of racism, those in the exclusion group were less likely to have experienced perceived racism.

Sociodemographic characteristics

The mean age for the total 2004 CHIS sample of 42,044 is 44.39 (44.37-44.42) years. The total sample is approximately 49% (49.01-49.01) male and 51% (50.99-50.99) female. The race/ethnicity distribution is as follows: 30% (29.86-30.09) Latino, 12% (11.92-11.95) Asian Pacific Islander, 6% (6.07-6.11) African American, <1% (0.71-0.71) American Indian/Alaskan Native and 49% (48.74-48.88) White. In addition, <0.25% (0.17-0.29) reported some other race and 2% (2.14-2.38) identified as being 2 or more races. Of the total sample, 55% (54.12-55.38) reported as being married, 23% (22.70-23.67) as widowed/divorced/other, and 22% (21.57-22.56) as never married. The distribution for the highest level of education attained among the total CHIS sample is 20% (20.08-20.57) for less than high school, 24% (23.43-24.07) for high school graduation or GED, 25% (24.77-25.70) for some college or completed associate's degree, 19% (18.11-18.97) for completed bachelor's degree, and 12% (11.84-12.49) for graduate school. The mean unadjusted household income was approximately $62,000 (61,492.75-62,824.56) and the adjusted household income was approximately $27,400 (27084.31-27754.20). The inclusion group has similar distributions to total 2003 CHIS sample for age, gender, race/ethnicity, marital status, educational achievement, unadjusted household income, and poverty level.

Compared to the inclusion, the exclusion group is older (53.75 vs. 42.99), has a higher proportion of females (58.88% vs. 49.81%), a higher proportion of Whites (56.19% vs. 47.70%) and lower proportions of Latinos (15.00% vs. 32.21%),

Asian/Pacific Islanders (5.97% vs. 12.83%), American Indian/Alaskan Natives (0.55% vs. 0.74%), and African Americans (3.26% vs. 6.52%). With respect to educational achievement, those in the exclusion group have a lower proportion of those who had not completed high school (18.21% vs. 20.64%) and a higher proportion of those who had attended some graduate school (14.32% vs. 11.84%) compared to the inclusion group. For employment status, the exclusion group has a much lower proportion of those who are employed (39.43% vs. 57.59%) and a higher proportion of those who are unemployed (50.59% vs. 35.47%). For adjusted household income, the exclusion group has a mean that is $3,000 dollars less than that for the inclusion group ($27,025 vs. $30,056). For poverty level, the exclusion group has a lower proportion of those in the lowest category, 0-99% of the FPL, (12.12% vs. 15.48%) and a higher proportion of those in the highest category, ≥ 400% of the FPL (44.26% vs. 41.44%) compared to the inclusion group. The exclusion group has a slightly higher proportion of married (56.82% vs. 54.44%), a higher proportion of other (29.11% vs. 22.30%) and a slightly lower proportion of never married (14.06% vs. 23.26%) compared to the inclusion group.

Health status and access

On average, the self-reported health status of the total 2003 CHIS sample is 2.53 (2.51-2.54) (on a scale of 1-5 with 1 being excellent and 5 being poor). Approximately 83% (82.97-83.83) of the total 2003 CHIS sample had health insurance and 17% (16.17-17.03) were currently uninsured. Again, these distributions are similar for the inclusion group. The exclusion group has a higher mean score for health status at 2.72 (2.68-2.75) reporting on average slightly worse health status than the inclusion group at 2.50 (2.48-

2.51). The exclusion group has a higher proportion of persons who had health insurance compared to those in the inclusion group (89.68% vs. 82.47%).

Area-level characteristics

Distribution of Individuals by county characteristics

Table 15 provides descriptive findings of county-level characteristics such as segregation and socioeconomic characteristics. The first column represents unweighted distributions and the remaining columns represent distributions using sample-design based analyses. The unweighted distributions have means that are lower than those in the weighted analyses for the Dissimilarity Indices, Interaction Indices (except for segregation of AI/ANs and African-Americans), and socioeconomic characteristics. In the weighted analyses, there were little differences between the inclusion and exclusion groups across these county characteristics.

County characteristics

Table 16 and Table 17 provide descriptive findings of county-level characteristics with counties as the unit of analyses. Table 16 presents county-level characteristics across all 58 counties in California. Table 17 presents county-level characteristics stratified by aggregate racial/ethnic groups and their respective counties that will be included in the race-specific multi-level analyses. Of the total 58 counties in California, 54 remain in the race-stratified analysis for Latinos, 47 for APIs, 51 for AI/ANs, 44 for African-Americans and all 58 for Whites. The mean Dissimilarity Indices for the all counties in California range from 0.26 for AI/ANs to 0.42 for African-Americans. Using categorical variables for these indices, representing counties as having low segregation,

Table 15. County-level Characteristics with 2003 CHIS respondents as unit of analyses.

	Total (unweighted) (n=42044)	Total[a] (N=42044)	Inclusion[a] (n=35203) Mean/%	Exclusion[a] (n=6841) Mean/%
Dissimilarity Index (DI)				
DI: Latino	0.48	0.51	0.51	0.50
DI: API	0.41	0.43	0.43	0.42
DI: AI/AN	0.33	0.34	0.34	0.33
DI: African-American	0.53	0.54	0.54	0.53
DI:White	0.43	0.46	0.46	0.45
Dissimilarity Index				
Latino**				
low	13.70	6.75	6.49	8.48
moderate	61.60	65.49	65.52	65.34
high	24.60	27.76	27.99	26.19
API**				
low	12.60	7.08	6.80	8.95
moderate	87.40	92.92	93.20	91.05
high	--	--	--	--
AI/AN**				
low	30.30	24.90	24.50	27.56
moderate	68.40	74.71	75.09	72.20
high	1.30	0.40	0.42	0.24
African-American**				
low	9.20	4.44	4.31	5.29
moderate	49.50	57.78	57.61	58.89
high	41.40	37.79	38.08	35.82
White**				
low	17.80	8.64	8.35	10.60
moderate	82.20	91.36	91.65	89.40
high	--	--	--	--

Table 15 (continued)

	Total (unweighted) (n=42044)	Total[a] (N=42044)	Inclusion[a] (n=35203) Mean/%	Exclusion[a] (n=6841) Mean/%
Interaction Index (II)				
II: Latino	0.46	0.42	0.42	0.44
II: API	0.67	0.65	0.65	0.66
II: AI/AN	0.96	0.97	0.97	0.97
II: African-American	0.64	0.63	0.63	0.64
II: White	0.35	0.36	0.36	0.35
Interaction Index				
Latino**				
low	13.60	6.97	6.67	9.01
moderate	47.30	47.62	47.70	47.07
high	39.10	45.41	45.63	43.92
API*				
low	39.00	32.07	31.73	34.35
moderate	61.00	67.93	68.27	65.65
high	--	--	--	--
AI/AN‡				
low	97.70	99.23	99.22	99.28
moderate	2.30	0.77	0.78	0.72
high	--	--	--	--
African-American**				
low	38.40	34.88	34.72	35.99
moderate	25.90	33.03	32.82	34.47
high	35.70	32.08	32.47	29.54
White**				
low	--	--	--	--
moderate	51.10	49.26	49.80	45.64
high	48.90	50.74	50.20	54.36

Table 15 (continued)

	Total (unweighted) (n=42044)	Total[a] (N=42044)	Inclusion[a] (n=35203) Mean/%	Exclusion[a] (n=6841) Mean/%
Hypersegregation				
African-Americans**				
No	64.30	67.92	67.53	70.46
Yes	35.70	32.08	32.47	29.54
***Latinos*‡**				
No	75.40	72.24	72.01	73.81
Yes	24.60	27.76	27.99	26.19
Owner occupied (%)	47.81	48.15	48.12	48.36
Female headed household (%)	18.32	18.34	18.36	18.23
Home value (median)	224267.00	228528.00	228853.00	226356.00
Family income (median)	53597.00	54291.00	54309.00	54169.00
Household income (median)	47208.00	48301.00	48328.00	48122.00
Per capita income	22544.00	22790.00	22794.00	22770.00
Percent at ≤ 100% FPL	14.38	14.16	14.17	14.08
Proportion at or below 100% of Federal Poverty Line* (%)				
Low	35.50	33.09	33.13	32.80
Moderate	23.12	28.30	28.04	29.99
High	41.38	38.62	38.83	37.20
Health Professionals Shortage Area‡				
No areas	26.70	21.36	21.42	20.92
All areas	0.10	0.05	0.05	0.05
Some areas	73.10	78.59	78.53	79.03

Table 15 (continued)

	Total (unweighted) (n=42044)	Total[a] (N=42044)	Inclusion[a] (n=35203) Mean/%	Exclusion[a] (n=6841) Mean/%
Rural/Urban Continuum**				
Metro counties				
Counties in metro areas of 1 million population or more	68.80	77.53	77.74	76.15
Counties in metro areas of 250,000 to 1 million population	14.06	15.80	15.81	15.77
Counties in metro areas of fewer than 250,000 population	11.11	4.29	4.22	4.76
Non-metro counties				
Urban population of 20,000 or more adjacent to a metro area	2.48	1.06	0.99	1.53
Urban population of 20,000 or more, not adjacent to a metro area	1.04	0.37	0.36	0.48
Urban population of 2,500 to 19,999, adjacent to a metro area	1.10	0.43	0.42	0.53
Urban population of 2,500 to 19,999, not adjacent to a metro area	1.11	0.39	0.36	0.59
Completely rural or less than 2,500 urban population, adjacent to a metro area	0.30	0.12	0.11	0.19

*p-value <0.05; **p-value <0.0001; ‡p-value ≥ 0.05; note p-values are from Chi-square tests for overall comparison of distributions for inclusion and exclusion groups.
a. Design-based analyses were conducted in SUDAAN using raked weights and Jackknife Repeated Replication method.

Table 16. County-level characteristics for all counties (n=58 counties).

Segregation Measures	***Latino***	***API***	***AI/AN***	***African-American***	***White***
Dissimilarity Index (mean)	0.34	0.31	0.26	0.42	0.31
Low segregation (%)	46.60	46.60	63.80	27.60	51.70
Moderate segregation (%)	51.70	53.40	34.50	56.90	48.30
High segregation (%)	1.70	--	1.70	15.50	--
Interaction Index (mean)	0.64	0.85	0.95	0.84	0.27
Low segregation (%)	44.80	79.30	96.60	72.40	--
Moderate segregation (%)	39.70	20.70	3.40	24.10	20.70
High segregation (%)	15.50	--	--	3.40	79.30
Hypersegregation					
No (%)	98.30			96.60	
Yes (%)	1.70			3.40	

Sociodemographic Characteristics	**TOTAL**
Proportion at or below 100% of Federal Poverty Line (%)	
Low	32.76
Moderate	32.76
High	34.48
Health Professionals Shortage Area (primary care) (%)	
No areas	24.10
Some areas	74.10
All areas	1.70
Rural/Urban Continuum (%)	
Metro counties	
Counties in metro areas of 1 million population or more;	27.59
Counties in metro areas of 250,000 to 1 million population;	18.97
Counties in metro areas of fewer than 250,000 population;	17.24
Non-metro counties	
Urban population of 20,000 or more adjacent to a metro area;	8.62
Urban population of 20,000 or more, not adjacent to a metro area;	1.72
Urban population of 2,500 to 19,999, adjacent to a metro area;	10.34
Urban population of 2,500 to 19,999, not adjacent to a metro area;	8.62
Completely rural or less than 2,500 urban population, adjacent to a metro area;	6.90
Completely rural or less than 2,500 urban population, not adjacent to a metro area	0.00

Table 17. County-level characteristics by inclusion/exclusion criteria for race/ethnicity specific MLM models.

	Latino (n=54)		*API (n=47)*		*AI/AN (n=51)*		*African-American (n=44)*		*White (n=58)*
	Inclusion	Exclusion	Inclusion	Exclusion	Inclusion	Exclusion	Inclusion	Exclusion	Inclusion
Segregation Measures									
Dissimilarity Index (mean)	0.36	0.08	0.34	0.16	0.27	0.20	0.43	0.39	0.31
Low segregation (%)	42.60	100.00	34.00	100.00	62.70	71.40	22.70	42.90	51.70
Moderate segregation (%)	55.60	0.00	66.00	0.00	35.30	28.60	65.90	28.60	48.30
High segregation (%)	1.90	0.00	--	--	2.00	0.00	11.40	28.60	--
Interaction Index (mean)	0.62	0.94	0.81	0.98	0.95	0.95	0.81	0.92	0.27
Low segregation (%)	40.70	100.00	74.50	100.00	96.10	100.00	65.90	92.90	--
Moderate segregation (%)	42.60	0.00	25.50	0.00	3.90	0.00	29.50	7.10	20.70
High segregation (%)	16.70	0.00	--	--	--	--	4.50	0.00	79.30
Hypersegregation									
No (%)	98.10	100.00					95.50	100.00	
Yes (%)	1.90	0.00					4.50	0.00	
Sociodemographic Characteristics									
Proportion at or below 100% of Federal Poverty Line (%)									
Low	33.33	25.00	29.79	45.45	31.37	42.86	36.36	21.43	32.76
Moderate	33.33	25.00	34.04	27.27	33.33	28.57	29.55	42.86	32.76
High	33.33	50.00	36.17	27.27	35.29	28.57	34.09	35.71	34.48
Health Professionals Shortage Area (primary care) (%)									
No areas	22.20	50.00	23.40	27.30	23.50	28.60	27.30	14.30	24.10
Some areas	1.90	0.00	0.00	9.10	2.00	0.00	0.00	7.10	1.70
All areas	75.90	50.00	76.60	63.60	74.50	71.40	72.70	78.60	74.10

Table 17 (continued)

	Latino (n=54)		*API (n=47)*		*AI/AN (n=51)*		*African-American (n=44)*		*White (n=58)*
	Inclusion	Exclusion	Inclusion	Exclusion	Inclusion	Exclusion	Inclusion	Exclusion	Inclusion
Rural/Urban Continuum (%)									
Metro counties									
Counties in metro areas of 1 million population or more;	29.63		31.91	9.09	31.37		36.36		27.59
Counties in metro areas of 250,000 to 1 million population;	20.37		23.40		19.61	14.29	25		18.97
Counties in metro areas of fewer than 250,000 population;	18.52		21.28		19.61		22.73		17.24
Non-metro counties									
Urban population of 20,000 or more adjacent to a metro area;	9.26		8.51	9.09	9.80		6.82	14.29	8.62
Urban population of 20,000 or more, not adjacent to a metro area;	1.85		2.13		1.96		2.27		1.72
Urban population of 2,500 to 19,999, adjacent to a metro area;	11.11		4.26	36.36	5.88	42.86		42.86	10.34
Urban population of 2,500 to 19,999, not adjacent to a metro area;	7.41	25.00	4.26	27.27	7.84	14.29	6.81	14.29	8.62
Completely rural or less than 2,500 urban population, adjacent to a metro area;	1.85	75.00	4.26	18.18	3.92	28.57		28.57	6.90
Completely rural or less than 2,500 urban population, not adjacent to a metro area	--	--	--	--	--	--	--	--	--

moderate segregation, and high segregation levels, over 50% of counties were classified as having moderate segregation for Latinos, APIs, and African-Americans. Over 60% of counties were classified as having low segregation for AI/ANs and over 50% having low segregation for Whites. No counties were classified as having high segregation for APIs and Whites. Almost 2% of counties were classified as having high segregation for AI/ANs and Latinos; 15% of counties in California were classified as having high segregation for African-Americans.

The mean Interaction Indices across all counties in California range from 0.27 for Whites to 0.95 for AI/ANs. Using categorical variables for these indices, representing counties as having low segregation, moderate segregation, and high segregation levels, high proportions of counties classified as having low segregation levels for APIs, AI/ANs, and African Americans (79.3%, 96.6%, and 72.4%, respectively). For APIs and AI/ANs, there are no counties classified as having high levels of segregation; for Latinos, African-Americans and Whites, 15.5%, 3.4% and 79.3% of the counties are classified as having high levels of segregation, respectively. No counties were classified as having low levels of segregation for Whites. Taking into account both these measures of segregation, majority of the counties were classified as not being hypersegregation for African-Americans or Latinos, with only 3.4% and 1.7% being classified as having hypersegregation for these two groups, respectively.

For poverty, each category included approximately a third of the counties which reflects the construction of the relative poverty measure. Thus, 33% of counties in California had relatively low proportions of their residents at or below 100% of the FPL, 33% had relatively moderate proportions and 34% had relatively high proportions. For

health care resources, approximately 24% of counties were classified as not having areas of primary care health professional shortage, 74% of counties had some areas, and almost 2% had all areas designated as facing a shortage. For rural/urban continuum, no counties in California are designated as being completely rural or having an urban population of less than 2,500 that is not adjacent to a metropolitan area. Almost 65% of counties are designated as metropolitan counties approximately 30% are urban/non-metropolitan counties, and 7% are rural/small urban/non-metropolitan counties.

Findings from stratified analyses presented in Table 17 suggest that in general, counties that will be included in the multi-level analyses will be more likely to have been classified as moderately segregated for all the non-White aggregate racial/ethnic groups. Little differences are apparent between those counties that are included or excluded for socioeconomic characteristics at the county-level.

Figure 2 through Figure 6 present maps for each racial/ethnic group of the state of California with the distribution of segregation for the Dissimilarity Index, for Interaction Index, and for hypersegregation as well as percent distribution for that racial/ethnic group by county. These maps offer an easy comparison across these measures and offer a sense of how these characteristics are distributed geographically. For example, Figure 2 shows that for Latinos, counties identified as having moderate or high segregation for the Dissimilarity Index are also likely to have been identified as having moderate or high segregation for the Interaction Index. It is also evident from these maps that there are low levels of segregation among northern counties for Latinos. Figure 3 which represents these characteristics for Asians and Pacific Islanders demonstrate there are more counties identified as being moderately segregated with the Dissimilarity Index

than with the Interaction Index. It is also evident that California has no counties classified as being hypersegregated for Asians and Pacific Islanders. Figure 4 shows similar patterns/trends experienced by APIs for AIANs. Figure 5 demonstrates that the Dissimilarity Index is more sensitive measure for African-Americans with many more counties classified as either moderate or high segregation compared to the Interaction Index. Figure 6 demonstrates that the Interaction Index is a more sensitive measure of segregation for Whites. In addition, Figure 7 presents distribution of the county-level correlates for California, poverty, health professionals shortage area and rural/urban continuum. For example, the map of the Health Professionals Shortage Areas for primary care demonstrates that California has one county designated as having a shortage throughout the entire county; almost 75% of the counties have been designated as having a shortage in some areas within the county.

Figure 2. Segregation and Composition of Latinos in California.

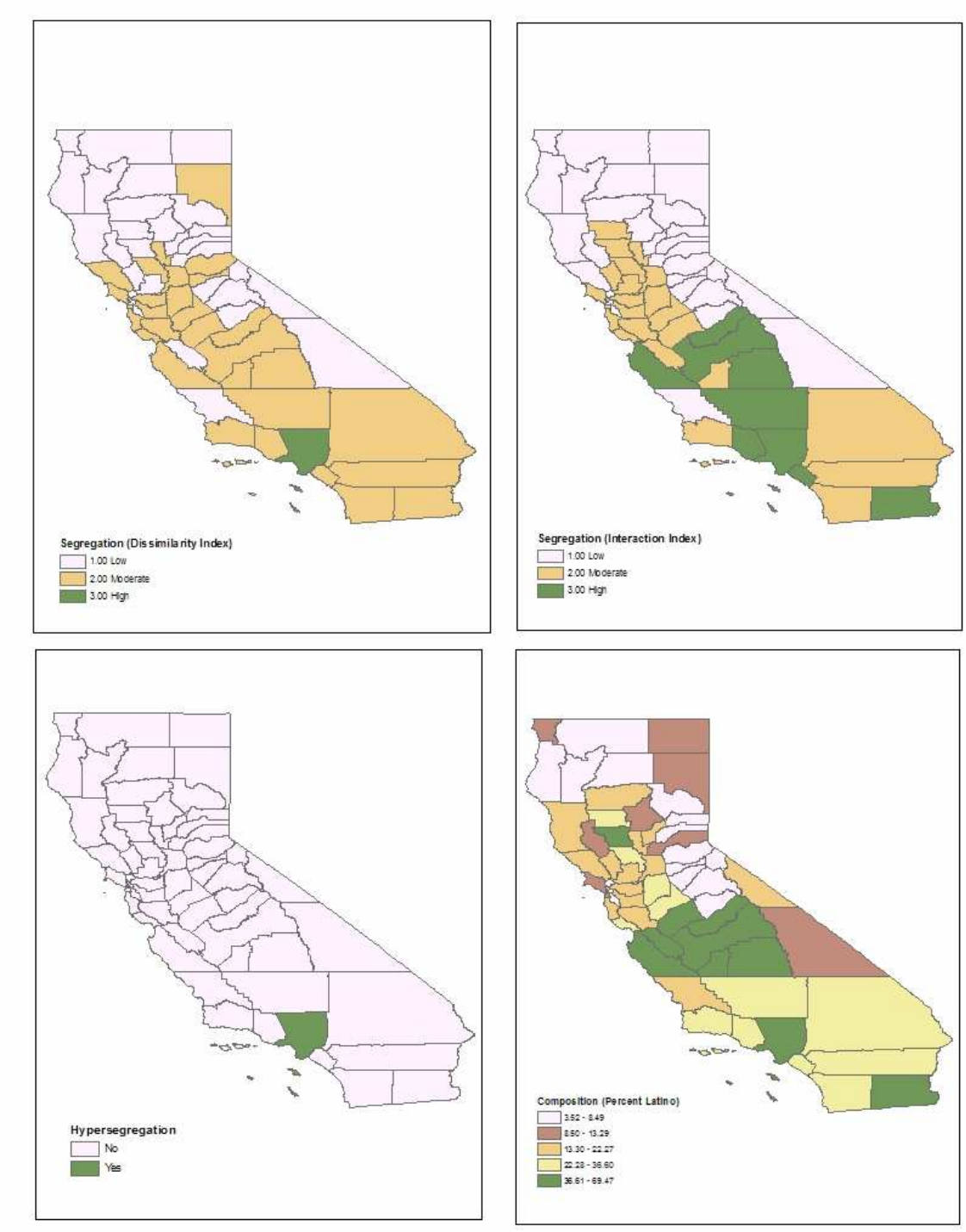


Figure 3. Segregation and Composition of Asians and Pacific Islanders in California.

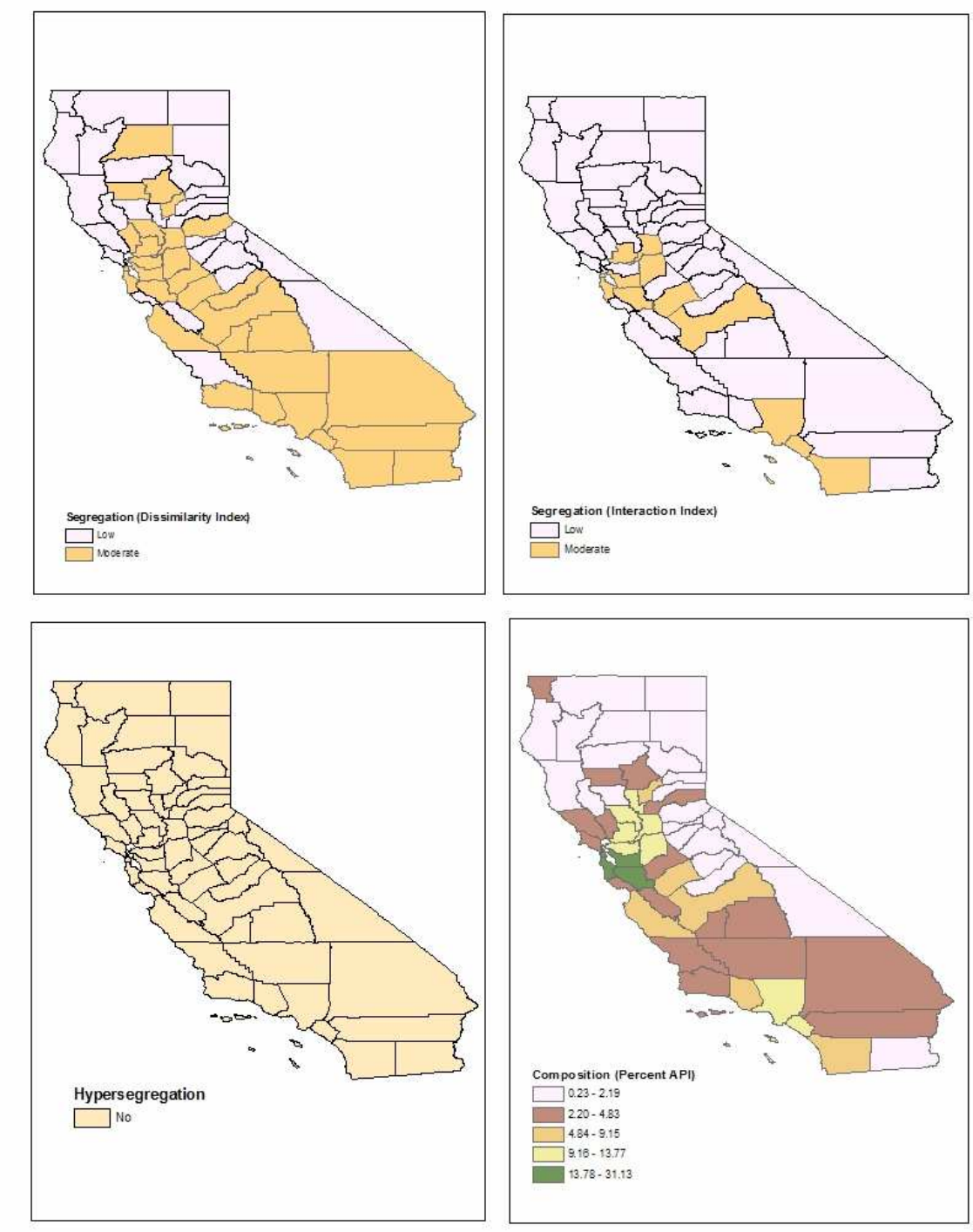


Figure 4. Segregation and Composition of American Indians/Alaska Natives in California.

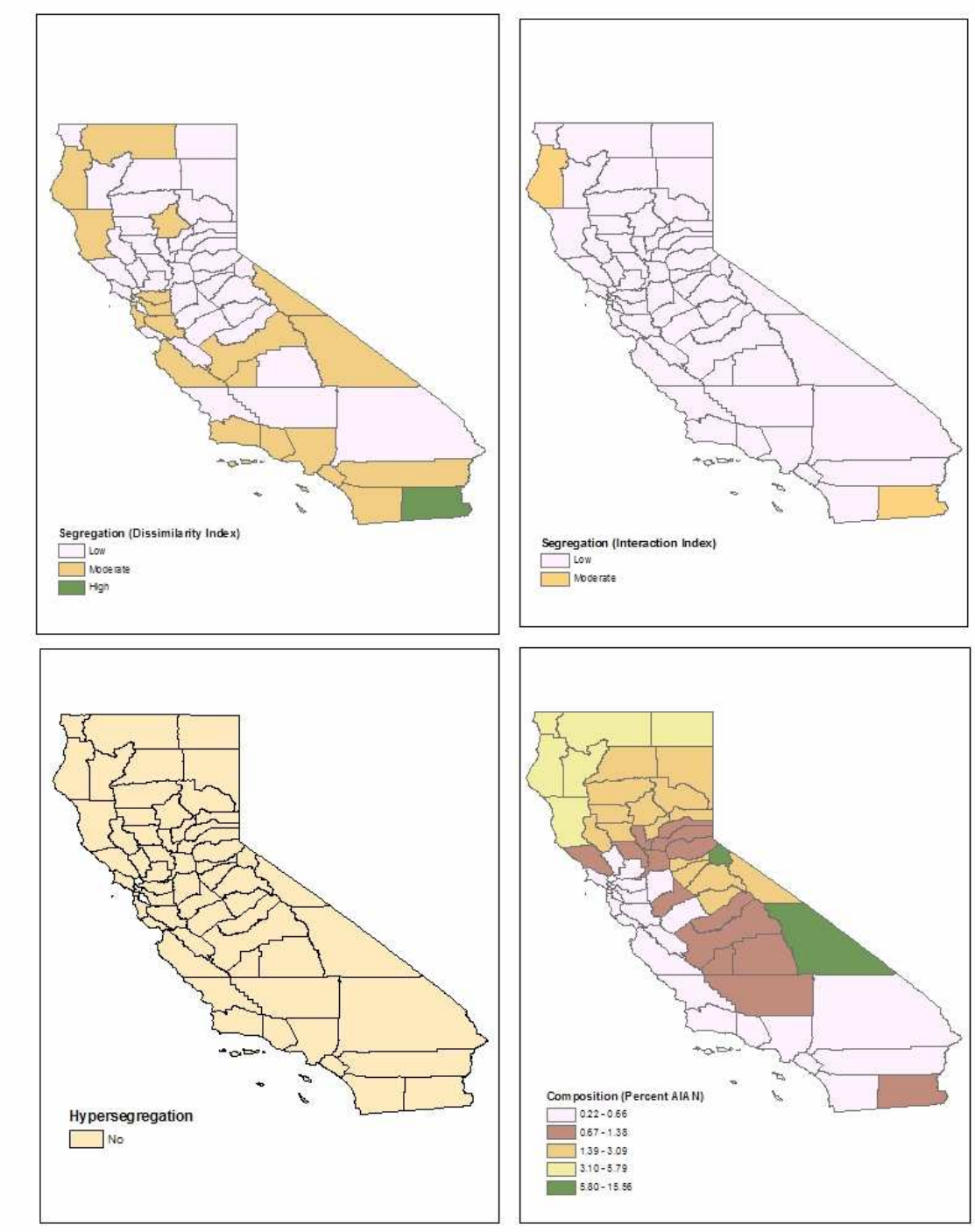


Figure 5. Segregation and Composition of African-Americans in California.

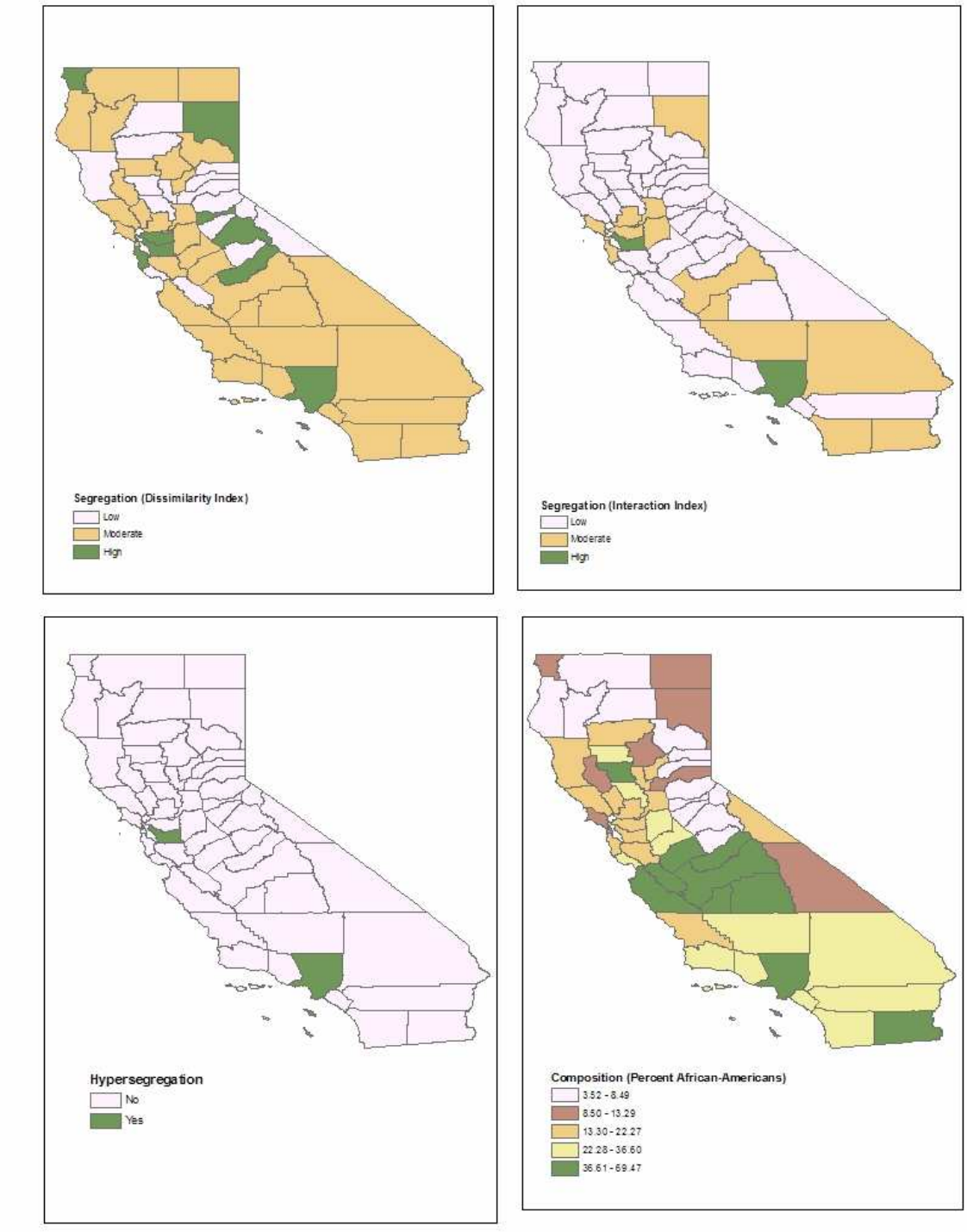


Figure 6. Segregation and Composition of Whites in California.

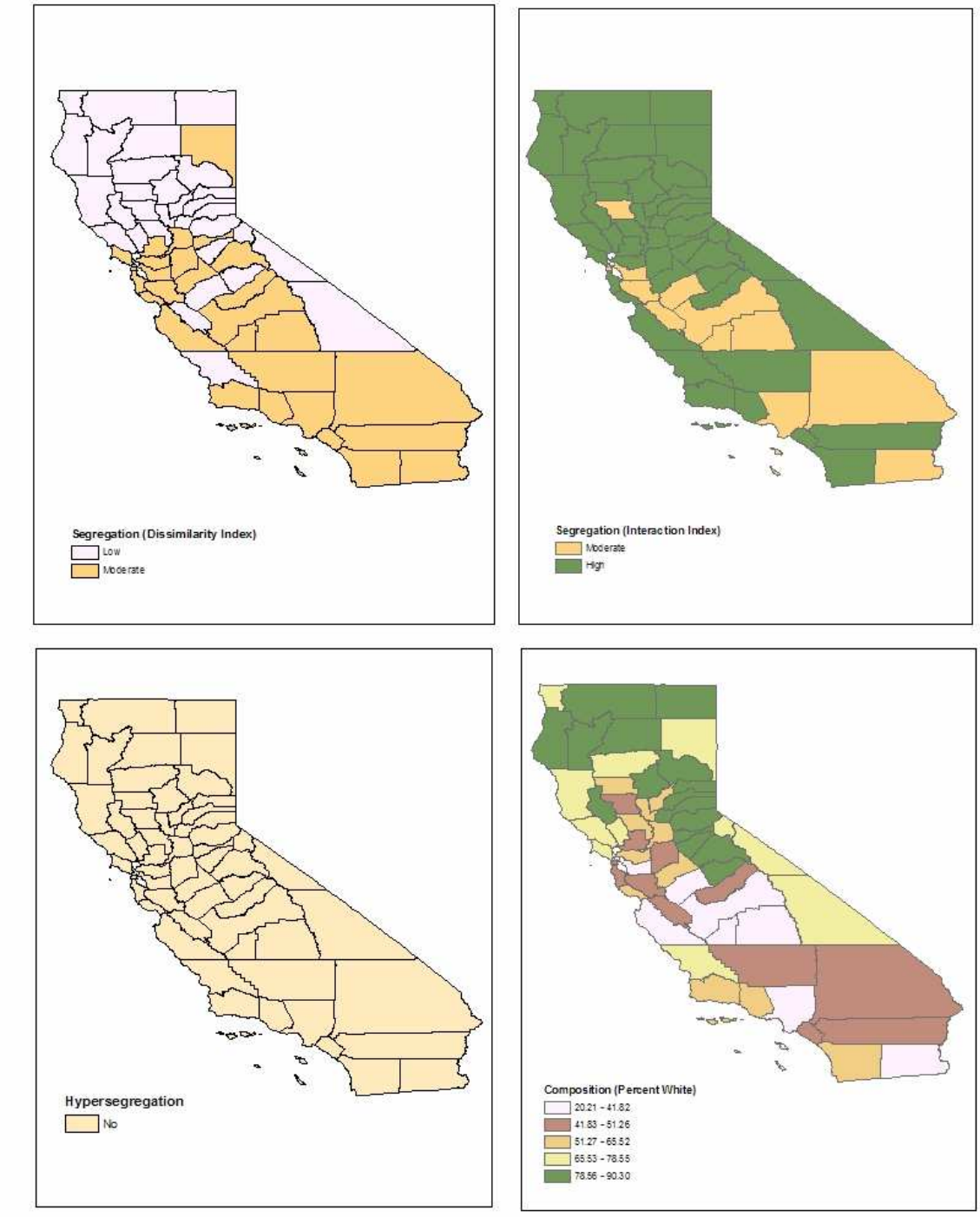
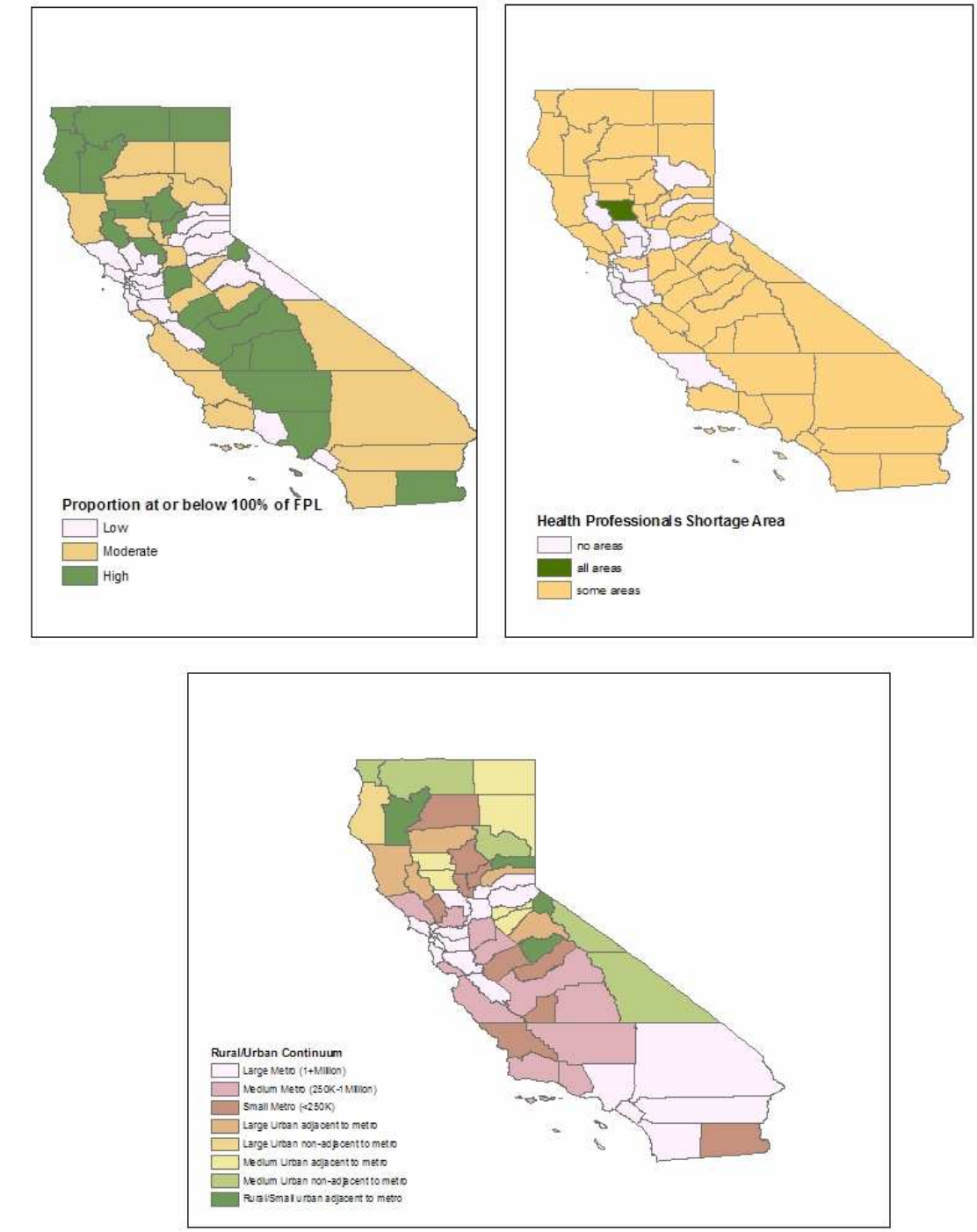


Figure 7. County-level rates of poverty, health professionals shortage and urban/rural status in California.



Chapter 5: Results for Prevalence of Perceived Racism (RQ1)

Prevalence of perceived racism

Total study population

As described in the study design and methods chapter, perceived racism is measured in a variety of ways in this study. The main study variables are perceived racism in general and perceived racism in health care context. A new binary variable was constructed with data from these variables to assess associations with any reporting of experienced racism. A second variable was created to capture the spectrum of perceived racism contexts (i.e., in general only, in health care only and both in general and in health care) within one variable to isolate any characteristics that might define those who only reported experiencing racism in general and/or in health care from those who reported experiencing racism in both.

The prevalence of perceived racism reported by the study sample (N=35,203) is presented in Table 18. For the total study sample, just over half the study population (53.05%; 95% CI=52.39-53.70) reported having experienced racism, either in general and/or in health care contexts. More specifically, almost half of the study sample (45.76%; 95% CI=45.09-46.43) reported having experienced racism in general only and approximately two percent (1.78%; 95% CI=1.60-1.99) reported having experienced racism within the health care context only. Almost six percent (5.50%; 95% CI=5.18-5.84) reported having experienced racism both in general and in health care contexts. With respect to frequency of exposure to racism in general, almost half of the study population (48.74%; 95% CI=48.07-49.41) reported never having experienced racism in general. Less than a quarter of the sample (22.73%; 95% CI=22.22-23.24) reported

experiencing racism in general rarely and just over a quarter of the sample (28.54%; 95% CI=27.94-29.14) reported experiencing racism at least sometimes, often or all of the time. For perceived racism in health care, over ninety percent of the study population (92.71%; 95% CI=92.33-93.08) reported no experiences of racism in health care context and about seven percent (7.29%; 95% CI=6.92-7.67) reported having experienced racism in health care context.

Table 18. Prevalence rates of Perceived Racism in the total study sample.

	Percentage (95% CI) ***(N=35,203)***
Any Perceived Racism	
No	46.95 (46.30-47.61)
Yes	53.05 (52.39-53.70)
Perceived Racism Index	
None	46.95 (46.30-47.61)
General only	45.76 (45.09-46.43)
Health care only	1.78 (1.60-1.99)
Both (general + health care)	5.50 (5.18-5.84)
Perceived Racism, Global	
Never	48.74 (48.07-49.41)
Rarely	22.73 (22.22-23.24)
Sometimes/often/all the time	28.54 (27.94-29.14)
Perceived Racism, Health Care	
No	92.71 (92.33-93.08)
Yes	7.29 (6.92-7.67)

Design-based analyses were conducted in SUDAAN using raked weights and jackknife replication method.

Table 19. Prevalence of perceived racism across aggregation racial/ethnic groups and Latino and API subgroups.

	Any Perceived Racism		Perceived Racism Index		
	No (95% CI)	***Yes (95% CI)***	***General only (95% CI)***	***Health care only (95% CI)***	***Both (95% CI)***
Total Study Population	46.95	53.05	45.76	1.78	5.5
Race/Ethnicity (N=35,203)	(p<0.001)				
Latino	42.81 (41.47-44.16)	**57.19 (55.84-58.53)**	44.3 (42.92-45.69)	3.53 (2.98-4.18)	9.36 (8.65-10.12)
NH API	33.63 (31.78-35.53)	**66.37 (64.47-68.22)**	59.15 (57.19-61.07)	1.68 (1.19-2.37)	5.54 (4.68-6.55)
NH AIAN	36.46 (30.16-43.26)	**63.54 (56.74-69.84)**	54 (47.37-60.49)	1.46 (0.58-3.64)	8.08 (4.75-13.42)
NH Black	15.23 (13.33-17.34)	**84.77 (82.66-86.67)**	71.96 (69.51-74.29)	0.39 (0.18-0.86)	12.42 (10.67-14.41)
NH White	57.83 (56.79-58.87)	**42.17 (41.13-43.21)**	39.44 (38.49-40.40)	0.83 (0.65-1.05)	1.9 (1.66-2.17)
Latin Ethnic groups (n=7,901)	(p<0.001)				
Mexican	43.12 (41.59-44.66)	56.88 (55.34-58.41)	43.75 (42.19-45.33)	3.49 (2.86-4.25)	9.64 (8.82-10.53)
Salvadoran	45.59 (39.00-52.34)	54.41 (47.66-61.00)	35.55 (29.58-42.00)	8.07 (4.35-14.50)	10.79 (7.16-15.94)
Guatemalan	45.94 (38.03-54.06)	54.06 (45.94-61.97)	38.79 (31.05-47.13)	2.33 (0.87-6.06)	12.95 (7.72-20.91)
Central American	40.93 (32.25-50.22)	59.07 (49.78-67.75)	49.16 (40.04-58.83)	2.96 (1.07-7.94)	6.95 (3.83-12.26)
Puerto Rican	42.06 (30.22-54.89)	57.94 (45.11-69.78)	47.84 (36.00-59.94)	1.1 (0.14-7.92)	9 (4.70-16.54)
Latino European	51.35 (41.83-60.78)	48.65 (39.22-58.17)	41.12 (32.34-50.50)	2.26 (0.86-5.82)	5.27 (2.60-10.37)
South American	42.85 (34.89-51.19)	57.15 (48.81-65.11)	45.67 (37.74-53.83)	3.41 (1.81-6.32)	8.07 (4.21-14.89)
Other Latino	48.94 (38.90-59.08)	51.06 (40.92-61.10)	43.29 (34.74-52.25)	2.21 (0.67-7.10)	5.56 (2.36-12.52)
2 or more groups	30.9 (25.94-36.34)	69.1 (63.66-74.06)	59.04 (53.51-64.35)	2.63 (1.24-5.52)	7.43 (5.03-10.84)
Asian Ethnic groups (n=3,646)	(p<0.001)				
Chinese	27.13 (24.02-30.49)	72.87 (69.51-75.98)	64 (60.53-67.32)	1.69 (1.00-2.85)	7.18 (5.53-9.27)
Japanese	23.33 (17.34-30.62)	76.67 (69.38-82.66)	72.94 (65.89-79.00)	0.63 (0.15-2.63)	3.1 (1.41-6.66)
Korean	29.93 (25.52-34.74)	70.07 (65.26-74.48)	61.04 (54.84-66.91)	2.56 (1.15-5.62)	6.46 (4.51-9.17)
Filipino	30.49 (26.06-35.32)	69.51 (64.68-73.94)	62.99 (57.80-67.90)	1.23 (0.52-2.86)	5.29 (3.22-8.57)
South Asian	41.42 (36.17-46.87)	58.58 (53.13-63.83)	54.61 (60.21-48.88)	1.59 (0.45-5.46)	2.38 (1.12-4.99)
Vietnamese	55.91 (49.49-62.15)	44.09 (37.85-50.51)	35.61 (29.85-41.81)	1.93 (0.59-6.11)	6.55 (4.25-9.96)
Southeast Asian	32.78 (20.26-48.34)	67.22 (51.66-79.74)	58.65 (44.99-71.10)	0.93 (0.12-6.68)	7.64 (2.91-18.57)
Cambodian/Other Asian	44.12 (28.90-60.53)	55.88 (39.47-71.10)	35.76 (21.12-53.65)	11.24 (2.81-25.63)	8.88 (2.35-28.27)
2 or more groups	27.81 (18.51-39.53)	72.19 (60.47-81.49)	65.87 (54.08-75.98)	1.98 (0.67-5.67)	4.34 (1.65-10.91)

	Perceived Racism, in General			Perceived Racism in Health Care	
	Never (95% CI)	***Rarely (95% CI)***	***Sometimes/often/all the time (95% CI)***	***No (95% CI)***	***Yes (95% CI)***
Total Study Population	48.74	22.73	28.54	92.71	7.29
Race/Ethnicity (n=35437)	(p<0.001)			(p<0.001)	
Latino	46.34 (45.04-47.65)	**24.08 (23.07-25.12)**	**29.58 (28.41-30.79)**	87.11 (86.12-88.03)	**12.89 (11.97-13.88)**
NH API	35.31 (33.51-37.16)	**35.37 (33.30-37.49)**	**29.32 (27.36-31.35)**	92.78 (91.66-93.76)	**7.22 (6.24-8.34)**
NH AIAN	37.92 (31.48-44.81)	**28.27 (22.44-34.93)**	**33.81 (27.21-41.11)**	90.46 (85.08-94.03)	**9.54 (5.97-14.92)**
NH Black	15.62 (13.65-17.81)	**28.33 (25.87-30.93)**	**56.05 (53.47-58.60)**	87.19 (85.24-88.91)	**12.81 (11.09-14.76)**
NH White	58.66 (57.65-59.67)	**29.74 (28.86-30.64)**	**11.60 (10.99-12.23)**	97.27 (96.93-97.58)	**2.73 (2.42-3.07)**
Latin Ethnic groups (N=7901)	(p<0.001)			(p=0.008)	
Mexican	46.61 (45.13-48.09)	23.24 (22.08-24.45)	30.15 (28.81-31.53)	86.87 (85.80-87.87)	13.13 (12.13-14.20)
Salvadoran	53.66 (46.85-60.33)	18.22 (13.67-23.87)	28.12 (22.37-34.68)	81.14 (74.29-86.49)	18.86 (13.51-25.71)
Guatemalan	48.27 (40.11-56.51)	14.79 (10.20-20.98)	36.94 (29.44-45.13)	84.72 (76.67-90.35)	15.28 (9.65-23.33)
Central American	43.9 (34.97-53.24)	28.36 (20.20-38.23)	27.75 (19.50-37.84)	90.09 (83.63-94.18)	9.91 (5.82-16.37)
Puerto Rican	43.16 (31.37-55.77)	26.54 (16.79-39.28)	30.3 (20.19-42.76)	89.9 (82.17-94.51)	10.1 (5.49-17.83)
Latino European	53.61 (44.08-62.89)	27.76 (20.75-36.06)	18.63 (13.30-25.47)	92.47 (87.14-95.70)	7.53 (4.30-12.86)
South American	46.26 (38.34-54.37)	27.76 (20.94-35.79)	25.98 (19.40-33.85)	88.52 (81.61-93.06)	11.48 (6.94-18.39)
Other Latino	51.15 (41.53-60.70)	27.5 (19.71-36.97)	21.34 (14.80-29.77)	92.23 (85.12-96.10)	7.77 (3.90-14.88)
2 or more groups	33.53 (28.32-39.18)	37.09 (31.65-42.88)	29.37 (24.88-34.31)	89.94 (86.11-92.80)	10.06 (7.20-13.89)
Asian Ethnic groups (n=3646)	(p<0.001)			(p=0.007)	
Chinese	28.82 (25.56-32.33)	39.75 (36.13-43.50)	31.42 (28.20-34.83)	91.13 (89.08-92.83)	8.87 (7.17-10.92)
Japanese	23.96 (17.97-31.19)	48.14 (41.16-55.19)	27.9 (22.50-34.02)	96.27 (92.68-98.13)	3.73 (1.87-7.32)
Korean	32.49 (27.72-37.66)	41.26 (34.80-48.04)	26.24 (21.02-32.23)	90.97 (86.87-93.89)	9.03 (6.11-13.13)
Filipino	31.72 (27.13-36.69)	34.65 (29.79-39.86)	33.63 (28.76-38.87)	93.48 (90.09-95.77)	6.52 (4.23-9.91)
South Asian	43.01 (37.74-48.45)	29.83 (24.41-35.88)	27.16 (22.63-32.21)	96.03 (92.37-97.97)	3.97 (2.03-7.63)
Vietnamese	57.85 (51.63-63.82)	21.07 (16.92-25.92)	21.08 (16.91-25.96)	91.52 (87.30-94.43)	8.48 (5.57-12.70)
Southeast Asian	33.71 (21.06-49.22)	21.42 (13.33-32.56)	44.88 (31.40-59.16)	91.43 (80.72-96.45)	8.57 (3.55-19.28)
Cambodian/Other Asian	55.36 (37.81-71.67)	25.31 (12.30-45.02)	19.33 (9.82-34.53)	79.88 (58.48-91.80)	20.12 (8.20-41.52)
2 or more groups	29.79 (20.17-41.61)	37.24 (25.78-50.34)	32.97 (22.02-46.14)	93.68 (87.25-96.98)	6.32 (3.02-12.75)

*p-value <0.05; **p-value <0.0001; ‡p-value ≥ 0.05; note p-values are from Chi-square tests for overall comparison of distributions across racial/ethnic groups.
Design-based analyses were conducted in SUDAAN using raked weights and jackknife Repeated Replication method.

Prevalence of perceived racism by race/ethnicity

The prevalence of perceived racism varied by aggregate racial/ethnic groups as well as by subgroups for Latinos and Asian/Pacific Islanders (APIs) are presented in Table 19. Across the board, non-White racial/ethnic groups reported higher prevalence of perceived racism with African-Americans at the high end of the range (84.77%; 95% CI=82.66-86.67) and Latinos at the low end (57.91%; 95% CI=55.84-58.53), with each group having more than half their population having experienced racism compared to Whites (42.17%; 95% CI=41.13-43.21). Similar trends are apparent for those who experienced perceived racism in general only and in general and in health care. For perceived racism in general only, non-White racial/ethnic groups had higher prevalence compared to Whites (39.44%; 95% CI=38.49-40.40), with African-Americans at the high end of the range (71.96%; 95% CI=69.51-74.29) and Latinos at the low end (44.30%; 95% CI=42.92-45.69). For perceived racism in general and in health care, non-White racial/ethnic groups had higher prevalence compared to Whites (1.90%; 95% CI=1.66-2.17), with African-Americans at the high end of the range (12.42%; 95% CI=69.51-74.29) and this time APIs at the low end (5.54%; 95% CI=4.68-6.55). For perceived racism in health care only, the trend is different. Across all the aggregate racial/ethnic groups, African-Americans have the lowest prevalence (0.39%; 95% CI=0.18-0.86) and Latinos having the highest prevalence (3.53%; 95% CI=2.98-4.18); Whites had the second lowest prevalence (0.83%; 95% CI=0.65-1.05).

When evaluating each perceived racism measure (in general and in health care) separately, for the most part, the trend is that non-White racial/ethnic groups experience perceived racism in general at higher prevalence than Whites (see Table 19). For those

who never experienced perceived racism in general, Whites had the highest prevalence (58.66%; 95% CI=57.65-59.67); among non-White aggregate racial/ethnic groups, Latinos had the highest prevalence (46.34%; 95% CI=45.04-47.65) and African-Americans had the lowest (15.62%; 95% CI=13.65-17.81) for never having experienced racism in general. For those who experienced perceived racism in general rarely, Whites had the lowest prevalence (11.60%; 95% CI=10.99-12.23); among non-White aggregate racial/ethnic groups, African-Americans had the highest prevalence (56.05%; 95% CI=53.47-58.60) and APIs had the lowest (29.32%; 95% CI=27.36-31.35) for having experienced racism in general rarely. For those who experienced perceived racism in general more frequently, the trend changes with Whites not having the lowest prevalence (29.74%; 95% CI=28.86-30.64) but Latinos having the lowest (24.08%; 95% CI=23.07-25.12) and APIs having the highest (35.37%; 95% CI=33.30-37.49). The trend for perceived racism in health care is that Whites had the lowest prevalence of perceived racism (2.73%; 95% CI=2.42-3.07); among non-White aggregate racial/ethnic groups, Latinos (12.89%; 95% CI=11.97-13.88) and African-Americans (12.81%; 95% CI=11.09-14.76) had high prevalence and APIs had the lowest (7.22%; 95% CI=6.24-8.34) for perceived racism in health care.

When using aggregate racial/ethnic groups, there is often as much variation within subgroups as there are between these aggregate groups. As the data permitted, subgroup analyses were conducted for Latinos and APIs which showed substantial variation within aggregate groups that can mask experiences of specific subgroups. For example, in the analyses with aggregate racial/ethnic groups, approximately 57% of Latinos had reported experiencing any racism. In an analysis with Latino subgroups, the range of experiencing

racism is at 69.10%, for those who identified as belonging to two or more Latino subgroups, at the high end and 48.65%, for Latino Europeans, at the low end. Similarly, for APIs, the aggregate analyses shows that approximately 66% reported experiencing any racism; the subgroup analyses presents a range that is at 76.67%, for Japanese, at the high end and 44.09%, for Vietnamese, at the low end. For Latinos, for perceived racism in general, Salvadorans were the highest proportion (53.66%; 95% CI=46.85-60.33) among those who had never experienced racism with those who identified with 2 or more Latino subgroups having the lowest proportion (33.53%; 95% CI=28.32-39.18). Among those who rarely experienced racism in general, those who identified with 2 or more Latino subgroups had the highest proportion (37.09%; 95% CI=31.65-42.88) with Salvadorans having the highest proportion (14.79%; 95% CI=10.20-20.98). Among those who more frequently experienced racism in general, Guatemalans had the highest proportion (36.94%; 95% CI=29.44-45.13) and Latino Europeans had the lowest proportion (18.63%; 95% CI=13.30-25.47). For Asian and Pacific Islanders, for perceived racism in general, among those who had never experienced racism in general, Vietnamese had the highest proportion (57.85%; 95% CI=51.63-63.82) and Japanese had the lowest proportion (23.96%; 95% CI=17.97-31.19). Among those who rarely experienced racism in general, Japanese had the highest proportion (48.14%; 95% CI=41.16-55.19) and Vietnamese had the lowest proportion (21.07%; 95% CI=16.92-25.92). Among those who had more frequently experienced racism in general, Southeast Asians had the highest proportion (44.88%; 95% CI=31.40-59.16) and Cambodians/Other Asians had the lowest proportion (19.33%; 95% CI=9.82-34.53).

For perceived racism in health care, for Latinos, among those who had experienced racism in health care, Salvadorans had the highest proportion (18.86%; 95% CI=13.51-25.71) and Other Latinos had the lowest proportion (7.77%; 95% CI=3.90-14.88). For APIs, among those who had experienced racism in health care, Cambodian/Other APIs had the highest proportion (20.12%; 95% CI=8.20-41.52) and Japanese having the lowest proportion (3.73%; 95% CI=1.87-7.32).

Characteristics associated with perceived racism

Total study population

Individual characteristics

As described in the Study Design and Methods chapter, logistic regressions were employed to assess associations between perceived racism (regardless of context) and a variety of individual and community characteristics that are relevant in understanding the relationship between health behaviors and perceived racism. First, associations are presented for demographic characteristics, followed by socioeconomic characteristics, access to health care, psychosocial factors, immigration/acculturation factors, perceptions of neighborhood resources and health outcomes. The results of these analyses are presented in Table 21. Associations between segregation and other county-level characteristics and perceived racism were assessed and are presented in Table 22.

Demographic characteristics

All non-White aggregate racial/ethnic groups are more likely to have reported experiencing racism compared to Whites, with African-Americans being almost 8 times

Table 20. Unadjusted Odds Ratios and 95%Confidence Intervals for perceived racism by individual characteristics for the total population and across racial/ethnic groups.

	Total Study Population (N=35,203) ORs (95% CI)	Latinos (N=7901) ORs (95% CI)	APIs (N=3646) ORs (95% CI)	AI/ANs (N=306) ORs (95% CI)	African-Americans (N=2361) ORs (95% CI)	Whites (N=20989) ORs (95% CI)
DEMOGRAPHICS						
Age (years)	(<0.001)	(<0.001)	(<0.001)	(0.415)	(<0.001)	(<0.001)
18-22	1.12 (0.99-1.28)	1.04 (0.83-1.29)	0.99 (0.71-1.38)	0.61 (0.14-2.55)	0.38 (0.22-0.67)	1.25 (1.02-1.52)
23-39	1.16 (1.07-1.25)	1.23 (1.05-1.44)	1.17 (0.91-1.50)	0.58 (0.25-1.37)	0.67 (0.41-1.09)	1.08 (0.96-1.21)
40-49 (reference)	1.00	1.00	1.00	1.00	1.00	1.00
50-64	0.77 (0.71-0.84)	0.97 (0.78-1.20)	0.81 (0.62-1.05)	0.55 (0.22-1.36)	0.82 (0.51-1.33)	0.69 (0.62-0.77)
65-102	0.32 (0.29-0.35)	0.45 (0.35-0.56)	0.41 (0.31-0.55)	0.38 (0.14-1.00)	0.32 (0.21-0.51)	0.24 (0.21-0.27)
Gender	(<0.001)	(<0.001)	(0.031)	(0.800)	(0.875)	(<0.001)
Male (reference)	1.00	1.00	1.00	1.00	1.00	1.00
Female	0.78 (0.74-0.82)	0.80 (0.72-0.90)	0.80 (0.65-0.98)	1.07 (0.61-1.88)	0.97 (0.68-1.38)	0.70 (0.64-0.75)
Race/Ethnicity	(<0.001)					
Latino	1.83 (1.70-1.97)					
Asian Pacific Islander	2.71 (2.46-2.98)					
American Indian/Alaska Native	2.39 (1.80-3.17)					
African American	7.64 (6.48-8.99)					
White (reference)	1.00					
Latino Subgroups	(0.001)					
Mexican (reference)	1.00					
Salvadoran	0.90 (0.68-1.20)					
Guatemalan	0.89 (0.64-1.25)					
Central American	1.09 (0.75-1.60)					
Puerto Rican	1.04 (0.62-1.76)					
Latino European	0.72 (0.49-1.06)					
South American	1.01 (0.73-1.40)					
Other Latino	0.79 (0.52-1.21)					
2+ Latino Subgroups	1.69 (1.32-2.18)					

Table 20 (continued)

	Total Study Population (N=35,203) ORs (95% CI)	Latinos (N=7901) ORs (95% CI)	APIs (N=3646) ORs (95% CI)	AI/ANs (N=306) ORs (95% CI)	African-Americans (N=2361) ORs (95% CI)	Whites (N=20989) ORs (95% CI)
Asian Subgroups	(<0.001)					
Chinese (reference)	1.00					
Japanese	1.22 (0.82-1.84)					
Korean	0.87 (0.66-1.15)					
Filipino	0.85 (0.65-1.11)					
South Asian	0.53 (0.40-0.70)					
Vietnamese	0.29 (0.22-0.40)					
Southeast Asian	0.76 (0.39-1.51)					
Cambodian/Other Asian	0.47 (0.24-0.91)					
2+ Asian Subgroups	0.97 (0.56-1.68)					
SOCIOECONOMIC CHARACTERISTICS						
Educational Achievement	(<0.001)	(<0.001)	(<0.001)	(0.265)	(<0.001)	(<0.001)
< High School	0.74 (0.66-0.83)	0.33 (0.24-0.45)	0.22 (0.15-0.31)	0.91 (0.23-3.65)	0.13 (0.06-0.31)	0.70 (0.56-0.88)
High School Diploma or GED	0.88 (0.80-0.96)	0.49 (0.36-0.67)	0.53 (0.39-0.73)	0.91 (0.22-3.78)	0.28 (0.12-0.68)	0.77 (0.69-0.86)
Some college	1.02 (0.94-1.12)	0.63 (0.45-0.86)	0.68 (0.49-0.94)	1.39 (0.42-4.60)	0.48 (0.22-1.03)	0.96 (0.86-1.06)
BA/BS	0.98 (0.89-1.08)	0.83 (0.58-1.17)	0.85 (0.64-1.14)	0.48 (0.11-2.01)	0.51 (0.21-1.22)	0.88 (0.79-0.99)
Graduate School (reference)	1.00	1.00	1.00	1.00	1.00	1.00
Employment Status	(<0.001)	(<0.001)	(<0.001)	(0.940)	(<0.001)	(<0.001)
Employed (reference)	1.00	1.00	1.00	1.00	1.00	1.00
Employed, but not working	0.95 (0.84-1.07)	1.14 (0.90-1.46)	0.84 (0.59-1.21)	0.96 (0.06-14.70)	1.00 (0.38-2.65)	0.87 (0.74-1.03)
Unemployed	0.68 (0.64-0.73)	0.71 (0.63-0.81)	0.64 (0.52-0.78)	0.90 (0.50-1.62)	0.42 (0.29-0.63)	0.62 (0.57-0.66)
Poverty Level (%FPL)	(0.010)	(<0.001)	(<0.001)	(0.215)	(0.011)	(<0.001)
0-99	0.86 (0.76-0.97)	0.60 (0.50-0.72)	0.58 (0.44-0.76)	2.24 (0.88-5.75)	0.54 (0.32-0.91)	1.17 (0.98-1.40)
100-199	0.98 (0.88-1.09)	0.81 (0.67-0.98)	0.63 (0.44-0.89)	1.41 (0.52-3.84)	0.77 (0.40-1.48)	1.05 (0.88-1.26)
200-299 (reference)	1.00	1.00	1.00	1.00	1.00	1.00
300-399	0.90 (0.80-1.02)	0.97 (0.73-1.30)	1.63 (1.12-2.39)	1.62 (0.38-6.99)	0.66 (0.34-1.30)	0.88 (0.76-1.02)
≥ 400	0.88 (0.80-0.96)	1.17 (0.94-1.44)	1.74 (1.35-2.23)	0.98 (0.40-2.39)	1.30 (0.75-2.26)	0.91 (0.81-1.02)

Table 20 (continued)

	Total Study Population (N=35,203) ORs (95% CI)	Latinos (N=7901) ORs (95% CI)	APIs (N=3646) ORs (95% CI)	AI/ANs (N=306) ORs (95% CI)	African-Americans (N=2361) ORs (95% CI)	Whites (N=20989) ORs (95% CI)
HEALTH CARE ACCESS						
Insurance Coverage	(<0.001)	(0.168)	(0.750)	(0.075)	(0.272)	(<0.001)
Yes (reference)	1.00	1.00	1.00	1.00	1.00	1.00
No	1.26 (1.16-1.37)	0.91 (0.79-1.04)	0.96 (0.73-1.25)	2.00 (0.93-4.28)	1.59 (0.69-3.64)	1.66 (1.48-1.85)
Usual Source of Care	(<0.001)	(0.236)	(0.076)	(0.244)	(0.427)	(<0.001)
Yes (reference)	1.00	1.00	1.00	1.00	1.00	1.00
No	1.23 (1.12-1.35)	0.91 (0.78-1.07)	1.31 (0.97-1.78)	1.88 (0.65-5.48)	0.75 (0.37-1.53)	1.60 (1.39-1.86)
Doctor visit(s) in past year	(0.073)	(0.307)	(0.814)	(0.238)	(0.148)	(<0.001)
Yes (reference)	1.00	1.00	1.00	1.00	1.00	1.00
No	1.08 (0.99-1.18)	0.92 (0.78-1.08)	1.03 (0.81-1.31)	1.92 (0.64-5.74)	0.67 (0.39-1.15)	1.21 (1.08-1.34)
Problem with Provider	(<0.001)	(<0.001)	(<0.001)	(0.164)	(0.030)	(<0.001)
Problem	2.02 (1.86-2.18)	2.75 (2.31-3.27)	1.68 (1.31-2.16)	2.06 (0.96-4.42)	1.76 (0.96-3.23)	1.91 (1.72-2.12)
No problem (reference)	1.00	1.00	1.00	1.00	1.00	1.00
Did not see a provider	1.21 (1.07-1.36)	1.12 (0.90-1.40)	1.07 (0.72-1.58)	1.24 (0.29-5.25)	0.50 (0.22-1.15)	1.44 (1.25-1.65)
Problem in Accessing Care	(<0.001)	(<0.001)	(<0.001)	(0.014)	(0.242)	(<0.001)
Problem	2.18 (1.99-2.39)	2.51 (2.08-3.02)	1.84 (1.38-2.45)	3.90 (1.59-9.60)	1.69 (0.92-3.10)	2.20 (1.98-2.45)
No problem (reference)	1.00	1.00	1.00	1.00	1.00	1.00
Did not need health care services	1.21 (1.11-1.32)	1.15 (0.95-1.40)	1.10 (0.83-1.46)	1.17 (0.36-3.84)	0.99 (0.44-2.21)	1.31 (1.15-1.49)
Satisfaction with Health Care	(<0.001)	(<0.001)	(<0.001)	(0.151)	(0.140)	(<0.001)
Don't Know/Refused	1.04 (0.88-1.23)	1.02 (0.74-1.41)	0.82 (0.49-1.37)	0.75 (0.10-5.84)	0.44 (0.14-1.41)	1.19 (0.96-1.47)
Did not use health care services	1.34 (1.13-1.59)	1.21 (0.92-1.58)	2.70 (1.50-4.87)	0.69 (0.18-2.71)	1.34 (0.58-3.10)	1.40 (1.14-1.71)
<5	2.31 (1.99-2.68)	2.41 (1.72-3.39)	1.87 (1.14-3.07)	4.75 (0.93-24.39)	1.78 (0.79-4.01)	2.50 (2.10-2.98)
5-7	1.91 (1.78-2.06)	2.35 (1.99-2.78)	1.61 (1.32-1.95)	3.02 (0.98-9.35)	1.54 (1.01-2.34)	1.84 (1.67-2.03)
8-10 (reference)	1.00	1.00	1.00	1.00	1.00	1.00
PSYCHOSOCIAL FACTORS						
Religious Participation	(<0.001)	(0.002)	(0.194)	(0.345)	(0.830)	(0.285)
Yes (reference)	1.00	1.00	1.00	1.00	1.00	1.00
No	0.86 (0.80-0.91)	0.82 (0.73-0.93)	1.13 (0.94-1.37)	0.73 (0.38-1.40)	0.96 (0.67-1.38)	1.05 (0.96-1.15)

Table 20 (continued)

	Total Study Population (N=35,203) ORs (95% CI)	Latinos (N=7901) ORs (95% CI)	APIs (N=3646) ORs (95% CI)	AI/ANs (N=306) ORs (95% CI)	African-Americans (N=2361) ORs (95% CI)	Whites (N=20989) ORs (95% CI)
Marital Status	(<0.001)	(0.299)	(<0.001)	(0.012)	(0.059)	(<0.001)
Married (reference)	1.00	1.00	1.00	1.00	1.00	1.00
Widowed/Seperated/Divorced/Living with partner (%)	1.04 (0.97-1.12)	0.95 (0.82-1.10)	0.94 (0.74-1.19)	1.92 (1.09-3.39)	0.74 (0.50-1.10)	1.08 (0.99-1.19)
Never Married (%)	1.53 (1.43-1.63)	1.07 (0.94-1.23)	1.75 (1.39-2.20)	2.87 (1.16-7.08)	0.57 (0.36-0.90)	1.70 (1.54-1.89)
Average Social Resources	(<0.001)	(0.345)	(0.623)	(0.424)	(0.979)	(<0.001)
	0.84 (0.81-0.87)	0.97 (0.91-1.03)	1.02 (0.93-1.12)	0.87 (0.62-1.22)	1.00 (0.79-1.26)	0.81 (0.77-0.84)
Binge Drinking	(<0.001)	(0.149)	(0.001)	(0.381)	(0.166)	(<0.001)
Yes	1.25 (1.14-1.37)	1.14 (0.95-1.37)	1.97 (1.32-2.96)	0.73 (0.36-1.49)	1.67 (0.81-3.45)	1.46 (1.29-1.64)
No (reference)	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Cigarette Smoking	(<0.001)	(0.288)	(0.257)	(0.239)	(0.030)	(<0.001)
None (reference)	1.00	1.00	1.00	1.00	1.00	1.00
Less than a pack/day	1.33 (1.20-1.47)	1.17 (0.96-1.43)	1.28 (0.94-1.74)	1.56 (0.75-3.22)	0.63 (0.41-0.95)	1.51 (1.34-1.71)
At least a pack/day	1.15 (1.01-1.32)	1.04 (0.61-1.77)	1.10 (0.53-2.31)	0.61 (0.23-1.66)	1.89 (0.78-4.58)	1.56 (1.32-1.84)
Food Security	(<0.001)	(0.044)	(0.001)	(0.039)	(0.696)	(<0.001)
Food secure + >300% FPL (reference)	1.00	1.00	1.00	1.00	1.00	1.00
Food insecure	1.45 (1.30-1.61)	1.16 (1.00-1.35)	0.58 (0.42-0.80)	2.45 (1.05-5.71)	1.10 (0.69-1.76)	1.81 (1.55-2.12)
Seen cockroaches at home in past 12 months	(<0.001)	(0.868)	(0.488)	(0.152)	(0.510)	(0.003)
Yes	1.25 (1.16-1.35)	0.99 (0.87-1.13)	1.10 (0.84-1.44)	2.06 (0.76-5.54)	1.15 (0.75-1.78)	1.27 (1.09-1.49)
No (reference)	1.00	1.00	1.00	1.00	1.00	1.00
Home ever broken into	(<0.001)	(0.060)	(0.014)	(0.816)	(0.163)	(<0.001)
Yes	1.27 (1.14-1.41)	1.26 (0.99-1.60)	1.56 (1.10-2.23)	0.90 (0.37-2.19)	1.55 (0.84-2.87)	1.28 (1.14-1.45)
No (reference)	1.00	1.00	1.00	1.00	1.00	1.00

Table 20 (continued)

	Total Study Population (N=35,203) ORs (95% CI)	Latinos (N=7901) ORs (95% CI)	APIs (N=3646) ORs (95% CI)	AI/ANs (N=306) ORs (95% CI)	African-Americans (N=2361) ORs (95% CI)	Whites (N=20989) ORs (95% CI)
IMMIGRATION AND ACCULTURATION FACTORS						
Citizenship/Immigration Status	(<0.001)	(<0.001)	(<0.001)	(0.200)	(0.274)	(0.763)
US-born citizen (reference)	1.00	1.00	1.00	1.00	1.00	1.00
Naturalized citizen	1.26 (1.16-1.36)	0.75 (0.64-0.89)	0.53 (0.42-0.67)	--	0.66 (0.25-1.76)	1.01 (0.87-1.18)
Resident with green card	0.98 (0.89-1.09)	0.58 (0.50-0.68)	0.42 (0.31-0.57)	0.45 (0.13-1.54)	0.98 (0.37-2.60)	0.85 (0.62-1.15)
Resident without green card	1.13 (1.00-1.29)	0.68 (0.56-0.83)	0.56 (0.38-0.83)	--	0.35 (0.12-1.07)	0.98 (0.62-1.55)
Language at home	(<0.001)	(<0.001)	(<0.001)	(0.086)	(0.237)	(<0.001)
English only (reference)	1.00	1.00	1.00	1.00	1.00	1.00
English + other language(s)	1.76 (1.66-1.87)	1.18 (1.00-1.40)	0.65 (0.49-0.86)	3.04 (1.11-8.36)	1.60 (0.90-2.83)	1.49 (1.32-1.69)
Other language(s) only	1.01 (0.92-1.11)	0.62 (0.52-0.75)	0.33 (0.25-0.43)	1.72 (0.38-7.83)	0.69 (0.22-2.19)	1.57 (1.22-2.01)
Years in the US	(0.002)	(<0.001)	(<0.001)		(0.033)	(0.361)
< 2	0.59 (0.39-0.91)	0.34 (0.18-0.64)	0.34 (0.18-0.64)	--	0.18 (0.03-1.13)	1.65 (0.50-5.43)
2-4	0.94 (0.79-1.13)	0.64 (0.49-0.84)	0.66 (0.49-0.89)	--	0.32 (0.07-1.38)	0.81 (0.47-1.40)
5-9	0.96 (0.81-1.14)	0.73 (0.57-0.94)	0.51 (0.39-0.66)	--	0.67 (0.17-2.66)	1.01 (0.64-1.61)
10-14	1.23 (1.06-1.42)	0.94 (0.75-1.18)	0.60 (0.46-0.78)	--	5.68 (1.23-26.28)	1.46 (0.98-2.18)
≥ 15 (reference)	1.00	1.00	1.00	1.00	1.00	1.00
NEIGHBORHOOD RESOURCES						
Neighborhood Watch	(0.036)	(0.083)	(0.038)	(0.145)	(0.126)	(0.279)
Yes (reference)	1.00	1.00	1.00	1.00	1.00	1.00
No	0.95 (0.90-1.00)	0.90 (0.80-1.01)	0.82 (0.69-0.99)	1.51 (0.86-2.65)	0.78 (0.56-1.08)	1.04 (0.97-1.12)
Safe Park/Open Space	(<0.001)	(0.009)	(0.017)	(0.031)	(0.080)	(<0.001)
No park	0.98 (0.91-1.07)	1.08 (0.94-1.25)	0.69 (0.54-0.89)	1.16 (0.58-2.33)	0.58 (0.38-0.89)	0.88 (0.80-0.98)
Always safe (reference)	1.00	1.00	1.00	1.00	1.00	1.00
Sometimes safe	1.23 (1.15-1.33)	1.10 (0.96-1.28)	1.07 (0.84-1.36)	1.16 (0.57-2.33)	0.88 (0.61-1.26)	1.21 (1.09-1.33)
Always unsafe	2.04 (1.62-2.58)	1.70 (1.24-2.32)	1.00 (0.55-1.83)	7.45 (1.96-28.39)	1.22 (0.55-2.69)	2.11 (1.51-2.95)
Social Cohesion Scale	(<0.001)	(0.001)	(0.213)	(<0.001)	(0.617)	(<0.001)
	0.57 (0.53-0.61)	0.76 (0.65-0.89)	0.87 (0.71-1.08)	0.35 (0.21-0.60)	0.92 (0.67-1.27)	0.60 (0.55-0.65)

Table 20 (continued)

	Total Study Population (N=35,203) ORs (95% CI)	Latinos (N=7901) ORs (95% CI)	APIs (N=3646) ORs (95% CI)	AI/ANs (N=306) ORs (95% CI)	African-Americans (N=2361) ORs (95% CI)	Whites (N=20989) ORs (95% CI)
HEALTH STATUS	(0.001)	(0.022)	(<0.001)	(0.212)	(0.765)	(0.009)
	1.04 (1.02-1.07)	0.94 (0.89-0.99)	0.77 (0.71-0.84)	1.20 (0.90-1.61)	1.03 (0.87-1.21)	1.05 (1.01-1.09)
Primary Risk Profile	(0.025)	(0.013)	(0.009)	(0.184)	(0.037)	(0.008)
	1.09 (1.01-1.17)	1.21 (1.04-1.40)	1.37 (1.08-1.74)	0.67 (0.37-1.21)	1.64 (1.03-2.62)	1.16 (1.04-1.28)
Secondary Risk Profile	(0.020)	(0.018)	(0.003)	(0.651)	(0.086)	(0.691)
	0.94 (0.90-0.99)	0.87 (0.78-.98)	0.80 (0.69-0.92)	1.13 (0.66-1.93)	0.77 (0.57-1.04)	0.98 (0.90-1.07)

Design-based analyses were conducted in SUDAAN using raked weights and jackknife Repeated Replication method.

as likely (OR=7.64; 95% CI=6.48-8.99), with APIs being almost 3 times as likely (OR=2.71; 95% CI=2.46-2.98), with AI/ANs being over 2 times as likely (OR=2.39; 95% CI=1.80-3.17); and with Latino's being almost twice as likely (OR=1.83; 95% CI=1.70-1.97). Among Latinos, with Mexicans as the reference group, only those who are of 2 or more Latino groups are more likely to experience racism (OR=1.69; 95% CI=1.32-2.18); all the other subgroups are as likely as Mexicans to experience racism as all their 95% CI's included 1. Among APIs, with Chinese as the reference group, no other group was more likely to have experienced racism; Japanese, Koreans, Filipinos, Southeast Asians, and those who identified as two or more Asian groups were as likely as Chinese to have experienced racism (with 95% CI's including 1). Three groups were less likely to have experienced racism and included, in increasing order of decreased likelihood, South Asians (OR=0.53; 95% CI=0.40-0.70), Cambodians/other Asians (OR=0.47; 95% CI=0.25-0.91) and Vietnamese (OR=0.29; 95% CI=0.22-0.40).

The odds of having reported experiencing racism increase with age for those under 40 years and decrease with age for those over fifty years. Those who are 18-22 are 12% more likely to have reported experiencing racism (OR=1.12; 95% CI=0.99-1.28), while those who are 23-39 are 16% more likely to have reported experiencing racism (OR=1.16; 95% CI=1.07-1.25) compared to the reference group, those who are 40-49 years. Those who are 50-64 years are 23% less likely to have reported experiencing racism (OR=0.77; 95% CI=0.71-.84) and those who are 65 and older are 68% less likely to have reported experiencing racism (OR=0.32; 95% CI=0.29-0.35).

Females are less likely to have reported experiencing racism (OR=0.78; 95% CI=0.74-0.82) than males. Persons residing in rural areas were approximately 25% less

likely to have reported experiencing racism (OR=0.73; 95% CI=0.67-0.79) than those in urban areas.

Socioeconomic characteristics

In general, for the various socioeconomic characteristics evaluated, those with higher socioeconomic resources were more likely to have reported experiencing racism with the exception of poverty level. For educational achievement, those who had not completed high school (OR=0.74; 95% CI=0.66-0.83) or had a high school diploma or GED (OR=0.88; 95%CI=0.80-0.96) were less likely to have reported experiencing racism than those who had higher education, including those with some college education (OR=1.02; 95% CI=0.94-1.12), a bachelor's degree (OR=0.98; 95% CI=0.89-1.09) and those who had attended graduate school (the reference group). For employment status, those who were unemployed were approximately 30% less likely to have reported experiencing racism (OR=0.68; 95% CI=0.64-0.73) than those who were employed. For poverty level, which is defined as percent of the Federal Poverty Line, the two groups at the extremes of the ranges, 0-99% (OR=0.86; 95% CI=0.76-0.97) and ≥ 400% (OR=0.88; 95% CI=0.80-0.96), are less likely to have reported experiencing racism compared to those groups in the middle.

Access to health care

Those who had limited or no access to health care were more likely to have reported experiencing racism. Those who were currently uninsured were over 25% more likely to have reported experiencing racism (OR=1.26; 95% CI=1.16-1.37) compared to those who were currently insured. Those who had no usual source of health care were

almost 25% more likely to have reported experiencing racism (OR=1.23; 95% CI=1.12-1.35) compared to those who had no usual source of health care. For the variable problem with provider, those who had a problem were twice as likely to have reported experiencing racism (OR=2.02; 95% CI=1.86-2.18) and those who had not seen a provider were 21% more likely to have reported experiencing racism (OR=1.21; 95% CI=1.07-1.36) compared to those that had no problem with their provider. For the variable problem accessing health care services, those who had a problem were more than twice as likely to have reported experiencing racism (OR=2.18; 95% CI=1.99-2.39) and those who had not needed services were 21% more likely to have reported experiencing racism (OR=1.21; 95% CI=1.11-1.32) compared to those that had no problem accessing health care services. For satisfaction with health care services, those who were least satisfied were more than twice as likely to have reported experiencing racism (OR=2.31; 95% CI=1.99-2.68) and those who were moderately satisfied were almost twice as likely to have reported experiencing racism (OR=1.91; 95% CI=1.78-2.06) compared to those who were most satisfied with their health care services. Those who did not utilize health care services were one-third more likely to have reported experiencing racism (OR=1.34; 95% CI=1.13-1.59) and those who did not response or didn't know how satisfied they were had no statistically significant difference compared to those who were most satisfied with their health care services.

Psychosocial factors

Relationships between perceived racism and three sets of psychosocial factors, social support/resources, coping mechanisms, and competing priorities, suggested that those with more social support/resources were less likely to have reported experiencing

racism while those with unhealthy coping mechanisms and competing priorities are more likely to have reported experiencing racism. For social resources and support these variables included marital status, religious participation and social resources. For marital status, those who were never married were 50% more likely to have reported experiencing racism (OR=1.53; 95% CI=1.43-1.63) compared to those who were married; there were no statistically significant differences between those who were widowed/divorced/living with a partner/other (OR=1.04; 95% CI=0.97-1.12) and those who were married. Those who did not participate in religious services were 15% less likely to have reported experiencing racism (OR=0.86; 95% CI=0.80-0.91) compared to those who had participated in religious services within the past week. For social resources, those with increased social resources were almost 15% less likely to have reported experiencing racism (OR=0.84; 95% CI=0.81-0.87).

Measures of coping mechanisms included binge drinking and heavy cigarette smoking. Those who participated in binge drinking were 25% more likely to have reported having experienced racism (OR=1.25; 95% CI=1.14-1.37) compared to those who had not participated. Those who smoked less than a pack per day of cigarettes were most likely to have reported experiencing racism (OR=1.33; 95% CI=1.20-1.47) followed by those who smoke more than a pack per day (OR=1.15; 95% CI=1.01-1.32) compared to those who did not smoke. Measures of competing priorities included food security, having seen cockroaches at home, and home ever been broken into. Those who were food insecure were almost 50% as likely to have reported experiencing racism (OR=1.45; 95% CI=1.30-1.61) compared to those who were food secure. Those who had seen cockroaches at home were 25% more likely to have reported experiencing racism

(OR=1.25; 95% CI=1.16-1.35) compared to those who had not seen them. Those whose homes had been broken into were over 25% more likely to have reported experiencing racism (OR=1.27; 95% CI=1.14-1.41) compared to those whose homes had not been broken into.

Immigration/acculturation factors

Immigration and acculturation factors included citizenship/immigration status, language spoken at home, and length of residency in the US. Naturalized citizens were most likely to have reported experiencing racism (OR=1.26; 95% CI=1.16-1.36) compared to US-born citizens with the other two groups showing mixed trends but no statistically significant differences. For language spoken at home, those who spoke English and another language were almost twice as likely to have reported having experienced racism (OR=1.76; 95% CI=1.66-1.87) compared to those who only spoke English at home; there were no statistically significant difference between those who only spoke another language at home (OR=1.01; 95% CI=0.92-1.11) and those who only spoke English. For length of residency, those who have lived in the US the least, that is less than 2 years, are least likely to have reported having experienced racism (OR=0.59; 95% CI=0.39-0.91) and those who have lived in the US 10-14 years are most likely to have reported experiencing racism (OR=1.23; 95% CI=1.06-1.42) compared to those who have lived in the US for at least 15 years. There are no statistically significant differences between the other 2 groups and the reference group.

Perceptions of neighborhood resources

Perceptions of neighborhood resources were measured by social cohesion, neighborhood watch programs and neighborhood parks. Those with increased social

cohesion are over 40% less likely to have reported experiencing racism (OR=0.57, 95% CI=0.53-0.61) compared to those who have average social cohesion. For those who have a park within walking distance that is sometimes unsafe, they are 23% more likely to have reported experiencing racism (OR=1.23; 95% CI=1.15-1.33) and those have a park that is always unsafe are twice as likely to have reported experiencing racism (OR=2.04; 95% CI=1.62-2.58) compared to those who have a park that is always safe. Those who do not have a park within walking distance of their home show no statistically significant difference (OR=0.98; 95% CI=0.91-1.07) between them and those who had a park that is always safe. There is no statistically significant difference between those who had no neighborhood watch program (OR=0.95; 95% CI=0.90-1.00) compared to those who had such a resource.

Outcomes: cancer risk profiles, health behaviors and health status

Results from bivariate analyses between perceived racism and various health outcomes are presented in Table 21. Mean primary cancer risk behavioral profiles increase with exposure to perceived racism (regardless of context); however, the trend is reversed for secondary cancer risk behavioral profiles, where risk profiles decrease with exposure to perceived racism. These trends hold for the association between primary risk profiles and perceived racism in general with increasing average risk profiles as frequency of exposure to racism in general increased; for never the mean profile is 1.76 (95% CI=1.75-1.77), for rarely the mean profile is 1.76 (95% CI=1.75-1.77), and for sometimes/often/all the time the mean is 1.79 (95% CI=1.78-1.80). For secondary risk profile, those who experienced racism in general rarely have the lowest risk profile (mean=1.46; 95% CI=1.44-1.48) with those who reported never experiencing racism in

general having the highest (mean=1.50; 95% CI=1.48-1.52); among those who experienced racism in general, there does appear to be a trend of increasing risk with increasing frequency in exposure for this outcome as the mean for sometimes/often/all the time is 0.02 higher than for rarely (mean=1.48; 95% CI=1.46-1.51).

For perceived racism in health care, both cancer risk profiles (of lifestyle behaviors and screening behaviors) were higher than for those who had been exposed to racism in health care. For primary risk profile, the mean is 0.02 higher for those who had experienced perceived racism in health care (mean=1.79; 95% CI=1.76-1.81) compared to those who had not (mean=1.77; 95% CI=1.76-1.77). For secondary risk profile, the mean is 0.01 higher for those who had experienced perceived racism in health care (mean=1.49; 95% CI=1.45-1.53) compared to those who had not (mean=1.48; 95% CI=1.47-1.50).

Table 21. Associations between Cancer Risk Profiles and Perceived Racism

	Primary Risk Profile (N=35,203)	**Secondary Risk Profile (N=26,172)**
Any Perceived Racism	(p<0.001)	(p<0.001)
No (95% CI)	1.76 (1.75-1.77)	1.50 (1.48-1.51)
Yes (95% CI)	1.77 (1.77-1.78)	1.47 (1.46-1.49)
Perceived Racism Index	(p<0.001)	(p<0.001)
General only (95% CI)	1.77 (1.76-1.78)	1.47 (1.45-1.48)
Health care only (95% CI)	1.74 (1.68-1.81)	1.55 (1.46-1.63)
Both (95% CI)	1.8 (1.78-1.83)	1.47 (1.42-1.52)
Perceived Racism (in General)	(p<0.001)	(p<0.001)
Never (95% CI)	1.76 (1.75-1.77)	1.5 (1.48-1.52)
Rarely (95% CI)	1.76 (1.75-1.77)	1.46 (1.44-1.48)
Sometimes/often/all the time (95% CI)	1.79 (1.78-1.80)	1.48 (1.46-1.51)
Perceived Racism (in Health Care)	(p<0.001)	(p<0.001)
No (95% CI)	1.77 (1.76-1.77)	1.48 (1.47-1.50)
Yes (95% CI)	1.79 (1.76-1.81)	1.49 (1.45-1.53)

*p-value <0.05; **p-value <0.0001; ‡p-value ≥ 0.05; note p-values are from Chi-square tests for overall comparison of distributions across racial/ethnic groups.
Design-based analyses were conducted in SUDAAN using raked weights and jackknife Repeated Replication method.

Three sets of health outcomes were included in these analyses including self-reported health status, cancer risk profiles and each of the health behaviors that constitute the risk profiles. For self-reported health status, those who had poorer health status were 4% more likely to have reported experiencing racism (OR=1.04; 95% CI=1.02-1.07) compared to those with average health status. For primary cancer risk profiles, a one unit change in risk profile increased odds of having perceived racism by 9% (OR=1.09; 95% CI=1.01-1.17) compared to those with average risk profile. For secondary cancer risk profiles, a one unit change in risk profile decreased odds of having perceived racism by 6% (OR=0.94; 95% CI=0.90-0.99) compared to those with average risk profile.

All four primary cancer risk factors (BMI, physical inactivity, smoking and alcohol consumption) have statistically significant associations with perceived racism. For BMI, there was no statistically significant difference between those who were classified as overweight and underweight/normal (OR=1.06; 95% CI=1.00-1.12); those who were classified as obese had increased odds of having perceived racism by 9% (OR=1.09; 95% CI=1.01-1.18) compared to those classified as underweight/normal. For walking, all subgroups had decreased odds of perceived racism compared to the reference group, those who walked for transportation and fun/exercise; odds decreased by almost 40% for those unable to walk (OR=0.61; 95% CI=0.43-0.89), by 12% for those who walked for either transportation or fun/exercise (OR=0.88; 95% CI=0.81-0.94) and by 21% for those who did not walk for at least 10 minutes (OR=0.79; 95% CI=0.72-0.86). For smoking, former smokers had a decreased odds of having perceived racism (OR=0.87; 95% CI=0.81-0.93) and current smokers had an increased odds of having perceived racism (OR=1.24; 95% CI=1.13-1.35) compared to those who had never

smoked. For alcohol consumption, there was no statistically significant difference between those who had 1-2 drinks at one occasion and did not drink (OR=1.00; 95% CI=0.94-1.07); those who drank at least 3 drinks at one occasion had in increased odds of having perceived racism by almost 30% (OR=1.28; 95% CI=1.18-1.40) compared to those who did not drink.

Of the secondary cancer risk factors assessed only participation in cervical cancer screening was associated with perceived racism (with statistical significance of $p < 0.05$). For cervical cancer screening, there was no statistically significant difference for having perceived racism between those who had never been screened and those who had recently been screened (OR=1.04; 95% CI=0.88-1.22); those who had ever been screened had decreased odds of having perceived racism compared to those who had recently been screened (OR=0.70; 95% CI=0.61-0.80). For the other cancer screenings, there were no statistically significant differences between those who had been ever screened or never screened and those who had been recently screened.

County characteristics

Regardless of race/ethnicity, associations between segregation measures and perceived racism were statistically significant. For Dissimilarity Indices (DI), in general, as segregation increased odds of having perceived racism increased. Dissimilarity Indices measures whether the proportion of a racial/ethnic group with respect to another reference group at the county level is uniformly distributed among census tracts within the county. Those who lived in a county that had a moderate level of African-American segregation as well as those who lived in a county that had a high level of African-American segregation had increased odds of perceived racism by 34% (OR=1.34; 95%

Table 22. Unadjusted Odds Ratios and 95% Confidence Intervals for perceived racism by county characteristics for the total population and across racial/ethnic groups.

	Total Study Population (N=35,203) ORs (95% CI)	Latinos (N=7901) ORs (95% CI)	APIs (N=3646) ORs (95% CI)	AI/ANs (N=306) ORs (95% CI)	African-Americans (N=2361) ORs (95% CI)	Whites (N=20989) ORs (95% CI)
Dissimilarity Index (DI)						
DI: African-Americans	(<0.001)				(0.203)	
Low (reference)	1.00				1.00	
Moderate	1.34 (1.20-1.49)				1.48 (0.36-6.06)	
High	1.76 (1.59-1.96)				1.00 (0.25-4.00)	
DI: Latinos	(<0.001)	(0.165)				
Low (reference)	1.00	1.00				
Moderate	1.41 (1.29-1.54)	0.87 (0.66-1.14)				
High	1.81 (1.65-1.98)	0.97 (0.72-1.30)				
DI:APIs	(<0.001)		(0.662)			
Low (reference)	1.00		1.00			
Moderate	1.62 (1.50-1.76)		1.11 (0.69-1.78)			
High	--		--			
DI: AI/Ans	(<0.001)			(0.479)		
Low (reference)	1.00			1.00		
Moderate	1.20 (1.13-1.28)			0.82 (0.48-1.42)		
High	1.01 (0.79-1.28)			--		
DI: Whites	(<0.001)					(<0.001)
Low (reference)	1.00					1.00
Moderate	1.60 (1.50-1.72)					1.36 (1.25-1.48)
High						--

Table 22 (continued)

	Total Study Population (N=35,203) ORs (95% CI)	Latinos (N=7901) ORs (95% CI)	APIs (N=3646) ORs (95% CI)	AI/ANs (N=306) ORs (95% CI)	African-Americans (N=2361) ORs (95% CI)	Whites (N=20989) ORs (95% CI)
Interaction Index (II)						
II: African-Americans	(<0.001)				(0.122)	
Low (reference)	1.00				1.00	
Moderate	1.26 (1.16-1.36)				0.91 (0.46-1.80)	
High	1.55 (1.45-1.66)				0.64 (0.34-1.20)	
II: Latinos	(<0.001)	(0.061)				
Low (reference)	1.00	1.00				
Moderate	1.70 (1.57-1.84)	0.75 (0.59-.95)				
High	1.82 (1.65-1.99)	0.76 (0.59-.98)				
II: APIs	(<0.001)		(0.828)			
Low (reference)	1.00		1.00			
Moderate	1.27 (1.21-1.34)		0.97 (0.74-1.27)			
High	--		--			
II: AI/ANs	(<0.001)			(0.312)		
Low (reference)	1.00			1.00		
Moderate	0.72 (0.61-0.84)			2.98 (0.35-25.18)		
High	--					
II: Whites	(<0.001)					(<0.001)
Low (reference)	--					--
Moderate	1.00					1.00
High	0.73 (0.69-0.77)					0.80 (0.074-0.86)
Hypersegregation (H)						
H: African-Americans	(<0.001)				(0.040)	
No (reference)	1.00				1.00	
Yes	1.39 (1.32-1.46)				0.68 (0.47-0.98)	

Table 22 (continued)

	Total Study Population (N=35,203) ORs (95% CI)	Latinos (N=7901) ORs (95% CI)	APIs (N=3646) ORs (95% CI)	AI/ANs (N=306) ORs (95% CI)	African-Americans (N=2361) ORs (95% CI)	Whites (N=20989) ORs (95% CI)
H: Latinos	(<0.001)	(0.107)				
No (reference)	1.00	1.00				
Yes	1.32 (1.25-1.40)	1.11 (0.98-1.27)				
Health Professionals Shortage Area	(0.044)	(0.078)	(0.086)	(0.057)	(0.977)	(0.087)
None (reference)	1.00	1.00	1.00	1.00	1.00	1.00
All areas	0.52 (0.28-0.99)	0.52 (0.21-1.27)	--	0.40 (0.06-2.44)	--	0.61 (0.25-1.49)
Some areas	0.94 (0.88-1.01)	0.86 (0.74-1.00)	1.19 (0.98-1.44)	1.86 (0.84-4.08)	0.99 (0.58-1.69)	0.92 (0.85-1.00)
Proportion at or below 100% of Federal Poverty Line (%)	(<0.001)	(0.677)	(0.185)	(0.043)	(0.175)	(0.019)
Low	1.01 (0.94-1.09)	1.05 (0.88-1.27)	1.05 (0.82-1.35)	0.77 (0.35-1.67)	0.80 (0.45-1.44)	0.97 (0.88-1.07)
Moderate (reference)	1.00	1.00	1.00	1.00	1.00	1.00
High	1.19 (1.11-1.27)	1.07 (0.92-1.26)	1.24 (0.94-1.63)	1.92 (0.93-3.96)	0.64 (0.38-1.06)	1.08 (0.99-1.17)
Rural/Urban Continuum	(<0.001)	(0.272)	(0.087)	(0.496)	(0.875)	(<0.001)
Counties in metro areas of 1 million population or more (reference)	1.00	1.00	1.00	1.00	1.00	1.00
Counties in metro areas of 250,000 to 1 million population	0.84 (0.78-.91)	0.95 (0.80-1.13)	0.82 (0.56-1.19)	2.07 (0.80-5.33)	1.07 (0.62-1.85)	0.89 (0.82-.98)
Counties in metro areas of fewer than 250,000 population	0.66 (0.61-0.71)	0.88 (0.75-1.03)	1.22 (0.79-1.89)	0.73 (0.32-1.74)	1.29 (0.44-3.84)	0.72 (0.65-0.80)

Table 22 (continued)

	Total Study Population (N=35,203) ORs (95% CI)	Latinos (N=7901) ORs (95% CI)	APIs (N=3646) ORs (95% CI)	AI/ANs (N=306) ORs (95% CI)	African-Americans (N=2361) ORs (95% CI)	Whites (N=20989) ORs (95% CI)
Urban population of 20,000 or more adjacent to a metro area	0.53 (0.45-0.63)	0.69 (0.41-1.15)	0.10 (0.00-1.94)	1.52 (0.24-9.74)	--	0.77 (0.64-0.92)
Urban population of 20,000 or more, not adjacent to a metro area	0.54 (0.42-0.68)	1.24 (0.43-3.58)	1.05 (0.02-47.16)	2.75 (0.30-25.21)	--	0.67 (0.50-0.88)
Urban population of 2,500 to 19,999, adjacent to a metro area	0.52 (0.41-0.64)	0.80 (0.41-1.56)	0.15 (0.03-0.67)	0.89 (0.20-3.94)		0.70 (0.55-0.91)
Urban population of 2,500 to 19,999, not adjacent to a metro area	0.61 (0.46-0.80)	2.00 (0.77-5.16)	3.69 (0.23-58.63)	0.86 (0.27-2.70)	--	0.70 (0.52-0.94)
Completely rural or less than 2,500 urban population, adjacent to a metro area	0.69 (0.43-1.10)	--	--	0.92 (0.22-3.78)		0.96 (0.58-1.59)
Completely rural or less than 2,500 urban population, not adjacent to a metro area						

Design-based analyses were conducted in SUDAAN using raked weights and jackknife Repeated Replication method.

CI=1.20-1.49) and 76% (OR=1.76; 95% CI=1.59-1.96), respectively. Those who lived in a county that had a moderate level of Latino segregation as well as those who lived in a county that had a high level of Latino segregation had increased odds of perceived racism by 41% (OR=1.41; 95% CI=1.29-1.54) and 81% (OR=1.81; 95% CI=1.65-1.98), respectively. Those who lived in a county that had a moderate level of API segregation had increased odds of perceived racism by 62% (OR=1.62; 95% CI=1.50-1.76). Those who lived in a county that had a moderate level of AI/AN segregation had increased odds of perceived racism by 20% (OR=1.20; 95% CI=1.13-1.28) and no statistically significant difference between those who lived in a county that had high AI/AN segregation (OR=1.01; 95% CI=0.79-1.28). Those who lived in a county that had a moderate level of White segregation had increased odds of perceived racism by 60% (OR=1.60; 95% CI=1.50-1.72).

For Interaction Indices, in general, as segregation increased odds of having perceived racism also increased, with the exception of the Interaction Index for American Indians/Alaska Natives. Interaction Indices measure the probability of contact or interaction between two groups. Those who lived in a county that had a moderate level of African-American segregation as well as those who lived in a county that had a high level of African-American segregation had increased odds of perceived racism by 26% (OR=1.26; 95% CI=1.16-1.36) and 55% (OR=1.55; 95% CI=1.45-1.66), respectively. Those who lived in a county that had a moderate level of Latino segregation as well as those who lived in a county that had a high level of Latino segregation had increased odds of perceived racism by 70% (OR=1.70; 95% CI=1.57-1.84) and 82% (OR=1.82; 95% CI=1.65-1.99), respectively. Those who lived in a county that had a moderate level

of API segregation had increased odds of perceived racism by 1.27% (OR=1.27; 95% CI=1.21-1.34). Those who lived in a county that had a moderate level of AI/AN segregation had decreased odds of perceived racism by almost 30% (OR=0.72; 95% CI=0.61-0.84). Those who lived in a county that had a high level of White segregation had decreased odds of perceived racism by 27% (OR=0.73; 95% CI=0.69-0.77) compared to those who had lived in a county with a moderate level of White segregation. There were no counties in California that were designated as having a low level of segregation for Whites.

For hypersegregation, which was measured as a binary variable of counties that had high segregation for both Dissimilarity Index and Interaction Index, in general, those living in counties classified as having hypersegregation for Latinos or African-Americans had increased odds of perceived racism by 32% (OR=1.32; 95% CI=1.25-1.40) and 39%, (OR=1.39; 95% CI=1.32-1.46) respectively.

For the other county characteristics, there were statistically significant associations between them and perceived racism. For health professionals shortage area, there was no statistically significant difference between those who lived in a county that had shortages in some areas within the county and those who lived in a county without any shortages (OR=0.94; 95% CI=0.88-1.01). Those who lived in a county that had shortages throughout the county had decreased odds of perceived racism by almost 50% (OR=0.52; 95% CI=0.28-0.99). For poverty, there was no statistically significant difference between those who lived in a county with a relatively low proportion of those at or below 100% of the Federal Poverty Line (FPL) compared to those who lived in a county with a relatively moderate proportion. However, those who lived in counties that

were classified as having a relatively high proportion of residents at or below 100% of the FPL had increased odds of perceived racism by almost 20% (OR=1.19; 95% CI=1.11-1.27). For comparisons by rural/urban status, those who lived in counties that were moderate/small urban communities had the lowest odds of perceived racism; those who lived in completely rural counties or small metropolitan counties had moderate odds of perceived racism; those who had lived in counties that were moderate/large metropolitan areas had the highest odds of perceived racism.

For each race/ethnicity

Table 21 also presents race/ethnicity stratified odds ratios of perceived racism for individual and community characteristics. Among Latinos, those whose self-reported health status is less than average were less likely to have reported perceived racism. As primary cancer risk profile increased by one unit odds of perceived racism increased by 21% compared to those who had an average cancer risk profile; as secondary cancer risk profile increased by one unit odds of perceived racism decreased by 13%. There were no statistically significant associations between BMI, walking, as well as smoking and perceived racism. For alcohol consumption, those who had 1-2 drinks or at least 3 drinks at one occasion odds of perceived racism increased by 35% and 36%, respectively. No statistically significant associations were present for any of the cancer screening behaviors and perceived racism. For Latinos, age and gender behaved similarly as for the total population with odds of having experienced racism being highest for those 18-23 years and lowest for those 65-102. Latinas were also less likely to have experienced racism as in the total sample. There was no significant difference for those living in rural compared to urban areas. For socioeconomic characteristics, while Latinos were similar

to the total sample with respect to employment status and perceived racism, differences were evident for educational achievement and poverty level. For educational achievement, those who had at least a high school education were approximately twice as less likely to have experienced racism compared to those in the total sample; in addition, those with a some college education were also less likely to have perceived racism. For poverty level, those below 200% of the federal poverty line were less likely to have reported perceived racism. For health care access, among Latinos, there were no differences in odds of having reported perceived racism for insurance coverage, usual source of care and doctor visit(s) within the past year. Those who had a problem with finding a provider they liked were more likely to have reported perceived racism. Similarly, those who had a problem accessing care were more likely to have reported perceived racism. For satisfaction with health care, those who reported being moderately satisfied or dissatisfied with their health care were more likely to have reported perceived racism. For psychosocial factors, similar to the total sample, Latinos who had not participated in religious services in the past week were less likely to have reported perceived racism; and Latinos who had fewer social resources than the average were less likely to have reported perceived racism. No differences in odds of reporting perceived racism were found for marital status, coping mechanism and competing priorities. Among Latinos, associations between immigration/acculturation factors differed from those among total sample. For citizenship/immigration status, all other groups compared to US-born citizens were less likely to have reported perceived racism. For language spoken at home, those who only spoke non-English language(s) at home were less likely to have reported perceived racism. For length of residency in the US, there was no

difference between those who had been in the US 10-14 years and at least 15 years, however for as length of residency decreased for those in the US less than 10 years, they were less likely to have reported perceived racism. For perceived neighborhood resources, there was no difference between groups by whether or not their community had a neighborhood watch. For safe park/open space within walking distance, only those who had a park that was always unsafe were more likely to report perceived racism (there were no differences among the other groups). Latinos who had higher social cohesion than the average were less likely to report perceived racism by almost 25%. Segregation, measured by the Dissimilarity Index, the Interaction Index and hypersegregation for Latinos, had no statistically significant associations with perceived racism. However, for the Interaction Index, a trend appears that is marginally significant suggesting that those who live in moderately or highly segregated counties may have had decreased odds of perceived racism by up to 25% compared to those living in counties with low segregation. Among Latinos, there were no statistically significant associations between the other county characteristics and perceived racism.

For Asian/Pacific Islanders (APIs) those who had lower than average self-reported health status were less likely to have reported perceived racism. An increase in primary cancer risk profiles increased odds of perceived racism by 37% compared to those who had an average risk profile; an increase in secondary cancer risk profiles decreased odds of perceived racism by 13%. For primary risk factors, there were no associations between BMI, walking, as well as smoking and perceived racism. For alcohol consumption, those who had 1-2 drinks or at least 3 drinks at one occasion had increased odds of perceived racism by 73% and 113% compared to those who had did not

drink. There were no statistically significant associations between screenings for breast and cervical cancers and perceived racism. For colorectal cancer, there was no statistically significant difference between those who had never been screened and those who had recently been screened; those who had ever been screened were twice as likely to have perceived racism. For prostate cancer screening, there was no statistically significant difference between those who had ever been screened and recently screened; however, those who had never been screened had decreased odds of perceived racism by 66%. For demographic characteristics, among APIs, females were less likely to have reported perceived racism similar to the total sample; for age, those 23-39 were most likely to have reported perceived racism by 17% and those 65-102 were least likely by almost 60%. There was no difference by rural/urban status. For socioeconomic characteristics, among APIs those who had at least some college education were less likely to have reported perceived racism, with those with at least a high school diploma being twice as less likely to have reported perceived racism compared with those in the total sample. There were no differences between those who had a bachelor's degree and some graduate education which is the reference group. For poverty level, among APIs at less than 200% of the FPL were less likely to have reported perceived racism by 37%-42%; those who were at or above 300% of the FPL were more likely to have reported perceived racism by 63%-74%. For health care access, there were no differences between groups for health insurance coverage, usual source of care, and doctor visit(s) within the past year. For problem finding a provider one likes, the only difference among APIs were for those with a problem who were 68% more likely to have reported perceived racism. Similarly, for problem in accessing care, those who had a problem

were 84% more likely to have reported perceived racism. For satisfaction with health care, those who were moderately satisfied and dissatisfied with their health care were more likely to have reported perceived racism by 61% and 87%, respectively. For psychosocial factors, among APIs there were no differences between groups for religious participation, social resources, heavy cigarette smoking, and seen cockroaches at home. For marital status, those who were never married were 75% more likely to have reported perceived racism. Among APIs, those who participated in binge drinking in the past month were almost twice as likely to have reported perceived racism. For food security, those who were food insecure were 42% less likely to have reported perceived racism. Those whose homes were ever broken into were almost 60% more likely to have reported perceived racism. For citizenship/immigration status, all other groups were less likely to have reported perceived racism compared to US-born citizens by 54%-68%. For language spoken at home, those who spoke English and other language(s) and those who only spoke other language(s) were less likely to have reported perceived racism by 35% and 67%, respectively. For length of residency in the US, all groups with less than 15 years of residency were less likely to have reported perceived racism by 34%-67%. For neighborhood watch, those who had no such resource in their neighborhood were less likely to have reported racism by 18%. For safe park/open space, those did not have a park were less likely to have reported perceived with no differences between groups with parks/open spaces. There was no statistically significant association between social cohesion and perceived racism. Segregation, measured by the Dissimilarity Index and the Interaction Index, did not have statistically significant associations with perceived

racism. The other county characteristics were also not associated with perceived racism at a statistically significant level.

For American Indians/Alaskan Natives, there were no differences by self-reported health status, primary cancer risk profile, secondary cancer risk profile, primary and secondary risk factors, age, gender, educational achievement, employment status, poverty level, insurance coverage, usual sources of care, doctor visit(s) during the past year, problem with provider, satisfaction with health care, religious participation, average social resources, binge drinking, heavy cigarette smoking, cockroaches in home, home broken into, citizenship/immigration status, length of residence in the US, and neighborhood watch in the likelihood of having reported perceived racism. Those who were rural residents were almost twice as likely to have reported perceived racism. For problem accessing health care, those who had a problem were almost 4 times as likely to have reported perceived racism. For marital status, those in the other group were almost twice as likely to have reported perceived racism and those who were never married were almost 3 times as likely. For food security, those who were food insecure were almost 2.5 times as likely to have reported perceived racism. For language spoken at home, those who spoke English and other language(s) at home were 3 times as likely to have reported perceived racism. For safe park/open space within walking distance of home, those who have one that is always unsafe were 7.5 time more likely to have reported perceived racism. An increase in one unit of social cohesion decreased odds of perceived racism by 65% compared to those who had an average social cohesion score. County characteristics, segregation as measured by Dissimilarity Index and Interaction Index as well as physician shortage area and rural/urban continuum were not associated with

perceived racism at a statistically significant level. For poverty, those who lived in counties with relatively high proportion of residents at or below 100% of the FPL had marginally significant increased odds of having perceived racism (OR=1.92; 95% CI=0.93-3.96).

For African-Americans, there were no differences by self-reported health status and secondary cancer risk profile. As primary risk profiles increased by one unit odds of perceived racism increased by 64% compared to those who had an average primary risk profile. Among primary risk factors, there were no statistically significant associations between BMI or walking and perceived racism. For smoking, there was no statistically significant difference between current smokers and those who had never smoked; former smokers had increased odds of perceived racism by 72%. For alcohol consumption, those who had 1-2 drinks at one occasion or at least 3 drinks had increased odds of perceived racism by 90% and 139%. For screening participation, there were no statistically significant associations for any of the cancers and perceived racism.
For demographic characteristics, there were no differences by gender for experienced racism. For age, differences were only at the extremes, with those who were 18-22 years and those who were 65-102 years less likely to have perceived racism by 62% and 68%, respectively. Those living in rural areas were over ten times as likely to have reported perceived racism. For socioeconomic characteristics, those who had at least a high school education were much less likely to have reported perceived racism by 72%-87%, with no differences between those who had some college education or a bachelor's degree and those with graduate education, the reference group. For employment status, those who were unemployed were almost 60% less likely to have reported perceived

racism. For poverty level, those who were 0-99% of the FPL were 56% less likely to have reported perceived racism; there are no differences among the other groups. For health care access, there were no differences for perceived racism by insurance coverage, usual source of care, doctor visit(s), problem accessing care and health care satisfaction. Those who had a problem finding a provider they were liked had marginally significant increased odds of perceived racism by 76%. Among the psychosocial characteristics, there were no statistically significant associations between social support/resource variables, binge drinking, and competing priorities. Those who smoked less than a pack of cigarettes per day has decreased odds of perceived racism by 37% compared to those who did not smoke, and there was no statistically significant difference between those who smoked at least a pack per day and those who did not smoke. There were no associations between citizenship/immigration status as well as language spoken at home and perceived racism. There were no statistically significant differences between those who had lived in the US less than 2 years, 2-4 years or 5-9 years and those who had lived in the US at least 15 years; however, for those who had lived in the US 10-14 yeas, there was an increased odds of perceived racism by 5.68 times compared to those who had lived in the US at least 15 years. None of the neighborhood resource variables had statistically significant associations with perceived racism. For county characteristics of segregation, there were no statistically significant associations between Dissimilarity Index or Interaction Index and perceived racism; for hypersegregation, African-Americans who lived in counties with hypersegregation had decreased odds of perceived racism by 32%. For the other county characteristics, there were no statistically significant associations with perceived racism.

For Whites, those who have less than average self-reported health status are more likely to have reported perceived racism. Those who had an increase of one unit in primary risk profile had increased odds of perceived racism by 16%; there was no statistically significant association between secondary risk profile and perceived racism. For BMI, those classified as overweight or obese had marginally significant increased odd of perceived racism by 9% and 15%, respectively. For walking, there was no statistically significant difference between those who were unable to walk and those who walked for both transportation and fun/exercise. Those who walked for either transportation or fun/exercise as well as those who did not walk at least 10 minutes had decreased odds of perceived racism by 23% and 37%, respectively. For smoking, there was no statistically significant difference in perceived racism between former and never smokes with increased odds of perceived racism for current smokers by 50%. For alcohol consumption, there was no statistically significant difference between those who had 1-2 drink at one occasion and those who did not drink; those who had at least 3 drinks at one occasion had increase odds of perceived racism by 42%. For screening participation, there was no statistically significant association between colorectal cancer screening as well as prostate cancer screening and perceived racism. For breast cancer screening, there was no statistically significant difference between those who had been ever screened and recently screened; those who had never been screed had increased odds of perceived racism by 46%. For cervical cancer screening, those who had been ever screened had decreased odds of perceived racism by 34% compared to those who had been recently screened; there was no statistically significant difference in perceived racism between those who had never been screened and recently screened. Most

variables behaved as they had in the analyses for total samples including age, gender, rural/urban status, employment status, problem accessing health care, satisfaction with health care, marital status, social resources, seen cockroaches at home and home broken into. For educational achievement, all groups were less likely to have reported perceived racism compared to those who had attended graduate school with the exception of those who had attended some college but not completed a bachelor's degree. There was no statistically significant between them and the reference group. For poverty level, there were no differences across groups that were statistically significant. For health insurance coverage, those who were uninsured were 66% more likely to have reported perceived racism. For those who did not have a usual source of health care, they were 60% more likely to have reported perceived racism. Those who had visited a doctor within the past year were 21% more likely to have reported perceived racism. For problem with finding a provider they like, those who had a problem were most likely to have reported perceived racism by 91% and those who did not need a provider were more likely by 44%. There was no difference in perceived racism by religious participation. Those who participated in binge drinking in the past month were 46% more likely to have reported perceived racism. Those who smoked less than a pack per day and those who smoked at least a pack per day were more likely to have reported perceived racism by 51% and 56%, respectively, compared to those who did not smoke. Those who were food insecure were 81% more likely to have reported perceived racism. There were no differences for perceived racism by citizenship/immigration status and length of residency in the US. For language spoken at home, those who spoke English and another language and those who spoke only another language were more likely to have reported perceived racism by

49% and 57%, respectively. There was no difference for perceived racism by neighborhood watch. For safe park/open space within walking distance of home, while likelihood of having reported perceived racism increased with decreased safety for those who had such a neighborhood resource, those without a park/open space were less likely to have reported perceived racism by 12% compared to those who had a safe park/open space. As social cohesion increased by one unit odds of perceived racism decreased by 40% compared to those who had an average social cohesion score. For Dissimilarity Index, those who lived in counties with moderate segregation had increased odds of perceived racism by 36% compared to those who had lived in counties with low segregation. For Interaction Index, those who lived in counties with high segregation had decreased odds of perceived racism by 20% compared to those who had lived in counties with moderate segregation. There were no counties in California that were classified as low segregation for Whites. There was no statistically significant association between physician shortage areas and perceived racism. For poverty, those who lived in counties with relatively high proportion of residents at or below 100% of the FPL had marginally significant increased odds of having perceived racism (OR=1.08; 95% CI=0.99-1.17). For rural/urban continuum status, those who lived in metropolitan areas or completely rural areas were most likely to have reported perceived racism compared to those who lived in moderate/small urban areas.

In summary, the results for prevalence of perceived racism demonstrated variation across racial/ethnic groups as well as within aggregate groups (for Latinos and Asians and Pacific Islanders). Most individual characteristics showed statistically significant associations with perceived racism with the exception of doctor visit; among county characteristics only health professionals shortage area was not associated with perceived racism. The following variables remain associated with perceived racism (in the same direction as for the total population) across at least 3 of the racial/ethnic groups: gender, education, employment, problem with health care provider, social cohesion, and primary risk profile. The following variables remain associated with perceived racism but are not associated in the same direction across at least 3 of the racial/ethnic groups: age, poverty level, health care satisfaction, food security, language spoken at home and length of residency in the US, safe park/open space and health status.

Chapter 6: Results for Primary Behavioral Cancer Risk Profile

The first outcome of interest in this study is primary cancer risk behavioral profile. As described earlier in the Study Design and Methods chapter, this risk profile was constructed as an index of behaviors including smoking, alcohol consumption, physical inactivity (via walking), and Body Mass Index which has a range from 1 (lowest cancer risk profile) to 3 (highest cancer risk profile). For instance, someone with a risk profile of 1 had never smoked, did not drink alcoholic beverages, was physically active and had a BMI that classified him/her as underweight/normal compared to someone with a risk profile of 3, who was a smoker, had at least servings of alcoholic beverages in one sitting, was not physically active and had a BMI that classified him/her as obese.

The discussion of results for this outcome are organized by the steps that were taken in modeling the fixed effects of perceived racism and other study correlates on primary cancer risk behavioral profiles. First, findings from the simple linear regressions are presented identifying variables that were included in the analyses for the best subsets. Next, findings from the best subset models are presented. This is followed the results from the multiple linear fixed effects model for total study sample including a discussion of potential moderators, mediators and confounders. In the last part of this section findings of the fixed effects model by race/ethnicity are presented.

Simple linear regression

Simple linear regression equations were estimated for the effects of perceived racism, the main study exposures, as well as for all study correlates on primary cancer risk behavioral profiles and the findings are presented in Table 23. For perceived racism,

the main study exposure of interest, there is a statistically significant association between the cancer risk profile of lifestyle behaviors and perceived racism in general while the association between the cancer risk profile of lifestyle behaviors and perceived racism in the health care context is only marginally significant (with p-values of <0.001 and 0.056, respectively). For perceived racism in either contexts, the trend appears to be that those who had perceived experiencing racism have on average a higher risk profile than those who had not perceived racism. For perceived racism in general, there was no difference in average risk profile between those who had rarely experienced racism and those who had never experienced racism (β=0.00; p=0.598). Those who experienced racism sometimes, often, or all the time, had an average risk profile that was slightly higher compared to those who had never experienced racism (β=0.03; p<0.001). Similarly, for perceived racism in health care, those who had experienced racism in health had an average risk profile that was slightly higher compared to those who had not experienced racism (β=0.02; p=0.056); this difference is only marginally statistically significant.

The associations between primary risk profile and demographic variables, race/ethnicity, age, and gender were all statistically significant. For race/ethnicity, Whites were the reference group, and differences in average primary risk profiles between African-Americans (β= 0.01; p=0.231) and Whites were not statistically significant. There were statistically significant difference was between Latinos, APIs,and AI/ANs compared to Whites. The differences between Latinos and Whites (β= -0.04; p<0.001) as well as APIs and Whites (β= -0.21; p<0.001) indicate that these two groups had lower primary risk profiles. The difference between AI/ANs and Whites was in the opposite direction, with AIANs having an average primary risk profile that was higher

than that for Whites (β=0.08; p=0.007). For gender, females had an average primary risk profile that is lower than the average for males (β=-0.20; p<0.001). For age, the reference group is 40-49 year olds. The two youngest groups and the oldest group had on average risk profiles that were lower compared to the reference group, with greater differences for those 18-22 (β=-0.15; p<0.001), followed by those 65-102 (β=-0.07; p<0.001) and those 23-39 (β=-0.03; p<0.001). There were no statistically significant differences between those 50-64 and the reference group (β=0.02; p=0.062).

The associations between primary cancer risk profile and socioeconomic characteristics were statistically significant for poverty level, educational achievement, and employment; the association between primary risk profile and home ownership was not statistically significant. For poverty level, there were no statistically significant differences in average risk profiles between those 100-199% of the FPL and the reference group at 200-299% of the FPL (β=-0.02; p=0.062) as well as between those at 300-399% of the FPL and the reference group (β=0.00; p=0.748). Statistically significant differences with the references group were evident for those groups at either extreme, those 0-99% of the FPL (β=-0.09; p<0.001) and those ≥ 400% of FPL (β=-0.03; p=0.008). For educational achievement, all groups with less education than the reference group (those who attended graduate school) had higher average risk profiles; the differences seemed to increase from those with less than high school education (β=0.11; p<0.001), to those who high school completed (β=0.12; p<0.001), and to those with some college (β=0.13; p<0.001). Those who had a bachelor's degree had only a slight difference compared to the reference group (β=0.02; p=0.006). For employment status, those who were employed but not working and those who were unemployed had lower risk profiles

compared to the reference group, those who were employed; the difference between those who were employed but not working had and the reference group (β=-0.11; $p<0.001$) was slightly greater than the difference between those who were unemployed and the reference group (β=-0.10; $p<0.001$).

The associations between primary cancer risk behavioral profile and access to health care were statistically significant for the broad set of health care access variables including the domains of insurance coverage, utilization and satisfaction; in general, those who had access to health care services had lower average risk profiles compared to those who had limited or no access to health care. Those who had no insurance coverage had a slightly higher average cancer risk profile (β=0.02; $p=0.021$) compared to those who had insurance coverage. Those who had no usual source of care had a higher average risk profile compared to those who had a usual source of care (β=0.04; $p=0.001$). Those who had not visited a doctor within the past year had a higher average cancer risk profile (β=0.05; $p<0.001$) compared to those who had not visited a doctor. There was no statistically significant difference between those who had a problem finding a provider with whom they were satisfied compared to those who had no problem (β=0.01; $p=0.457$); those who had no need for a provider had a higher average risk profile compared to those who had no problem (β=0.09; $p<0.001$). Those who had a problem accessing health care services they needed had a slightly higher average primary cancer risk profile compared to those who had no problem (β=0.03; $p=0.001$); those who did not need health care services had a higher average risk profile compared to those who had no problem (β=0.05; $p<0.001$). The trend for satisfaction of health care services shows that average risk profiles increased with decreased satisfaction; those who were most satisfied

was the reference group, those who were moderately satisfied had a difference of 0.02 ($p=0.014$) and those who were dissatisfied had a difference of 0.10 ($p<0.001$). Those who had not utilized health care services within the last year had a higher average risk profile compared to the reference group ($\beta=0.05$; $p=0.002$). Those who refused to answer or did not know how satisfied they were had the largest difference compared to the reference group ($\beta=0.12$; $p<0.001$).

The associations between primary cancer risk profiles and psychosocial factors were statistically significant for social resources/support (e.g., marital status, religious participation and social resources) and one of the competing priorities, home ever broken into. For marital status, the difference in average risk profiles between those who are widowed/divorced/living with partner/other and those who are married is 0.05 ($p<0.001$) and the difference between those who were never married and those who were married is -0.03 ($p=0.002$). For religious participation, the average risk profile for those who did not participate in religious services in the past week is higher compared to those who did participate ($\beta=0.11$; $p<0.001$). For social resources, average risk profiles increase ($\beta=0.03$; $p<0.001$) as social resources increase. Among the competing priorities, the association was only statistically significant for home security. Those whose homes had been broken into on average had a slightly higher risk profile compared to those whose home had not been broken into ($\beta=0.03$; $p=0.004$).

The associations between primary cancer risk profiles and neighborhood resources were statically significant only for neighborhood watch. For neighborhood watch, those who had no neighborhood watch program had an increase in their average risk profile compared to those who had such a resource ($\beta=0.02$; $p<0.001$).

The associations between primary cancer risk profiles and immigration and acculturation factors were all statistically significant. For immigration/citizenship status, US-born citizens were the reference group and all other groups had lower average risk profiles. The largest difference was between the reference group and residents without green cards (β=-0.13; $p<0.001$), the second largest difference was between the reference group and naturalized citizens (β= -0.12; $p<0.001$), and the smallest difference was between the reference group and residents with green cards (β= -0.09; $p<0.001$). For language spoken at home, the differences in average risk profiles decreased with other languages being spoken compared to those who only spoke English at home; for English and other language(s) the difference was -0.07 ($p<0.001$) and for only other language(s) the difference was -0.13 ($p<0.001$). For length of residency in the US, as time increased, average risk profiles increased. Those who were in the US less than 2 years had the largest decrease in risk profile (β=-0.30; $p<0.001$) compared to those who had lived in the US for at least 15 years, followed by those who had been in the US 2-4 years (β= -0.20; $p<0.001$), then by those who had been in the US 5-9 years (β= -0.14; $p<0.001$), and lastly by those 10-14 years (β= -0.12; $p<0.001$).

Table 23. Simple Linear Regression Equation Estimates (and p-values) for Primary Cancer Risk Behavioral Profiles (N=35,203).[a]

Predictors	Coefficients (p-values)
Perceived Racism, General	(<0.001)
Intercept	1.76 (<0.001)
Never (reference)	0.00 (.)
Rarely	0.00 (0.598)
Sometimes/often/all the time	0.03 (<0.001)
Perceived Racism, Health Care context	(0.056)
Intercept	1.77 (<0.001)
No (reference)	0.00 (.)
Yes	0.02 (0.056)
Demographics	
Race/Ethnicity	(<0.001)
Intercept	1.80 (<0.001)
Latino	-0.04 (<0.001)
API	-0.21 (<0.001)
AIAN	0.08 (0.007)
African-American	0.01 (0.231)
White (reference)	0.00 (.)
Gender	(<0.001)
Intercept	1.87 (<0.001)
Male (reference)	0.00 (.)
Female	-0.20 (<0.001)
Age	(<0.001)
Intercept	1.80 (<0.001)
18-22	-0.15 (<0.001)
23-39	-0.03 (<0.001)
40-49 (reference)	0.00 (.)
50-64	0.02 (0.062)
65-102	-0.07 (<0.001)
Socioeconomic characteristics	
Education	(<0.001)
Intercept	1.68 (<0.001)
Less than High School	0.11 (<0.001)
High School/GED	0.12 (<0.001)
Some college	0.13 (<0.001)
BA/BS	0.02 (0.006)
Graduate school (reference)	0.00 (.)

Predictors	Coefficients (p-values)
Employment	(<0.001)
Intercept	1.81 (<0.001)
Employed (reference)	-- (.)
Employed but no work	-0.11 (<0.001)
Unemployed	-0.10 (<0.001)
Home Ownership	(0.704)
Intercept	1.77 (<0.001)
Own (reference)	0.00 (.)
Rent	0.00 (0.488)
Other arrangement	0.01 (0.717)
% Federal Poverty Line	(<0.001)
Intercept	1.80 (<0.001)
0-99%	-0.09 (<0.001)
100-199%	-0.02 (0.062)
200-299% (reference)	0.00 (.)
300-399%	0.00 (0.748)
400%+	-0.03 (0.008)
Access	
Insurance Coverage	(0.021)
Intercept	1.76 (<0.001)
Yes (reference)	0.00 (.)
No	0.02 (0.021)
Usual source of care	(0.001)
Intercept	1.76 (<0.001)
Yes (reference)	0.00 (.)
No	0.04 (0.001)
Doctor visit(s) in past year	(<0.001)
Intercept	1.76 (<0.001)
Yes (reference)	0.00 (.)
No	0.05 (<0.001)
Problem with Provider	(<0.001)
Intercept	1.76 (<0.001)
Problem	0.01 (0.457)
No problem (reference)	0.00 (.)
Did not need to see a provider	0.09 (<0.001)
Satisfaction with Health Care	(<0.001)
Intercept	1.75 (<0.001)
Don't Know/Refused	0.12 (<0.001)
No health care services in past year	0.05 (0.002)
Dissatisfied<5	0.10 (<0.001)
Moderately satisfied	0.02 (0.014)
Most satisfied (reference)	0.00 (.)

Predictors	Coefficients (p-values)
Problem in accessing care	(<0.001)
Intercept	1.76 (<0.001)
Problem	0.03 (0.001)
No problem (reference)	0.00 (.)
Did not need care	0.05 (<0.001)
Psychosocial Factors	
Religious Participation	(<0.001)
intercept	1.70 (<0.001)
Yes (reference)	0.00 (.)
No	0.11 (<0.001)
Marital Status	(<0.001)
Intercept	1.76 (<0.001)
Married (reference)	0.00 (.)
Other/widowed/divorced/living with partner	0.05 (<0.001)
Never married	-0.03 (0.002)
Social Resources: 1(none)-5(all of the time)	(<0.001)
Intercept	1.67 (<0.001)
rate of change	0.03 (<0.001)
Binge Drinking	(<0.001)
Intercept	1.71 (<0.001)
Yes	0.38 (<0.001)
No (reference)	0.00 (.)
Heavy Smoking	(<0.001)
Intercept	1.68 (<0.001)
None (reference)	0.00 (.)
Less than a pack/day	0.51 (<0.001)
At least a pack/day	0.56 (<0.001)
Food Security	(0.190)
Intercept	1.77 (<0.001)
Food Secure or >200% of FPL (reference)	0.00 (.)
Food insecure	-0.01 (0.190)
Home ever broken into	(0.004)
Intercept	1.76 (<0.001)
Yes	0.03 (0.004)
No (reference)	0.00 (.)

Predictors	Coefficients (p-values)
Seen cockroaches in home	(0.414)
Intercept	1.77 (<0.001)
Yes	0.01 (0.414)
No (reference)	0.00 (.)
Perceptions of Neighborhood Resources	
Neighborhood Watch	(<0.001)
Intercept	1.75 (<0.001)
Yes (reference)	0.00 (.)
No	0.02 (<0.001)
Safe Park/Open Space in Neighborhood	(0.135)
Intercept	1.76 (<0.001)
No park in neighborhood	0.02 (0.032)
Always safe park/open space (reference)	0.00 (.)
Sometimes safe park/open space	0.00 (0.834)
Always unsafe park/open space	0.00 (0.829)
	(0.060)
Social Cohesion	1.81 (<0.001)
Intercept	-0.01 (0.060)
rate of change	
Immigration/Acculturation	
Citizenship/Immigration status	(<0.001)
Intercept	1.81 (<0.001)
US-born citizen (reference)	0.00 (.)
Naturalized Citizen	-0.12 (<0.001)
Green card resident	-0.09 (<0.001)
Resident without Green card	-0.13 (<0.001)
Language Spoken at Home	(<0.001)
Intercept	1.81 (<0.001)
English only (reference)	0.00 (.)
English + other language(s)	-0.07 (<0.001)
Other language(s) only	-0.13 (<0.001)
Length of Residency in the US	(<0.001)
Intercept	1.79 (<0.001)
< 2 years	-0.30 (<0.001)
2-4 years	-0.20 (<0.001)
5-9 years	-0.14 (<0.001)
10-14 years	-0.12 (<0.001)
≥ 15 years (reference)	0.00 (.)

a. Outcome is primary behavioral cancer risk profile, 1=low risk and 3=high risk.
Note: Design-based analyses in SUDAAN using raked weights and Jackknife Repeated Replication method.

In summary, most variables showed statistically significant (at $p<0.05$) associations with primary risk profiles except for perceived racism in health care ($p=0.056$), home ownership ($p=0.704$), food security ($p=0.190$), seen cockroaches at home ($p=0.414$), safe park/open space ($p=0.135$) and social cohesion ($p=0.060$). Those that had a p-value of >0.25 were not included in further analyses.

Best subsets Models

As described in more detail in the Study Design and Methods chapter, the second step in modeling the relationship between the cancer risk profiles and perceived racism was to build models of conceptually related correlates (e.g., demographic characteristics, socioeconomic characteristics, health care access, psychosocial factors, perceptions of neighborhood resources, immigration/acculturation and perceived racism) to identify the 'best subsets' of correlates to be used in building the main effects models. The results for the best subset models are shown in Table 24 for each of the subsets listed above. Columns labeled Model 1 and Model 2, in the table, are specific to each of the perceived racism measures, perceived racism in general and perceived racism in health care, respectively. The results from these analyses are presented first for with perceived racism in general as the main exposure and then results from the analyses with perceived racism in health care with a focus on differences between the two models.

For each subset analyses with perceived racism in general as the main exposure variable, perceived racism remains a statistically significant explanatory factor of primary cancer risk behavioral profiles in all the subsets. For each subset analyses with perceived racism in health care as the main exposure, perceived racism does not remain a statistically significant explanatory factor of cancer risk profiles for all subsets including

socioeconomic characteristics (p=0.074), access to health care (p=0.385), neighborhood resources (p=0.073) and perceived racism (p=0.288). Across the sets of models with the different perceived racism measures there are no differences in which variables remain statistically significant within each subset. Thus, for both sets of models assessing the association between cancer risk profile and perceived racism (in general and in health care), the following variables remain statistically significant for their respective subset:

- Demographics: race/ethnicity, age, gender;
- Socioeconomic characteristics: poverty level, employment, education;
- Access to health care: problem with provider, satisfaction with health care services;
- Psychosocial factors: marital status, religious participation, average social resources, home broken into;
- Neighborhood resources: neighborhood watch;
- Immigration/Acculturation factors: citizenship/immigration status, language at home, length of residency in the US;
- Perceived racism: perceived racism in general.

The relationship between perceived racism in general and primary cancer risk behavioral profiles remains the same in the various best subset models. Recall in the simple linear regression equations, the difference between those who rarely and never perceived experiencing racism was not statistically significant; there was a 0.03 ($p<0.001$) difference between those who sometimes/often/all the time and never perceived experiencing racism. The estimates for perceived racism in general were similar in the following subsets: demographic characteristics, neighborhood resources

and perceived racism. For perceived racism in general, the estimate of the difference in average risk profiles, for those who had perceived experiencing racism more frequently, changed in magnitude in the following subsets: socioeconomic characteristics (-0.01), access to health care (-0.01), psychosocial factors (+0.02), and immigration/acculturation factors (+0.01). The differences for perceived racism in general in the subset equation estimates were as follows: in the socioeconomic characteristics and access to health care, the difference between those who had experienced racism sometimes, often, or all the time and those who had never experienced it was 0.02 ($p=0.002$); again, there was no statistically significant difference between those who had rarely perceived experiencing racism and those who had never perceived experiencing it. Similarly for psychosocial factors, the difference between those who had perceived experiencing racism sometimes, often, or all the time and those who had never perceived it was 0.05 ($p<0.001$). In the best subset model for immigration/acculturation factors, the difference between those who had perceived experiencing racism sometimes, often, or all the time and those who had never perceived it was 0.04 ($p<0.001$).

The relationship between perceived racism in health care and primary cancer risk behavioral profiles remains the same in the best subset models for socioeconomic characteristics and neighborhood resources. Recall in the simple linear regression equations, the difference between those who had perceived experiencing racism and those who had not was marginally significant at 0.02 ($p=0.056$). The estimate for perceived racism in health care changed in magnitude as well as statistically significance in the following subsets: demographic characteristics ($\beta=0.03$; $p=0.033$), psychosocial factors ($\beta=0.04$; $p=0.001$), and immigration/acculturation factors ($\beta=0.05$; $p<0.001$). The

estimate for perceived racism in health became statistically insignificant in the following subsets: access to health care (β=0.01; p=0.385) and perceived racism (β=0.01; p=0.288).

For study correlates, the results from these subset analyses generally show similar relationships as in the simple linear regression findings described above with a few exceptions. For percentage of Federal Poverty Line, the key difference is that in the subset analyses, after adjusting for the effects of perceived racism and other socioeconomic characteristics, the difference between those who were at least 400% of the FPL compared to the reference group was not statistically significant (β=0.01; p=0.335); in the simple linear regression this group had a decrease in risk profile (β= -0.03; p=0.008). For immigration/citizenship status, the key differences is that in the subset analyses, after adjusting for the effects of perceived racism and other immigration/acculturation factors, the difference between those who were residents with green cards had no statistically significant difference with the reference group (β=0.00; p=0.550); in the simple linear regression this group had a decrease in risk profile (β= -0.09; p<0.001). The estimate for the difference between those who were residents without green cards and the reference group changed direction in the subset analyses (β=0.04; p=0.033), after adjusting for perceived racism and other immigration/acculturation factors; in the simple linear regression this group had a decrease in risk profile (β= -0.13; p<0.001).

Table 24. Best Subsets (Forward Linear Regression, manually) for Primary Behavioral Cancer Risk Profiles (1=low risk to 3=high risk) and Perceived Racism (N=35,203).[a]

	Model 1: Percieved Racism in General	Model 2: Perceived Racism in Health Care
Variables	Coefficients (p-values)	Coefficients (p-values)
SUBSET 1: Demographics		
R-squared	0.10	0.10
Intercept	1.92 (<0.001)	1.92 (<0.001)
Perceived Racism, General	(<0.001)	
Never (reference)	0.00 (.)	
Rarely	0.01 (0.327)	
≥ Sometimes/Often/ All the time	0.03 (<0.001)	
Perceived Racism, Health care		(0.033)
No (reference)		0.00 (.)
Yes		0.03 (0.033)
Race/Ethnicity	(<0.001)	(<0.001)
Latino	-0.03 (<0.001)	-0.03 (<0.001)
API	-0.20 (<0.001)	-0.20 (<0.001)
AI/AN	0.08 (0.008)	0.08 (0.005)
African-American	0.01 (0.411)	0.02 (0.067)
White (reference)	0.00 (.)	0.00 (.)
Age	(<0.001)	(<0.001)
18-22	-0.15 (<0.001)	-0.15 (<0.001)
23-39	-0.02 (0.002)	-0.02 (0.001)
40-49 (reference)	0.00 (.)	0.00 (.)
50-64	0.02 (0.021)	0.02 (0.024)
65-102	-0.04 (<0.001)	-0.05 (<0.001)
Gender	(<0.001)	(<0.001)
Male (reference)	0.00 (.)	0.00 (.)
Female	-0.20 (<0.001)	-0.20 (<0.001)
SUBSET 2: Socioeconomic Characteristics		
R-squared	0.04	0.04
Intercept	1.70 (<0.001)	1.71 (<0.001)
Perceived Racism, General	(0.004)	
Never (reference)	0.00 (.)	
Rarely	0.00 (0.808)	
≥ Sometimes/Often/ All the time	0.02 (0.002)	
Perceived Racism, Health care		(0.074)
No (reference)		0.00 (.)
Yes		0.02 (0.074)
Poverty Level	(<0.001)	(<0.001)
0-99%	-0.10 (<0.001)	-0.10 (<0.001)
100-199%	-0.03 (0.006)	-0.03 (0.006)
200-299% (reference)	0.00 (.)	0.00 (.)
300-399%	0.00 (0.665)	0.00 (0.695)
≥ 400%	0.01 (0.335)	0.01 (0.378)

	Model 1: Percieved Racism in General	Model 2: Perceived Racism in Health Care
Employed (reference)	0.00 (.)	0.00 (.)
Employed/not working	-0.11 (<0.001)	-0.11 (<0.001)
Unemployed	-0.10 (<0.001)	-0.10 (<0.001)
Educational Achievement	(<0.001)	(<0.001)
< High School	0.18 (<0.001)	0.18 (<0.001)
HS Diploma/ GED	0.15 (<0.001)	0.15 (<0.001)
Some college	0.15 (<0.001)	0.15 (<0.001)
BA/BS	0.03 (0.001)	0.03 (0.001)
Graduate school (reference)	0.00 (.)	0.00 (.)
SUBSET 3: Access to Health Care		
R-squared	0.01	0.01
Intercept	1.75 (<0.001)	1.75 (<0.001)
Perceived Racism, General	(0.006)	
Never (reference)	0.00 (.)	
Rarely	0.00 (0.677)	
≥ Sometimes/Often/ All the time	0.02 (0.002)	
Perceived Racism, Health care		(0.385)
No (reference)		0.00 (.)
Yes		0.01 (0.385)
Problem with provider	(0.007)	(0.007)
Problem	-0.01 (0.085)	-0.01 (0.116)
No problem (reference)	0.00 (.)	0.00 (.)
Did not need to see a provider	0.04 (0.009)	0.04 (0.008)
Health care rating	(<0.001)	(<0.001)
No health care	0.03 (0.037)	0.03 (0.037)
Don't Know/Refused	0.08 (0.002)	0.08 (0.002)
Dissatisfied	0.10 (<0.001)	0.10 (<0.001)
Moderately satisfied	0.02 (0.013)	0.02 (0.008)
Most satisfied	0.00 (.)	0.00 (.)
SUBSET 4: Psychosocial Factors		
R-squared	0.03	0.03
Intercept	1.56 (<0.001)	1.57 (<0.001)
Perceived Racism, General	(<0.001)	
Never (reference)	0.00 (.)	
Rarely	0.01 (0.163)	
≥ Sometimes/Often/ All the time	0.05 (<0.001)	
Perceived Racism, Health care		(0.001)
No (reference)		0.00 (.)
Yes		0.04 (0.001)
Marital Status	(<0.001)	(<0.001)
Married (reference)	0.00 (.)	0.00 (.)
Widowed/Divorced/ Separated/Living with partner	0.05 (<0.001)	0.05 (<0.001)
Never Married	-0.03 (<0.001)	-0.03 (0.000)
Religious participation	(<0.001)	(<0.001)
Yes (reference)	0.00 (.)	0.00 (.)
No	0.12 (<0.001)	0.12 (<0.001)

	Model 1: Percieved Racism in General	Model 2: Perceived Racism in Health Care
Average Social Resources	(<0.001)	(<0.001)
Rate of change	0.03 (<0.001)	0.03 (<0.001)
Home ever broken into	(0.002)	(0.002)
Yes (reference)	0.03 (0.002)	0.04 (0.002)
No	0.00 (.)	0.00 (.)
SUBSET 5: Neighborhood Resources		
R-squared	0.00	0.00
Intercept	1.75 (<0.001)	1.75 (<0.001)
Perceived Racism, General	(0.001)	
Never (reference)	0.00 (.)	
Rarely	0.00 (0.518)	
≥ Sometimes/Often/ All the time	0.03 (<0.001)	
Perceived Racism, Health care		(0.073)
No (reference)		0.00
Yes		0.02 (0.073)
Neighborhood Watch	(<0.001)	(<0.001)
Yes (reference)	0.00 (.)	0.00
No	0.02 (<0.001)	0.02 (<0.001)
SUBSET 6: Immigration/Acculturation Factors		
R-squared	0.03	0.03
Intercept	1.81 (<0.001)	1.81 (<0.001)
Perceived Racism, General	(<0.001)	
Never (reference)	0.00 (.)	
Rarely	0.00 (0.550)	
≥ Sometimes/Often/ All the time	0.04 (<0.001)	
Perceived Racism, Health care		(<0.001)
No (reference)		0.00 (.)
Yes		0.05 (<0.001)
Citizenship and Immigration Status		
	(<0.001)	(<0.001)
US-born citizen (reference)	0.00 (.)	0.00 (.)
Naturalized citizen	-0.08 (<0.001)	-0.08 (<0.001)
Non-citizen w/Green Card	0.00 (0.846)	0.00 (0.948)
Non-citizen w/o Green Card	0.04 (0.033)	0.04 (0.052)
Language spoken at home	(0.001)	(0.002)
English only (reference)	0.00 (.)	0.00 (.)
English and other language(s)	-0.03 (0.003)	-0.02 (0.008)
Other language(s) only	-0.05 (<0.001)	-0.05 (0.001)
Length of residency in the US	(<0.001)	(<0.001)
< 2 years	-0.31 (<0.001)	-0.31 (<0.001)
2-4 years	-0.21 (<0.001)	-0.21 (<0.001)
5-9 years	-0.14 (<0.001)	-0.14 (<0.001)
10-14 years	-0.11 (<0.001)	-0.11 (<0.001)
≥ 15 years (reference)	0.00 (.)	0.00 (.)

	Model 1: Percieved Racism in General	Model 2: Perceived Racism in Health Care
SUBSET 7: Perceived Racism		
R-squared	0.00	
Intercept	1.76 (<0.001)	
Perceived Racism, General	(0.003)	
Never (reference)	0.00 (.)	
Rarely	0.00 (0.616)	
≥ Sometimes/Often/ All the time	0.03 (0.001)	
Perceived Racism, Health care	(0.288)	
No (reference)	0.00 (.)	
Yes	0.01 (0.288)	

a. Outcome is primary behavioral cancer risk profile, 1=low risk and 3=high risk.
Note: Design-based analyses in SUDAAN using raked weights and Jackknife Repeated Replication method.
Shaded areas designate separate regression equations.

Multiple linear regression: fixed effects model

The next step in building the individual-level fixed effects model for primary cancer risk behavioral profiles was to build main effects models by adding one subset at a time and keeping those variables that were statistically significant at $p \leq 0.05$. Main effects models were developed for each exposure of interest and a final main effects model was created that included both exposures as there were little differences between the perceived racism specific models (see Appendix E for these models). The model with both perceived racism measures was carried to the next step where the fixed effects model was finalized after assessing interaction terms.

The results from the fixed effects model for perceived racism and primary cancer risk behavioral profile presented in Table 25 demonstrate the main effects of the following variables on primary cancer risk behavioral profile: race/ethnicity, poverty level, employment status, marital status, religious participation, average social resources, neighborhood watch, immigration/citizenship status, length of residency in the US, and language spoken at home. The effects of perceived racism on risk profiles are moderated by the gender (for both perceived racism in general and in health care), age and

Table 25. Fixed Effects Model (Coefficients and p-values) for Primary Cancer Risk Behavioral Profiles for total study sample and stratified by race/ethnicity.

Variables	**Total (N=35,203)** *Coefficients (p-values)*	**Latinos (N=7901)** *Coefficients (p-values)*	**API (N=3646)** *Coefficients (p-values)*	**AI/AN (N=306)** *Coefficients (p-values)*	**African-American (N=2361)** *Coefficients (p-values)*	**White (N=20989)** *Coefficients (p-values)*
R-squared	0.162	0.191	0.198	0.249	0.164	0.122
Intercept	1.71 (<0.001)	1.77 (<0.001)	1.55 (<0.001)	1.73 (<0.001)	1.67 (<0.001)	1.70 (<0.001)
Interactions						
Perceived Racism in General						
Never (reference)	0.00 (.)	0.00 (.)	0.00 (.)	0.00 (.)	0.00 (.)	0.00 (.)
Rarely	-0.01 (0.378)	-0.02 (0.369)	0.00 (0.942)	-0.04 (0.609)	0.05 (0.218)	-0.01 (0.196)
Sometimes/Often/All the time	0.03 (0.008)	0.04 (0.072)	0.00 (0.904)	-0.01 (0.934)	0.09 (0.036)	0.00 (0.861)
Perceived Racism in Health Care						
No (reference)	0.00 (.)	0.00 (.)	0.00 (.)	0.00 (.)	0.00 (.)	0.00 (.)
Yes	0.23 (<0.001)	0.31 (0.003)	0.11 (0.110)	0.51 (0.117)	-0.03 (0.780)	0.17 (0.063)
Gender						
Male (reference)	0.00 (.)	0.00 (.)	0.00 (.)	0.00 (.)	0.00 (.)	0.00 (.)
Female	-0.19 (<0.001)	-0.23 (<0.001)	-0.29 (<0.001)	-0.05 (0.530)	-0.06 (0.286)	-0.17 (<0.001)
Perceived Racism in General*Gender	(0.024)	(0.329)	(0.615)	(0.713)	(0.261)	(0.040)
Rarely*Female	0.03 (0.013)	0.03 (0.327)	0.04 (0.331)	0.01 (0.905)	-0.01 (0.902)	0.04 (0.020)
Sometimes/Often/All the time*Female	-0.01 (0.538)	-0.02 (0.426)	0.04 (0.662)	-0.10 (0.525)	-0.07 (0.273)	0.04 (0.083)
Perceived Racism in Health Care*Gender	(0.001)	(0.088)	(0.664)	(0.833)	(0.835)	(0.208)
Yes*Female	-0.07 (0.001)	-0.05 (0.088)	-0.03 (0.664)	0.06 (0.833)	0.01 (0.835)	-0.06 (0.208)

	Total (N=35,203)	Latinos (N=7901)	API (N=3646)	AI/AN (N=306)	African-American (N=2361)	White (N=20989)
Age (years)						
18-22	-0.17 (<0.001)	-0.18 (<0.001)	-0.10 (0.016)	0.10 (0.453)	-0.34 (<0.001)	-0.16 (<0.001)
23-39	-0.01 (0.082)	-0.01 (0.325)	0.01 (0.709)	0.15 (0.075)	-0.06 (0.047)	-0.02 (0.055)
40-49 (reference)	0.00 (.)	0.00 (.)	0.00 (.)	0.00 (.)	0.00 (.)	0.00 (.)
50-64	0.03 (0.001)	0.04 (0.055)	-0.03 (0.243)	0.00 (0.961)	0.05 (0.060)	0.04 (0.001)
65-102	-0.03 (0.001)	-0.03 (0.249)	-0.11 (<0.001)	-0.16 (0.168)	-0.09 (0.032)	-0.03 (0.007)
Perceived Racism in Health Care*Age	(0.016)	(0.110)	(0.127)	(0.181)	(0.896)	(0.251)
Yes*18-22	-0.07 (0.157)	-0.13 (0.077)	-0.04 (0.708)	-0.11 (0.689)	0.13 (0.454)	0.05 (0.606)
Yes*23-39	-0.07 (0.021)	-0.11 (0.022)	0.01 (0.935)	-0.02 (0.948)	-0.01 (0.896)	0.01 (0.889)
Yes*50-64	-0.11 (0.001)	-0.14 (0.031)	-0.05 (0.358)	0.32 (0.072)	-0.00 (0.984)	-0.12 (0.056)
Yes*65-102	-0.11 (0.013)	-0.18 (0.025)	0.15 (0.074)	-0.06 (0.849)	-0.04 (0.760)	-0.08 (0.271)
Education						
< High School	0.20 (<0.001)	0.20 (<0.001)	0.22 (<0.001)	0.01 (0.963)	0.09 (0.078)	0.24 (<0.001)
High School Diploma or GED	0.17 (<0.001)	0.15 (<0.001)	0.14 (<0.001)	0.00 (0.990)	0.10 (0.015)	0.19 (<0.001)
Some college	0.16 (<0.001)	0.16 (<0.001)	0.18 (<0.001)	-0.09 (0.461)	0.07 (0.058)	0.16 (<0.001)
BA/BS	0.05 (<0.001)	0.05 (0.089)	0.08 (0.001)	-0.02 (0.880)	-0.02 (0.645)	0.04 (<0.001)
Graduate School (reference)	0.00 (.)	0.00 (.)	0.00 (.)	0.00 (.)	0.00 (.)	0.00 (.)
Perceived Racism in Health Care*Education	(0.015)	(0.218)	(0.022)	(0.008)	(0.912)	(0.554)
Yes*< High School	-0.11 (0.005)	-0.17 (0.066)	-0.30 (0.004)	-0.84 (0.010)	0.11 (0.375)	0.03 (0.779)
Yes*High School Diploma or GED	-0.12 (0.014)	-0.16 (0.100)	-0.11 (0.209)	-0.91 (0.010)	0.01 (0.912)	-0.06 (0.466)
Yes*Some college	-0.13 (0.002)	-0.21 (0.035)	-0.17 (0.033)	-0.57 (0.018)	0.03 (0.801)	-0.06 (0.472)
Yes*BA/BS	-0.04 (0.245)	-0.10 (0.307)	-0.02 (0.762)	-0.84 (0.009)	0.01 (0.956)	0.02 (0.812)

	Total (N=35,203)	Latinos (N=7901)	API (N=3646)	AI/AN (N=306)	African-American (N=2361)	White (N=20989)
Main Effects						
Race/Ethnicity						
Latino	-0.01 (0.150)					
API	-0.09 (<0.001)					
AIAN	0.04 (0.198)					
African-American	0.00 (0.840)					
White (reference)	0.00 (.)					
Poverty Level (% FPL)	(0.011)	(0.090)	(0.143)	(0.235)	(0.003)	(0.004)
0-99	-0.04 (<0.001)	-0.05 (0.021)	0.04 (0.169)	-0.18 (0.200)	-0.11 (0.001)	0.00 (0.910)
100-199	0.00 (0.643)	-0.03 (0.165)	0.08 (0.009)	-0.02 (0.870)	-0.01 (0.726)	0.01 (0.264)
200-299 (reference)	0.00 (.)	0.00 (.)	0.00 (.)	0.00 (.)	0.00 (.)	0.00 (.)
300-399	-0.01 (0.264)	-0.01 (0.731)	0.04 (0.266)	-0.06 (0.639)	-0.08 (0.025)	-0.01 (0.389)
≥ 400	-0.02 (0.068)	0.01 (0.769)	0.05 (0.082)	0.04 (0.706)	-0.03 (0.198)	-0.03 (0.011)
Employment Status	(<0.001)	(<0.001)	(0.195)	(0.113)	(0.822)	(<0.001)
Employed (reference)	0.00 (.)	0.00 (.)	0.00 (.)	0.00 (.)	0.00 (.)	0.00 (.)
Employed/not working	-0.03 (0.005)	-0.04 (0.038)	-0.08 (0.077)	0.08 (0.583)	-0.01 (0.879)	-0.03 (0.063)
Unemployed	-0.05 (<0.001)	-0.09 (<0.001)	-0.02 (0.260)	0.20 (0.038)	0.01 (0.565)	-0.04 (<0.001)
Marital Status	(<0.001)	(0.093)	(0.162)	(0.479)	(0.144)	(<0.001)
Married (reference)	0.00 (.)	0.00 (.)	0.00 (.)	0.00 (.)	0.00 (.)	0.00 (.)
Widowed/Divorced/Living with a partner/Other	0.05 (<0.001)	0.02 (0.243)	0.04 (0.081)	0.08 (0.281)	0.05 (0.050)	0.05 (<0.001)
Never Married	0.00 (0.676)	-0.03 (0.144)	0.02 (0.302)	0.01 (0.924)	0.03 (0.420)	-0.01 (0.568)
Religious Participation	(<0.001)	(<0.001)	(0.002)	(0.805)	(<0.001)	(<0.001)
Yes (reference)	0.00 (.)	0.00 (.)	0.00 (.)	0.00 (.)	0.00 (.)	0.00 (.)
No	0.09 (<0.001)	0.09 (<0.001)	0.06 (0.002)	0.02 (0.805)	0.10 (<0.001)	0.10 (<0.001)

	Total (N=35,203)	Latinos (N=7901)	API (N=3646)	AI/AN (N=306)	African-American (N=2361)	White (N=20989)
Average Social Resources	(<0.001)	(0.413)	(<0.001)	(0.842)	(0.014)	(0.202)
Rate of change	0.01 (0.001)	0.01 (0.413)	0.03 (0.001)	0.01 (0.842)	0.03 (0.014)	0.01 (0.202)
Neighborhood Watch	(<0.001)	(<0.001)	(0.295)	(0.040)	(0.516)	(<0.001)
Yes (reference)	0.00 (.)	0.00 (.)	0.00 (.)	0.00 (.)	0.00 (.)	0.00 (.)
No	0.02 (<0.001)	0.04 (0.001)	0.02 (0.295)	0.12 (0.040)	0.01 (0.516)	0.02 (0.001)
Citizenship and Immigration Status	(<0.001)	(<0.001)	(<0.001)	(0.745)	(0.008)	(0.551)
US-born citizen (reference)	0.00 (.)	0.00 (.)	0.00 (.)	0.00 (.)	0.00 (.)	0.00 (.)
Naturalized Citizen	-0.06 (<0.001)	-0.09 (<0.001)	-0.01 (0.777)	0.02 (0.957)	-0.08 (0.228)	-0.02 (0.240)
Non-citizen with Green Card	-0.04 (0.008)	-0.10 (<0.001)	0.11 (0.004)	-0.68 (0.468)	-0.05 (0.703)	0.00 (0.940)
Non-citizen without Green Card	-0.06 (0.005)	-0.12 (<0.001)	0.11 (0.020)	-1.11 (<0.001)	-0.46 (0.002)	0.06 (0.461)
Length of residency in the US (years)	(<0.001)	(0.007)	(<0.001)	(<0.001)	(0.003)	(0.038)
< 2	-0.16 (<0.001)	-0.18 (0.002)	-0.21 (0.001)	0.00 (.)	0.28 (0.033)	-0.20 (0.206)
2-4	-0.09 (<0.001)	-0.09 (0.009)	-0.17 (<0.001)	-0.32 (0.728)	-0.10 (0.348)	-0.16 (0.003)
5-9	-0.06 (0.007)	-0.05 (0.093)	-0.16 (<0.001)	1.21 (0.201)	0.06 (0.643)	0.00 (0.969)
10-14	-0.06 (<0.001)	-0.05 (0.025)	-0.09 (0.006)	-0.89 (0.152)	-0.12 (0.597)	-0.02 (0.713)
≥ 15 (reference)	0.00 (.)	0.00 (.)	0.00 (.)	0.00 (.)	0.00 (.)	0.00 (.)
Language spoken at home	(0.001)	(0.806)	(<0.001)	(0.152)	(0.090)	(0.773)
English only (reference)	0.00 (.)	0.00 (.)	0.00 (.)	0.00 (.)	0.00 (.)	0.00 (.)
English + other language(s)	-0.01 (0.474)	0.00 (0.910)	-0.03 (0.191)	0.02 (0.877)	-0.05 (0.119)	-0.01 (0.627)
Other language(s) only	-0.05 (0.001)	-0.01 (0.716)	-0.10 (0.002)	0.31 (0.057)	-0.11 (0.118)	-0.02 (0.577)

Note: Design-based analyses in SUDAAN using raked weights and Jackknife Repeated Replication method.

educational achievement (for perceived racism in health care). Figure 8 through Figure 11 display the varying rates of change among the subgroups for the interactions of perceived racism and gender, age, and educational achievement (which are described below).

Among males, there was no statistically significant difference between those who had rarely perceived experiencing racism in general and those who had never experienced it (β= -0.01; p=0.378); those who had experienced racism more frequently had a higher average risk profile (β= 0.03; p=0.008) compared to those who had never experienced it. Among females, those who had rarely perceived experiencing racism and those who had more frequently perceived experiencing racism had higher average risk profiles compared to those who had never experienced it by 0.02 and 0.02, respectively. For perceived racism in health care, among males, the difference in those who had experienced racism compared to those who had not was almost one-quarter of a point (β= 0.23; p<0.001); among females, the difference was 0.16.

Figure 8. Interaction of Perceived Racism in General and Gender on Primary Risk Profile.

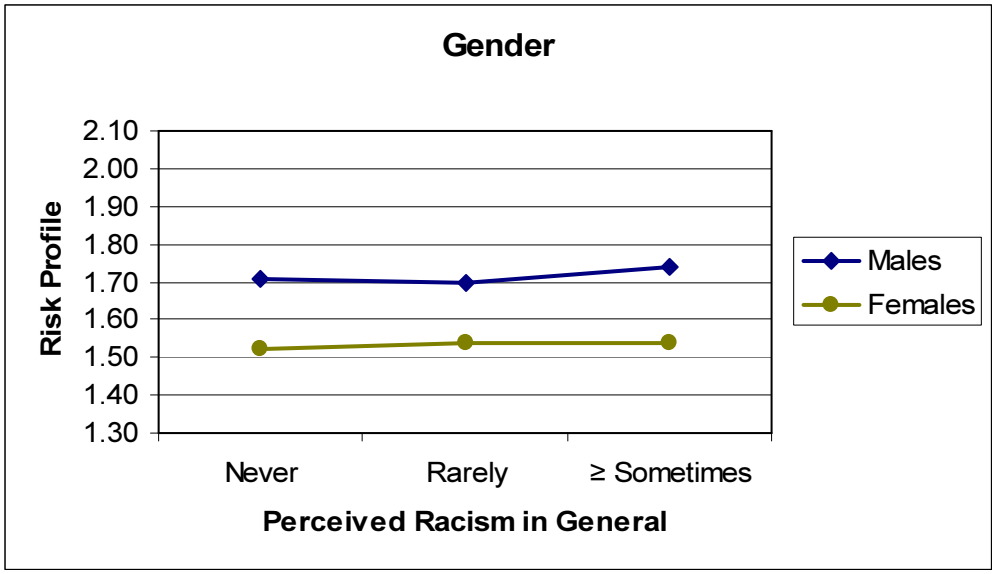
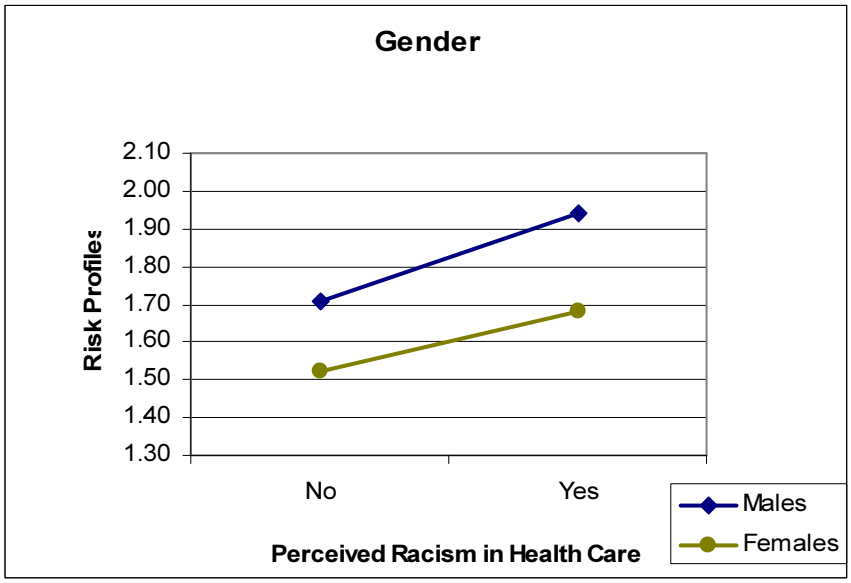


Figure 9. Interaction of Perceived Racism in Health Care and Gender on Primary Risk Profile.



The effect of perceived racism in health care on cancer risk profiles is also moderated by age and educational achievement. Among those 40-49 years, the difference in those who had experienced racism compared to those who had not was almost one-quarter of a point (β= 0.23; $p<0.001$); among those 18-22 years and among those 23-29 years, the difference was 0.16; among those 50-64 years and among those 65-102 years, the difference was 0.12. Thus, as age increases the difference in average risk profiles, between those who had perceived experiencing racism in health care compared to those who had not, decelerates. Among those who had attended graduate school, the difference in those who had experienced racism compared to those who had not was almost one-quarter of a point (β= 0.23; $p<0.001$); among those who did not complete high school, the difference was 0.12; among those who did complete high school/GED, the difference was 0.11; among those who had some college education, the difference was 0.10; and among those who had a bachelor's degree, the difference was 0.19. Thus, it appears that as educational achievement increases from less than high

school to some college, the difference in average risk profiles between those who had perceived experiencing racism and those who had not slightly decelerates and then accelerates as achievement reaches bachelor's degree.

Figure 10. Interaction of Percieved Racism in Health Care and Age on Primary Risk Profile.

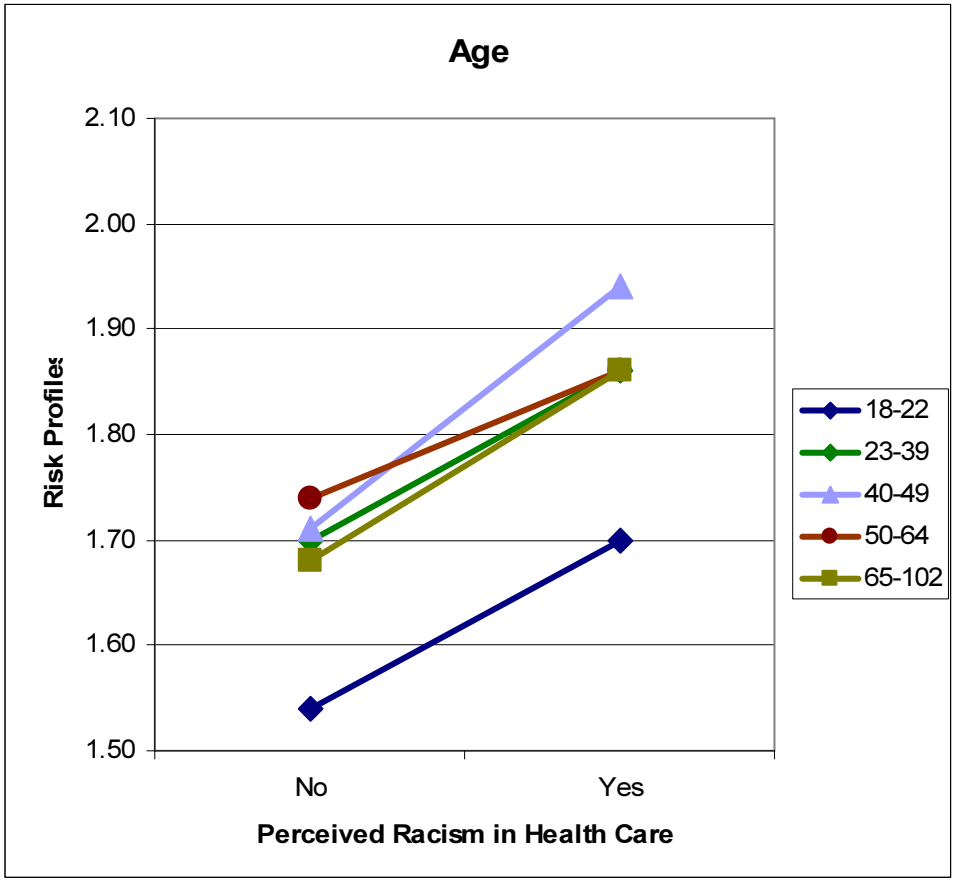
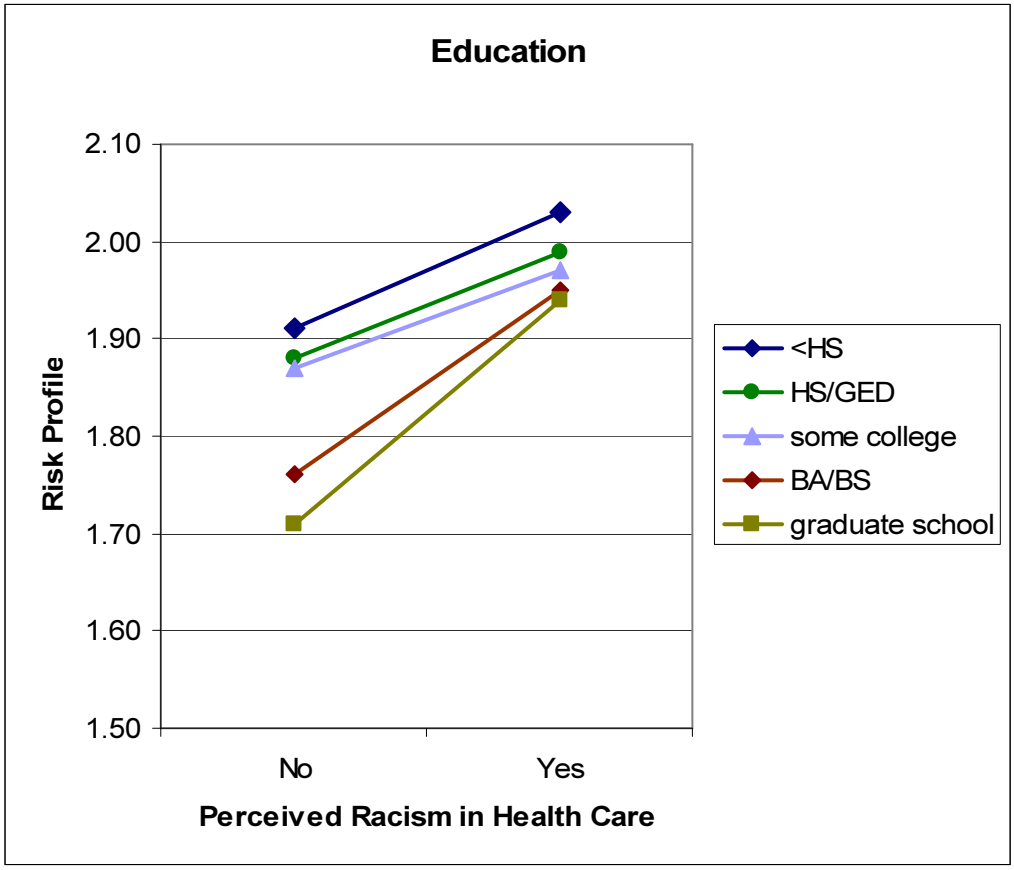


Figure 11. Interaction of Perceived Racism in Health Care and Educational Achievement on Primary Risk Profile.



Race/ethnicity had statistically significant main effect on primary cancer risk behavioral profile. For race/ethnicity, there were no statistically significant differences between Latinos (β= -0.01; p=0.150), AI/ANs (β=0.04; p=0.198), and African-Americans (β= 0.00; p=0.840) compared to Whites; APIs had a lower average risk profile compared to Whites (β= -0.09; p<0.001). For socioeconomic characteristics, poverty level and employment status had statistically significant main effects on primary cancer risk profile. There were no statistically significant differences between those 100-199% of the FPL (β=0.00; p=0.643), those 300-399% of the FPL (β= -0.01; p=0.264), and those at least 400% of the FPL (β= -0.02; p=0.068) compared to those 200-299%; for those 0-99% of

the FPL the average risk profiles decrease in comparison to those 200-299% of the FPL (β= -0.04; p<0.001). For employment status, the employed but not working had a decrease in average risk profile compared to the employed (β= -0.03; p=0.005); the unemployed had a further decrease in average risk profile compared to the employed (β= -0.05; p<0.001).

For psychosocial factors, main effects were statistically significant for marital status, religious participation and average social resources. For marital status, there was no statistically significant difference between those who had never been married and those who were married (β=0.00; p=0.676). Compared to those who were married, those who were widowed/divorced/living with partner/other had an increase in their average risk profile (β=0.05; p<0.001). For religious participation in the last week, those who did not participate had an increase in their risk profile compared to those who did participate (β=0.09; p<0.001). For average social resources, as average social resources increased by one unit cancer risk profiles slightly increased (β=0.01; p=0.001). For neighborhood resources, those who did not have a neighborhood watch program had a slight increase in their risk profile compared to those who had such a resource (β=0.02; p<0.001).

For immigration and acculturation factors, main effects were statistically significant for citizenship/immigration status, length of residency in the US, and language spoken at home. For citizenship/immigration status, naturalized citizens had a decrease in average risk profile compared to US-born citizens (β= -0.06; p<0.001). Similarly, residents without green-cards (β= -0.04; p=0.008) and residents with green cards (β= -0.06; p=0.005) had decreases in their average risk profiles compared to US-born citizens. For length of residency in the US, the trend is that with increasing length of residency

average risk profiles increased. Compared to those who had resided in the US for at least 15 years, the differences were as follows: for those who had resided in the US for less than 2 years, -0.16 ($p<0.001$); for those 2-4 years, -0.09 ($p<0.001$); for those 5-9 years, -0.06 ($p=0.007$); for those 10-14 years, -0.06 ($p<0.001$). Moving from English to other languages spoken at home, average risk profiles decrease. There was no statistically significant difference between those who spoke English and another language at home and those who only spoke English at home ($\beta= -0.01$; $p=0.474$). Those who only spoke another language at home had a decrease in their average risk profile ($\beta= -0.05$; $p=0.001$).

Potential moderator, mediators, confounders

Based on the literature reviewed in the background chapter, the following variables were identified as potential moderators of the relationship between perceived racism and primary cancer risk behavioral profiles: race/ethnicity, gender, age, educational achievement, poverty level, and immigration/citizenship status. The results from the preliminary analyses of these potential moderators are available in Appendix G which demonstrate that gender moderates the relationship between perceived racism in general and primary risk profile and race/ethnicity, age and gender moderate the relationship between perceived racism in health care and primary risk profile. The effects of these moderators on the relationship between perceived racism and primary cancer risk profiles were tested for statistically significance by adding them to the main effects model. Of the interaction terms that were evaluated in the perceived racism and primary cancer risk profiles model, four remained in the final fixed effects model: (1) perceived racism in general and gender, (2) perceived racism in health care and gender, (3) perceived racism in health care and age, and (4) perceived racism in health care and

educational achievement. The findings for these interactions terms are presented in Table 25 and discussed above in the section on the fixed effects model.

To assess confounders in the fixed effects model for perceived racism and primary cancer risk behavioral profiles, variables had to meet three standard statistical criteria previously described in the Study Design and Methods section. The following variables met these criteria: marital status, religious participation, average social resources, neighborhood watch, citizenship/immigration status, length of residency, and language spoken at home. Comparing the coefficients from the simple linear regression models and those from the best subset models provided some insight into the level of confounding in the relationship between cancer risk profiles and perceived racism. Results demonstrate that immigration/acculturation factors are confounders of the relationship between perceived racism in general and primary risk profiles (with a change in the difference in average risk profiles for those who perceived racism sometimes/often/all the time by 0.01) and of the relationship between perceived racism in health care and primary risk profiles (with a change in the difference in average profiles for those who perceived racism in health care by 0.03). Psychosocial factors are confounders of the relationship between perceived racism in general and primary risk profiles (with a change in the difference in average risk profiles for those who perceived racism sometimes/often/all the time by -0.02). These factors did not appear to confound the relationship between perceived racism in health care and primary risk profiles. Neighborhood resources also did not confound either of the two relationships between perceived racism and primary cancer risk profiles.

Fixed effects model across aggregate racial/ethnic groups

In race/ethnicity stratified analyses, the relationships evident in the total sample fixed effects model presented do not remain the same across all groups; the findings are presented in Table 25. The relationship between perceived racism in general and primary cancer risk profiles is moderated by gender only among Whites. There are no statistically significant differences for perceived racism in general among males, there is a difference among females. Among White females, there is a 0.03 increase in average risk profile for those who perceived experiencing racism rarely compared to those who never had; a similar trend is apparent among White females between those who perceived experiencing racism more frequently with a difference of 0.04. There were no statistically significant fixed effects of the interaction between perceived racism in health care and gender and the interaction between perceived racism in health care and age across all aggregate racial/ethnic groups.

Educational achievement moderates the relationship between perceived racism in health care and primary cancer risk profile among APIs. Among those who attended graduate school, there is no statistically significant difference in average risk profile between those who had perceived experiencing racism in health care compared to those who had not (β=0.11; $p<0.110$).

Poverty level has a statistically significant main effect on primary cancer risk profile among African-Americans and Whites. Among African-Americans, there are no statistically significant differences between those 100-199% of the FPL (β= -0.01; p=0.726) as well as those at least 400% of the FPL (β= -0.03; p=0.198) compared to the reference group, those 200-299% of the FPL. Those 0-99% of the FPL have a decrease

in average risk profiles (β= -0.11; p=0.001) as do those 300-399% (β= -0.08; p=0.025) compared to the reference group. Among Whites, the only statistically significance difference with the reference group is for those at least 400% of the FPL having a lower average risk profile (β= -0.03; p=0.011). Employment status has a statistically significant main effect on primary cancer risk profile among Latinos and Whites. Among both groups, there is no statistically significant difference between those employed but not working and those employed. Among both groups, the difference between those unemployed and those employed is a decrease in cancer risk profile; for Latinos the difference is -0.09 (p<0.001) and for Whites, -0.04 (p<0.001).

Marital status has a statistically significant main effect on primary cancer risk profile only among Whites. There is no statistically significant difference between those who were never married and those who were married (β= -0.01; p=0.568); the difference was between those who were in the other group (e.g., widowed, divorced, living with a partner) and those who were married (β=0.05; p<0.001) with the former having an increase in their average cancer risk profile. Religious participation has a statistically significant main effect on primary cancer risk profile among all groups except AI/ANs. Among all groups, those who had not participated in religious services within the past week had an increase in their average risk profiles compared to those who had participated; among Latinos the difference is 0.09 (p<0.001), among APIs the difference is 0.06 (p=0.002), among African-Americans the difference is 0.10 (p<0.001) and among Whites the difference is also 0.10 (p<0.001). Social resources have a statistically significant main effect on primary cancer risk profile among APIs, and African-Americans. Among both groups, the trend appears to be that for an increase in social

resources there are increases in risk profiles; among APIs the increase is 0.03 ($p=0.001$) and among African-Americans the increase is also 0.03 ($p=0.014$).

Neighborhood watch has a statistically significant main effect on cancer risk profiles among Latinos, AI/ANs and Whites. Among all aggregate racial/ethnic groups, those who did not have a neighborhood watch program had a higher average cancer risk profile compared to those who did not; among Latinos the difference is 0.02 ($p<0.001$); among AI/ANs, the difference is 0.12 ($p=0.040$); and among Whites, the difference is 0.02 ($p=0.001$).

Citizenship/immigration status is a statistically significant explanatory factor of primary cancer risk profile among Latinos, APIs and African Americans. Among Latinos decreases in average risk profiles are evident for all groups compared to US-born citizens with differences increasing with each status. The difference for naturalized citizens is -0.09 ($p<0.001$), for residents with green cards it is -0.10 ($p<0.001$) and for residents without green cards it is -0.12 ($p<0.001$). Among APIs, there were no statistically significant difference between the two citizen groups ($\beta= -0.01$; $p=0.777$). Average cancer risk profiles increase for residents with green cards ($\beta=0.11$; $p=0.004$) as well as for residents without green cards ($\beta=0.11$; $p=0.020$) when compared to US-born citizens. Among African-Americans, there are no statistically significant differences between naturalized citizens ($\beta=0.02$; $p=0.957$) as well as residents with green cards ($\beta= -0.05$; $p=0.703$) when compared with US-born citizens. Residents without green cards had a decrease in their average risk profile compared to US-born citizens by almost half a point ($\beta= -0.46$; $p=0.002$). Length of residency in the US is a statistically significant explanatory factor of primary cancer risk profile among Latinos, APIs, African-

Americans, and Whites. Among Latinos and APIs, length of residency in the US has similar main effects on primary cancer risk profiles as it did in the model for the total sample, with increasing risk profiles as length of residency increased. The differences among APIs were of higher magnitude compared to those in the model with the total sample. Among African-Americans, the only statistically significant difference in average cancer risk profiles is between those in the US for less than 2 years compared to those in the US for at least 15 years (β=0.28; p=0.033). Among Whites, the only statistically significant difference in average cancer risk profiles is between those in the US for 2-4 years compared to those in the US for at least 15 years (β= -0.16; p=0.003). Language spoken at home is a statistically significant explanatory factor among APIs. There is no statistically significant difference in average cancer risk profile between those who spoke English and another at home compared to those who only spoke English at home (β= -0.03; p=0.191). Those who spoke only another language at home had a lower average cancer risk profile compared to those who only spoke English at home (β= -0.10; p=0.002).

Chapter 7: Results for Secondary Behavioral Cancer Risk Profile

The second outcome of interest in this study is secondary cancer risk profile, constructed as an index of age and gender specific cancer screening behaviors ranging from 1 (lowest risk profile representing those who were current with all recommended cancer screenings) to 3 (highest risk profile representing those who had never participated in any of the recommended cancer screenings). For women average scores were created using information on screening participation for cervical, breast and colorectal cancers; for men average scores are dependent upon colorectal and prostate cancer screenings. These analyses are limited to a subset of the study sample (n=26,172) due to the fact that no cancer screenings are recommended for males 18-39.

The discussion of the results for this outcome are organized by the steps that were taken in modeling the fixed effects of perceived racism and other study correlates on secondary cancer risk behavioral profiles. First, findings from the simple linear regressions are presented identifying variables that were included in the analyses for the best subsets. Next, findings from the best subset models are presented. This is followed the results from the multiple linear fixed effects model for total study sample including a discussion of potential moderators, mediators and confounders. In the last part of this section findings of the fixed effects model by race/ethnicity are presented.

Simple linear regression

Simple linear regression equations were estimated for the effects of perceived racism, the main study exposures, as well as for all study correlates on primary cancer risk behavioral profiles and the findings are presented in Table 26. The estimates from

the simple linear regressions indicate that the two perceived racism measures behaved differently with respect to secondary cancer risk profiles. Perceived racism in general had an association that was statistically significant with exposure to perceived racism resulting in decreased risk profiles. The difference in the average risk profiles between those who had rarely experienced racism and for those who have never experienced racism was -0.04 ($p=0.001$). There was no statistically significant difference in the average risk profiles between those who experienced racism sometimes, often, or all the time and those who never experienced racism in general ($\beta= -0.02$; $p=0.276$). For perceived racism in health care, the association with secondary cancer risk profile was not statistically significant; thus, no difference in average risk profiles is evident between those who had experienced racism in health and those who had not ($\beta=0.01$; $p=0.750$).

The associations between secondary risk profile and demographic variables, race/ethnicity, age, and gender were all statistically significant. For race/ethnicity, Whites were the reference group, and differences in average secondary risk profiles between Latinos ($\beta=0.03$; $p=0.088$), AI/ANs ($\beta=0.04$; $p=0.556$), and African-Americans ($\beta= -0.03$; $p=0.103$) and Whites were not statistically significant. The only statistically significant difference was between APIs and Whites ($\beta=0.22$; $p<0.001$), with APIs having an average secondary risk profile that is almost a quarter of a point higher than that for Whites. For gender, females had an average secondary risk profile that is almost two-thirds of a point lower than the average for males with the difference in average risk profiles between females and males is -0.60 ($p<0.001$). For age, there was no statistically significant difference between those 18-22 years and the reference group, those 50-64 years. Those groups younger than the reference group had decreased average risk

profiles with those 23-39 years having a larger difference (β= -0.60; p<0.001) than those 40-49 years (β=-0.42; p<0.001). Those 65-102 years also had a decrease in their average risk profile compared to the reference group though their difference was not as large as for the other groups (β= -0.17; p<0.001).

The associations between secondary cancer risk profile and socioeconomic characteristics were statistically significant for poverty level, educational achievement, and home ownership; the association between secondary risk profile and employment status was not statistically significant. For poverty level, there appears to be a threshold at 300% of the FPL under which there is no difference in average risk profiles, however, as you move above this threshold there is a decrease in average risk profiles. There were no statistically significant differences between those 0-99% of the FPL (β=0.00; p=0.876), 100-199% of the FPL (β= -0.02; p=0.080), and the reference group, 200-299%. Those 300-399% of the FPL and at least 400% of the FPL have average risk profiles that are lower than the reference group by -0.13 (p<0.001) and -0.14 (p<0.001), respectively. For educational achievement, with increased education there was a decrease in average secondary cancer risk profiles. There were no statistically significant differences between those who had a bachelor's degree and those who had attended graduate school, the reference group (β=0.00; p=0.872). The difference in average risk profiles between those who had some college education (β=0.05; p=0.005), high school/GED (β=0.11; p<0.001), less than high school education (β=0.14; p<0.001) and the reference group showed graduated increases in risk profiles. For home ownership, there were no statistically significant difference between those who rented and owned their homes

(β=0.02; p=0.080) and those who had other arrangements had an increased risk compared to those who owned their homes (β=0.10; p=0.003).

The associations between secondary cancer risk profile and access to health care were statistically significant for the broad set of health care access variables including the domains of insurance coverage, utilization and satisfaction; in general, those who had access to health care services had lower average risk profiles compared to those who had limited or no access to health care. Those who had no insurance coverage had an increase in their average cancer risk profile (β=0.19; p<0.001) compared to those who had insurance coverage. Those who had not visited a doctor within the past year had a in increase in their average cancer risk profile by almost one-third of a point (β=0.32; p<0.001) compared to those who had not visited a doctor. Those who had a problem finding a provider with whom they were satisfied had a decrease in their secondary cancer risk profile (β= -0.06; p=0.001) compared to those who had no problem; those who had no need for a provider had an increase in their average risk profile by over half a point (β=0.52; p<0.001) compared to those who had no problem. Those who had a problem accessing health care services had no statistically significant difference in their average secondary cancer risk profiles (β=0.01; p=0.771) compared to those who had no problem; those who did not need health care services had an increase in their average risk profile by almost a third of a point, (β=0.31; p<0.001) compared to those who had no problem. The trend for satisfaction of health care services shows that average risk profiles increased with decreased satisfaction (i.e., those who were most satisfied was the reference group, those who were moderately satisfied had a difference of 0.04 (p=0.009) and those who were not satisfied had a difference of 0.14 (p<0.001)) with those who

refused to answer/did not know how satisfied they were having the largest difference (β=0.79; $p<0.001$). Those who had not utilized health care services within the last year had an increase in their average risk profile (β=0.37; $p<0.001$) compared to those who were most satisfied with their health care services.

The associations between secondary cancer risk profiles and psychosocial factors were statistically significant for social resources/support (e.g., marital status, religious participation and social resources) coping mechanisms (e.g., binge drinking and heavy smoking) and one competing priority, home safety. For marital status, the difference in average risk profiles between those who are widowed/divorced/living with partner/other and those who are married is 0.05 ($p<0.001$) and the difference between those who were never married and those who are married is 0.18 ($p<0.001$). For religious participation, the average risk profile for those who did not participation in religious services in the past week is higher (β=0.02; $p=0.041$) compared to those who did participate. For an increase in social resources by 1 unit, average risk profiles decrease (β= -0.03; $p<0.001$). Those who participated in binge drinking, defined as having 5 or more drinks at one occasion, had an increase in their average higher risk profile (β=0.11; $p<0.001$) compared to those that did not participate in binging. For heavy smoking, those who smoked less than one pack per day had a difference in average risk profile of 0.05 ($p=0.008$) and those who smoked a pack or more per day had a difference in average risk profile of 0.27 ($p<0.001$) compared to those who did not smoke. Those whose homes had been broken into had an increase in their average risk profile (β=0.06; $p=0.004$) compared to those whose home had not been broken into.

The associations between secondary cancer risk profiles and perceptions of neighborhood resources were statically significant for safe park/open space and social cohesion. For safe park/open space, there were no statistically significant differences between those who had a park/open space within walking distance that was sometimes safe (β= -0.00; p=0.851), always unsafe (β= -0.04; p=0.278) compared to those who had one that was always safe. However, those who did not have a park/open space in their neighborhood on average had a risk profile that was higher (β=0.06; p=0.001). For an increase in 1 unit of social cohesion, risk profiles decreased (β=0.10; p<0.001).

The associations between secondary cancer risk profiles and immigration and acculturation factors were all statistically significant. For citizenship/immigration status, US-born citizens were the reference group and there was no statistically significant difference between residents without green cards and the reference group (β= -0.02; p=0.557). Naturalized citizens (β=0.13; p<0.001) and residents with green cards (β=0.14; p<0.001) had increases in their risk profiles compared to US-born citizens. For language spoken at home, the differences in average risk profiles increased with other languages being spoken compared to those who only spoke English at home; for those who spoke English and other language(s) at home the difference was an increase of 0.09 (p<0.001) and for those who spoke only another language(s) at home the difference was an increase of 0.18 (p<0.001). For length of residency in the US, those who were in the US less than 2 years on average had an increase in their risk profile (β=0.36; p=0.005) compared to those who had lived in the US for at least 15 years; there were no statistically significant differences between those who were in the US for 2-4 years (β=0.10; p=0.070), for 5-9

years (β=0.04; p=0.233), and for 10-14 years (β=0.01; p=0.857) compared to those who had lived in the US for at least 15 years.

Table 26. Simple Linear Regression Equation Estimates (and p-values) for Secondary Behavioral Cancer Risk Profiles (N=26,172).[a]

	Coefficients (p-values)
Perceived Racism, General	0.0052
Intercept	1.50 (<0.001)
Never (reference)	0.00 (.)
Rarely	-0.04 (0.001)
Sometimes/often/all the time	-0.02 (0.276)
Perceived Racism, Health Care context	(0.750)
Intercept	1.48 (<0.001)
No (reference)	0.00 (.)
Yes	0.01 (0.750)
Demographics	
Race/Ethnicity	(<0.001)
Intercept	1.45 (<0.001)
Latino	0.03 (0.088)
API	0.22 (<0.001)
AIAN	0.04 (0.556)
African-American	-0.03 (0.103)
White (reference)	0.00 (.)
Gender	(<0.001)
Intercept	1.95 (<0.001)
Male (reference)	0.00 (.)
Female	-0.60 (<0.001)
Age	(<0.001)
Intercept	1.32 (<0.001)
18-22	0.44 (<0.001)
23-39	-0.18 (<0.001)
40-49 (reference)	0.00 (.)
50-64	0.42 (<0.001)
65-102	0.25 (<0.001)
Socioeconomic characteristics	
Education	(<0.001)
Intercept	1.42 (<0.001)
Less than High School	0.14 (<0.001)
High School/GED	0.11 (<0.001)
Some college	0.05 (0.005)
BA/BS	0.00 (0.872)
Graduate school (reference)	0.00 (.)

	Coefficients (p-values)
Employment	(0.906)
Intercept	1.48 (<0.001)
Employed (reference)	0.00 (.)
Employed but no work	0.01 (0.658)
Unemployed	0.00 (0.790)
Home Ownership	(0.007)
Intercept	1.47 (<0.001)
Own (reference)	0.00 (.)
Rent	0.02 (0.080)
Other arrangement	0.10 (0.003)
% Federal Poverty Line	(<0.001)
Intercept	1.56 (<0.001)
0-99%	0.00 (0.875)
100-199%	-0.02 (0.389)
200-299% (reference)	0.00 (.)
300-399%	-0.13 (<0.001)
400%+	-0.14 (<0.001)
Access	
Insurance Coverage	(<0.001)
Intercept	1.46 (<0.001)
Yes (reference)	0.00 (.)
No	0.19 (<0.001)
Usual source of care	(<0.001)
Intercept	1.45 (<0.001)
Yes (reference)	0.00 (.)
No	0.32 (<0.001)
Doctor visit(s) in past year	(<0.001)
Intercept	1.43 (<0.001)
Yes (reference)	0.00 (.)
No	0.46 (<0.001)
Problem with Provider	(<0.001)
Intercept	1.47 (<0.001)
Problem	-0.06 (0.001)
No problem (reference)	0.00 (.)
Did not need to see a provider	0.52 (<0.001)
Satisfaction with Health Care	(<0.001)
Intercept	1.44 (<0.001)
Don't Know/Refused	0.79 (<0.001)
No health care services in past year	0.37 (<0.001)
Dissatisfied<5	0.14 (<0.001)
Moderately satisfied	0.04 (0.009)
Most satisfied (reference)	0.00 (.)

	Coefficients (p-values)
Problem in accessing care	(<0.001)
Intercept	1.46 (<0.001)
Problem	0.01 (0.771)
No problem (reference)	0.00 (.)
Did not need care	0.31 (<0.001)
Psychosocial Factors	
Religious Participation	(0.041)
intercept	1.47 (<0.001)
Yes (reference)	0.00 (.)
No	0.02 (0.041)
Marital Status	(<0.001)
Intercept	1.44 (<0.001)
Married (reference)	0.00 (.)
Other/widowed/divorced/living with partner	0.05 (<0.001)
Never married	0.18 (<0.001)
Social Resources: 1(none)-5(all of the time)	(<0.001)
Intercept	1.62 (<0.001)
rate of change	-0.03 (<0.001)
Binge Drinking	(<0.001)
Intercept	1.48 (<0.001)
Yes	0.11 (<0.001)
No (reference)	0.00 (.)
Smoking 20+ cigarettes	(<0.001)
Intercept	1.47 (<0.001)
None (reference)	0.00 (.)
Less than a pack/day	0.05 (0.008)
At least a pack/day	0.27 (<0.001)
Food Security	(0.648)
Intercept	1.48 (<0.001)
Food Secure or >200% of FPL (reference)	0.00 (.)
Food insecure	0.01 (0.648)
Home ever broken into	(0.004)
Intercept	1.48 (<0.001)
Yes	0.06 (0.004)
No (reference)	0.00 (.)
Seen cockroaches in home	(0.088)
Intercept	1.48 (<0.001)
Yes	0.03 (0.088)
No (reference)	0.00 (.)

	Coefficients (p-values)
Perceptions of Neighborhood Resources	
Neighborhood Watch	(0.082)
Intercept	1.47 (<0.001)
Yes (reference)	0.00 (.)
No	0.02 (0.082)
Safe Park/Open Space in Neighborhood	(0.005)
Intercept	1.47 (<0.001)
No park in neighborhood	0.06 (0.001)
Always safe park/open space (reference)	0.00 (.)
Sometimes safe park/open space	0.00 (0.851)
Always unsafe park/open space	-0.04 (0.278)
	(<0.001)
Social Cohesion	1.76 (<0.001)
Intercept	-0.10 (<0.001)
rate of change	
Immigration/Acculturation	
Citizenship/Immigration status	(<0.001)
Intercept	1.45 (<0.001)
US-born citizen (reference)	0.00 (.)
Naturalized Citizen	0.13 (<0.001)
Green card resident	0.14 (<0.001)
Resident without Green card	-0.02 (0.557)
Language Spoken at Home	(<0.001)
Intercept	1.43 (<0.001)
English only (reference)	0.00 (.)
English + other language(s)	0.09 (<0.001)
Other language(s) only	0.18 (<0.001)
Length of Residency in the US	(0.021)
Intercept	1.48 (<0.001)
< 2 years	0.36 (0.005)
2-4 years	0.10 (0.070)
5-9 years	0.04 (0.233)
10-14 years	0.01 (0.857)
≥ 15 years (reference)	0.00 (.)

a. Outcome is secondary behavioral cancer risk profile, 1=low risk and 3=high risk.
Note: Design-based analyses in SUDAAN using raked weights and Jackknife Repeated Replication method.

Best subsets models

As described in more detail in the Methods chapter/section, the second step in modeling the relationship between the cancer risk profiles and perceived racism was to build models of conceptually related correlates (e.g., demographic characteristics, socioeconomic characteristics, health care access, psychosocial factors, perceptions of neighborhood resources, immigration/acculturation and perceived racism) to identify the 'best subsets' of correlates to be used in building the main effects models. The results for the best subset models are shown in Table 27 for each of the subsets listed above. Columns labeled Model 1 and Model 2, in the table, are specific to each of the perceived racism measures (perceived racism in general and perceived racism in health care, respectively).

For each subset analyses with perceived racism in general as the main exposure variable, perceived racism remains a statistically significant explanatory factor of secondary cancer risk profiles in all the subsets with the exception of socioeconomic characteristics. For each subset analyses with perceived racism in health care as the main exposure, perceived racism was associated with secondary cancer risk profiles at a statistically significant level only in the subset of demographic characteristics. There are no differences in which variables remain statistically significant within each subset across the sets of models with the different perceived racism measures. Thus, for both sets of models assessing the association between cancer risk profile and perceived racism (in general and in health care), the following variables remain statistically significant for their respective subset:

- Demographics: race/ethnicity, age, gender;

- Socioeconomic characteristics: poverty level, educational achievement, home ownership;
- Access to health care: usual source of care, doctor visit(s) within the past year, problem with provider, problem with accessing health care services, satisfaction with health care services;
- Psychosocial factors: marital status, average social resources, binge drinking, heavy smoking, home broken into;
- Neighborhood resources: neighborhood watch, safe park/open space, social cohesion;
- Immigration/acculturation factors: citizenship/immigration status, language at home, length of residency in the US;
- Perceived racism: perceived racism in general.

The relationship between perceived racism in general and secondary cancer risk behavioral profiles remains the same as it was in the simple linear regression model in the perceived racism subset model; for all the other subset models, there is a change in this relationship. Recall in the simple linear regression equations, the difference between those who rarely and never perceived experiencing racism was -0.04, a decrease in average cancer risk profile; there was no statistically significant difference in average cancer risk profiles between those who perceived racism sometimes/often/all the time and never. In the demographic characteristics subset, the difference between those who had more frequently perceived racism and never perceived it was statistically significant at -0.04 ($p=0.015$). In the socioeconomic characteristics subset, there was no statistically significant association between perceived racism in general and caner risk profiles. In the

access to health care subset, the difference between those who had rarely perceived experiencing racism and those who had never perceived racism was -0.03 ($p=0.004$). In the psychosocial factors subset, perceived racism coefficients changed for both groups, rarely and sometimes/often/all the time. The difference between those who had rarely perceived experiencing racism and those who had never was -0.06 ($p<0.001$) and the difference between those who had rarely perceived experience racism more often and those who had never was -0.04 ($p=0.009$). In the neighborhood resources subset, the difference between those who more frequently perceived experiencing racism and those who had never became marginally significant ($\beta=-0.03$; $p=0.053$). In the immigration/acculturation factors subset, the difference between those who had rarely perceived experiencing racism and those who had never was -0.03 ($p=0.005$).

The relationship between perceived racism in health care and secondary cancer risk behavioral profiles remains statistically insignificant in the best subset models for socioeconomic characteristics, access to health care, psychosocial factors, neighborhood resources, and immigration/acculturation factors; it changed only in the demographic characteristics subset ($\beta=0.05$; $p=0.007$). Recall in the simple linear regression equations, the difference between those who had perceived experiencing racism and those who had not was marginally significant at 0.01 ($p=0.750$).

Table 27. Best Subsets for Secondary Risk Profiles and Perceived Racism (N=26,172).[a]

	Model 1: Perceived Racism in General	Model 2: Perceived Racism in Health Care
Variables	Coefficients (p-values)	Coefficients (p-values)
SUBSET 1: Demographics		
R-squared	0.23	0.23
Intercept	1.77 (<0.001)	1.75 (<0.001)
Perceived Racism, General	(0.002)	
Never (reference)	0.00 (.)	
Rarely	-0.04 (0.001)	
≥ Sometimes/Often/All the time	-0.04 (0.015)	
Perceived Racism, Health care		(0.007)
No (reference)		0.00 (.)
Yes		0.05 (0.007)
Race/Ethnicity	(<0.001)	(<0.001)
Latino	0.14 (<0.001)	0.13 (<0.001)
API	0.28 (<0.001)	0.27 (<0.001)
AI/AN	0.08 (0.165)	0.07 (0.235)
African-American	0.02 (0.440)	-0.01 (0.668)
White (reference)	0.00 (.)	0.00 (.)
Age	(<0.001)	(<0.001)
18-22	0.43 (<0.001)	0.43 (<0.001)
23-39	-0.19 (<0.001)	-0.19 (<0.001)
40-49	0.00 (.)	0.00 (.)
50-64 (reference)	0.18 (<0.001)	0.19 (<0.001)
65-102	0.05 (0.005)	0.06 (0.001)
Gender	(<0.001)	(<0.001)
Male (reference)	0.00 (.)	0.00 (.)
Female	-0.50 (<0.001)	-0.50 (<0.001)
SUBSET 2: Socioeconomic Characteristics		
R-squared	0.01	0.01
Intercept	1.55 (<0.001)	1.54
Perceived Racism, General	(0.131)	
Never (reference)	0.00 (.)	
Rarely	-0.02 (0.083)	
≥ Sometimes/Often/ All the time	-0.03 (0.109)	
Perceived Racism, Health care		(0.152)
No (reference)		0.00 (.)
Yes		-0.03 (0.153)
Poverty Level	(<0.001)	(<0.001)
0-99%	-0.01 (0.749)	-0.01 (0.798)
100-199%	-0.02 (0.220)	-0.02 (0.242)
200-299% (reference)	0.00 (.)	0.00 (.)
300-399%	-0.12 (<0.001)	-0.12 (<0.001)
≥ 400%	-0.13 (<0.001)	-0.13 (<0.001)

	Model 1: Perceived Racism in General	Model 2: Perceived Racism in Health Care
Educational Achievement	(0.003)	(0.0015)
< High School	0.06 (0.008)	0.07 (0.004)
HS Diploma/ GED	0.06 (0.005)	0.06 (0.003)
Some college	0.01 (0.413)	0.01 (0.371)
BA/BS	-0.01 (0.675)	-0.01 (0.695)
Graduate school (reference)	0.00 (.)	0.00 (.)
Home Ownership	(0.025)	(0.0245)
Own (reference)	0.00 (.)	0.00 (.)
Rent	-0.03 (0.056)	-0.03 (0.048)
Other arrangement	0.05 (0.140)	0.05 (0.153)
SUBSET 3: Access to Health Care		
R-squared	0.07	0.07
Intercept	1.43 (<0.001)	1.42 (<0.001)
Perceived Racism, General	(0.015)	
Never (reference)	0.00 (.)	
Rarely	-0.03 (0.004)	
≥ Sometimes/Often/ All the time	-0.02 (0.127)	
Perceived Racism, Health care		(0.064)
No (reference)		0.00 (.)
Yes		-0.04 (0.064)
Insurance Coverage	(0.089)	(0.066)
Yes (reference)	0.00 (.)	0.00 (.)
No	0.04 (0.089)	0.04 (0.066)
Usual Source of Care	(<0.001)	(<0.001)
Yes (reference)	0.00 (.)	0.00 (.)
No	0.14 (<0.001)	0.14 (<0.001)
Doctor visit within past year	(<0.001)	(<0.001)
Yes (reference)	0.00 (.)	0.00 (.)
No	0.33 (<0.001)	0.33 (<0.001)
Problem with provider	(<0.001)	(<0.001)
Problem	-0.09 (<0.001)	-0.10 (<0.001)
No Problem (reference)	0.00 (.)	0.00 (.)
Did not need a provider	0.10 (0.032)	0.10 (0.033)
Health care rating	(<0.001)	(<0.001)
No health care	0.01 (0.859)	0.01 (0.849)
Don't Know/Refused	0.32 (<0.001)	0.32 (<0.001)
Dissatisfied	0.11 (0.001)	0.11 (0.001)
Moderately satisfied	0.05 (0.001)	0.05 (0.002)
Most satisfied (reference)	0.00 (.)	0.00 (.)
SUBSET 4: Psychosocial Factors		
R-squared	0.02	0.02
Intercept	1.57 (<0.001)	1.54 (<0.001)
Perceived Racism, General	(<0.001)	
Never (reference)	0.00 (.)	
Rarely	-0.06 (<0.001)	
≥ Sometimes/Often/ All the time	-0.04 (0.009)	

	Model 1: Perceived Racism in General	Model 2: Perceived Racism in Health Care
Perceived Racism, Health care		(0.469)
No (reference)		0.00
Yes		-0.02 (0.469)
Marital Status	(<0.001)	(<0.001)
Married (reference)	0.00 (.)	0.00 (.)
Widowed/Divorced/ Separated/Living with partner	0.03 (0.028)	0.03 (0.024)
Never Married	0.17 (<0.001)	0.16 (<0.001)
Average Social Resources	(<0.001)	(<0.001)
Rate of change	-0.03 (<0.001)	-0.03 (<0.001)
Binge Drinking	(0.001)	(0.001)
Yes	0.08 (0.001)	0.08 (0.001)
No (reference)	0.00 (.)	0.00 (.)
Heavy Cigarette Smoking	(<0.001)	(<0.001)
None (reference)	0.00 (.)	0.00 (.)
Less than a pack/day	0.03 (0.129)	0.03 (0.146)
At least a pack/day	0.26 (<0.001)	0.26 (<0.001)
Home ever broken into	(0.002)	(0.003)
Yes	0.06 (0.002)	0.06 (0.003)
No (reference)	0.00 (.)	0.00 (.)
SUBSET 5: Neighborhood Resources		
R-squared	0.01	0.01
Intercept	1.81 (<0.001)	1.79 (<0.001)
Perceived Racism, General	(0.004)	
Never (reference)	0.00 (.)	
Rarely	-0.04 (0.001)	
≥ Sometimes/Often/ All the time	-0.03 (0.053)	
Perceived Racism, Health care		(0.473)
No (reference)		0.00 (.)
Yes		-0.02 (0.473)
Safe park/open space	(0.005)	(0.003)
No park/open space	0.04 (0.034)	0.04 (0.028)
Always safe park/open space (reference)	0.00 (.)	0.00 (.)
Sometimes safe park/open space	-0.03 (0.107)	-0.03 (0.100)
Always unsafe park/open space	-0.09 (0.019)	-0.09 (0.018)
Social cohesion scale	(<0.001)	(<0.001)
Rate of change	-0.11 (<0.001)	-0.10 (<0.001)
SUBSET 6: Immigration/Acculturation Factors		
R-squared	0.02	0.02
Intercept	1.45 (<0.001)	1.43 (<0.001)
Perceived Racism, General	(0.014)	
Never (reference)	0.00 (.)	
Rarely	-0.03 (0.005)	
≥ Sometimes/Often/ All the time	-0.03 (0.064)	

	Model 1: Perceived Racism in General	Model 2: Perceived Racism in Health Care
Perceived Racism, Health care		
No (reference)		0.00 (.)
Yes		-0.01 (0.627)
Citizenship and Immigration Status		
	(<0.001)	
US-born citizen (reference)	0.00 (.)	0.00 (.)
Naturalized citizen	0.05 (0.054)	0.05 (0.049)
Non-citizen w/Green Card	0.02 (0.565)	0.02 (0.501)
Non-citizen w/o Green Card	-0.19 (<0.001)	-0.19 (<0.001)
Language spoken at home	(<0.001)	
English only (reference)	0.00 (.)	0.00 (.)
English and other language(s)	0.09 (<0.001)	0.09 (<0.001)
Other language(s) only	0.19 (<0.001)	0.19 (<0.001)
Length of residency in the US	(0.011)	
< 2 years	0.39 (0.004)	0.39 (0.004)
2-4 years	0.09 (0.118)	0.09 (0.112)
5-9 years	0.02 (0.633)	0.02 (0.630)
10-14 years	-0.05 (0.157)	-0.04 (0.160)
≥ 15 years (reference)	0.00 (.)	0.00 (.)
SUBSET 7: Perceived Racism		
R-squared	0.00	
Intercept	1.50 (<0.001)	
Perceived Racism, General	(0.005)	
Never (reference)	0.00 (.)	
Rarely	-0.04 (0.001)	
≥ Sometimes/Often/ All the time	-0.02 (0.251)	
Perceived Racism, Health care	(0.622)	
No (reference)	0.00 (.)	
Yes	0.01 (0.622)	

a. Outcome is secondary behavioral cancer risk profile, 1=low risk and 3=high risk.
Note: Design-based analyses in SUDAAN using raked weights and Jackknife Repeated Replication method.
Shaded areas indicate separate regression equations.

Multiple linear regression

The next step in building the individual-level fixed effects model for secondary cancer risk behavioral profiles was to build main effects models by adding one subset at a time and keeping those variables that were statistically significant at $p \leq 0.05$. Main effects models were developed for each exposure of interest and a final main effects model was created that included both exposures as there were little differences between the perceived racism specific models (see Appendix E for these models). The model with both perceived racism measures was carried to the next step where the fixed effects model was finalized after assessing interaction terms.

The results from the fixed effects model for perceived racism and secondary cancer risk profile suggest that the following variables have a main effect on the risk profiles: perceived racism in general, race/ethnicity, age, poverty level, insurance coverage, usual source of care, doctor visit(s) within the past year, health care satisfaction, marital status, heavy smoking, length of residency in the US, and language at home. Immigration/citizenship status had a marginally significant main effect. In addition, the effect of perceived racism in health care on risk profiles is moderated by gender and educational achievement.

In general, exposure to perceived racism in general was associated on average with a lower cancer risk profile, after adjusting for all the other explanatory factors in the model. There was no statistically difference (β= -0.01; p=0.374) between those who had rarely experienced racism in general and those who had never experienced it; those who had experienced racism more frequently on average had a lower risk profile ((β= -0.04; p=0.003) compared to those who had never experienced it. For perceived racism in

Table 28. Fixed Effects (Coefficients and p-values) for Secondary Cancer Risk Behavioral Profiles for total study sample and stratified by race/ethnicity.

Variables	**Total (N=26,172)**	**Latinos (N=5218)**	**API (N=2568)**	**AIAN (N=226)**	**African-American (N=1826)**	**White (N=16334)**
R-squared	0.321	0.359	0.365	0.389	0.326	0.319
Intercept	1.84 (<0.000)	2.05 (<0.000)	1.91 (<0.000)	1.69 (<0.000)	1.81 (<0.000)	1.76 (<0.000)
Interactions						
Perceived Racism in General	(0.013)	(0.527)	(<0.001)	(0.746)	(0.500)	(0.267)
Never (reference)	0.00 (.)	0.00 (.)	0.00 (.)	0.00 (.)	0.00 (.)	0.00 (.)
Rarely	-0.01 (0.374)	-0.03 (0.259)	-0.02 (0.625)	0.00 (0.991)	-0.05 (0.446)	-0.01 (0.609)
Sometimes/Often/All the time	-0.04 (0.003)	-0.02 (0.532)	-0.12 (0.001)	-0.11 (0.448)	-0.07 (0.244)	-0.03 (0.105)
Perceived Racism in Health Care						
No	0.00 (.)	0.00 (.)	0.00 (.)	0.00 (.)	0.00 (.)	0.00 (.)
Yes	0.21 (0.028)	0.74 (0.005)	0.34 (0.205)	1.53 (0.014)	0.10 (0.586)	-0.14 (0.188)
Gender						
Male (reference)	0.00 (.)	0.00 (.)	0.00 (.)	0.00 (.)	0.00 (.)	0.00 (.)
Female	-0.50 (<0.000)	-0.69 (<0.000)	-0.66 (<0.000)	-0.24 (0.274)	-0.50 (<0.000)	-0.42 (<0.000)
Perceived Racism in Health Care*Gender	(0.003)	(0.0215)	(0.047)	(0.063)	(0.532)	(0.552)
Yes*Female	-0.17 (0.003)	-0.12 (0.215)	-0.27 (0.047)	-0.95 (0.063)	-0.11 (0.532)	0.06 (0.552)
Education						
< High School	0.12 (<0.000)	0.15 (0.006)	0.18 (0.004)	0.21 (0.431)	0.08 (0.331)	0.18 (<0.000)
High School Diploma or GED	0.12 (<0.000)	0.16 (0.002)	0.13 (0.036)	0.26 (0.124)	0.00 (0.975)	0.13 (<0.000)
Some college	0.07 (<0.000)	0.11 (0.024)	0.03 (0.533)	0.19 (0.235)	0.07 (0.262)	0.07 (0.000)
BA/BS	0.06 (0.001)	0.11 (0.030)	0.11 (0.012)	0.13 (0.662)	0.20 (0.007)	0.03 (0.068)
Graduate School (reference)	0.00 (.)	0.00 (.)	0.00 (.)	0.00 (.)	0.00 (.)	0.00 (.)

	Total (N=26,172)	Latinos (N=5218)	API (N=2568)	AIAN (N=226)	African-American (N=1826)	White (N=16334)
Perceived Racism in Health Care*Education	(0.002)	(0.020)	(0.104)	(0.076)	(0.978)	(0.512)
Yes*< High School	-0.15 (0.142)	-0.66 (0.008)	-0.33 (0.295)	-1.02 (0.060)	-0.04 (0.767)	0.05 (0.720)
Yes*High School Diploma or GED	-0.15 (0.150)	-0.78 (0.002)	-0.03 (0.922)	-0.93 (0.021)	0.01 (0.918)	0.08 (0.342)
Yes*Some college	0.03 (0.746)	-0.57 (0.027)	0.15 (0.653)	-0.77 (0.201)	0.04 (0.699)	0.21 (0.089)
Yes*BA/BS	-0.09 (0.413)	-0.69 (0.008)	-0.20 (0.517)	0.53 (0.602)	-0.03 (0.874)	0.10 (0.346)
Main Effects						
Race/Ethnicity	(<0.001)					
Latino	-0.02 (0.346)					
API	0.19 (<0.000)					
AIAN	0.00 (0.931)					
African-American	-0.04 (0.082)					
White (reference)	0.00 (.)					
Age (years)	(<0.001)	(<0.001)	(<0.001)	(<0.001)	(<0.001)	(<0.001)
18-22	0.02 (0.662)	0.01 (0.880)	0.39 (0.004)	0.30 (0.686)	-0.07 (0.565)	-0.06 (0.194)
23-39	-0.43 (<0.000)	-0.46 (<0.000)	-0.32 (<0.000)	-0.62 (<0.000)	-0.38 (<0.000)	-0.42 (<0.000)
40-49	-0.19 (<0.000)	-0.18 (<0.000)	-0.20 (<0.000)	-0.26 (0.173)	-0.16 (0.001)	-0.19 (<0.000)
50-64 (reference)	0.00 (.)	0.00 (.)	0.00 (.)	0.00 (.)	0.00 (.)	0.00 (.)
65-102	-0.12 (<0.000)	-0.10 (0.036)	-0.08 (0.071)	-0.15 (0.422)	0.07 (0.305)	-0.15 (<0.000)
Poverty Level (% FPL)	(<0.001)	(0.010)	(0.288)	(0.371)	(0.003)	(<0.001)
0-99	-0.02 (0.296)	-0.06 (0.121)	-0.07 (0.269)	0.01 (0.982)	0.09 (0.235)	0.02 (0.614)
100-199	-0.02 (0.247)	-0.05 (0.080)	-0.09 (0.171)	-0.05 (0.826)	0.01 (0.943)	0.02 (0.432)
200-299 (reference)	0.00 (.)	0.00 (.)	0.00 (.)	0.00 (.)	0.00 (.)	0.00 (.)
300-399	-0.08 (0.000)	-0.15 (0.005)	-0.12 (0.072)	-0.23 (0.291)	-0.06 (0.366)	-0.05 (0.047)
≥ 400	-0.11 (<0.000)	-0.13 (0.001)	-0.11 (0.032)	-0.31 (0.169)	-0.10 (0.113)	-0.08 (0.000)

	Total (N=26,172)	Latinos (N=5218)	API (N=2568)	AIAN (N=226)	African-American (N=1826)	White (N=16334)
Insurance Coverage	(0.008)	(0.007)	(0.340)	(0.307)	(0.213)	(0.023)
Yes (reference)	0.00 (.)	0.00 (.)	0.00 (.)	0.00 (.)	0.00 (.)	0.00 (.)
No	0.06 (0.008)	0.09 (0.007)	0.05 (0.340)	-0.23 (0.307)	0.13 (0.213)	0.07 (0.023)
Usual Source of Care	(<0.001)	(0.026)	(0.003)	(0.126)	(0.464)	(<0.001)
Yes (reference)	0.00 (.)	0.00 (.)	0.00 (.)	0.00 (.)	0.00 (.)	0.00 (.)
No	0.12 (<0.000)	0.09 (0.026)	0.22 (0.003)	0.38 (0.126)	-0.06 (0.464)	0.13 (<0.000)
Doctor Visit within past year	(<0.001)	(<0.001)	(<0.001)	(0.132)	(<0.001)	(<0.001)
Yes (reference)	0.00 (.)	0.00 (.)	0.00 (.)	0.00 (.)	0.00 (.)	0.00 (.)
No	0.30 (<0.000)	0.23 (<0.000)	0.30 (<0.000)	0.54 (0.132)	0.30 (<0.000)	0.36 (<0.000)
Satisfaction with health care services	(<0.001)	(<0.001)	(0.153)	(0.444)	(<0.001)	(<0.001)
Did not use health care services	0.04 (0.305)	0.04 (0.446)	0.07 (0.612)	0.23 (0.657)	-0.05 (0.665)	0.05 (0.297)
Don't Know/Refused	0.32 (<0.000)	0.30 (<0.000)	0.27 (0.010)	-0.09 (0.859)	0.46 (0.001)	0.33 (<0.000)
Dissatisfied	0.07 (0.015)	0.08 (0.247)	0.01 (0.907)	0.38 (0.080)	-0.01 (0.847)	0.08 (0.020)
Moderately Satisfied	0.04 (0.001)	-0.01 (0.694)	0.02 (0.429)	0.03 (0.865)	0.10 (0.031)	0.04 (0.002)
Highly Satisfied (reference)	0.00 (.)	0.00 (.)	0.00 (.)	0.00 (.)	0.00 (.)	0.00 (.)
Marital Status	(<0.001)	(<0.001)	(<0.001)	(0.693)	(0.006)	(<0.001)
Married (reference)	0.00 (.)	0.00 (.)	0.00 (.)	0.00 (.)	0.00 (.)	0.00 (.)
Widowed/Divorced/Living with Partner/Other	0.07 (<0.000)	0.04 (0.087)	0.14 (0.001)	0.02 (0.878)	0.02 (0.564)	0.08 (<0.000)
Never Married	0.25 (<0.000)	0.33 (<0.000)	0.40 (<0.000)	0.19 (0.401)	0.12 (0.003)	0.15 (<0.000)
Heavy Cigarette Smoking	(<0.001)	(0.101)	(0.658)	(0.492)	(0.265)	(<0.001)
None (reference)	0.00 (.)	0.00 (.)	0.00 (.)	0.00 (.)	0.00 (.)	0.00 (.)
Less than a pack/day	0.02 (0.160)	0.01 (0.790)	0.06 (0.398)	-0.05 (0.779)	0.01 (0.909)	-0.01 (0.750)
At least a pack/day	0.11 (<0.000)	-0.20 (0.042)	-0.04 (0.791)	0.18 (0.481)	0.13 (0.105)	0.12 (<0.000)

	Total (N=26,172)	Latinos (N=5218)	API (N=2568)	AIAN (N=226)	African-American (N=1826)	White (N=16334)
Citizenship and Immigration Status	(0.058)	(0.818)	(0.031)	(0.231)	(0.711)	(0.448)
US-born citizen (reference)	0.00 (.)	0.00 (.)	0.00 (.)	0.00 (.)	0.00 (.)	0.00 (.)
Naturalized Citizen	0.00 (0.969)	0.00 (0.980)	0.13 (0.019)	-0.64 (0.384)	-0.02 (0.861)	-0.02 (0.439)
Non-citizen with Green Card	0.04 (0.160)	0.02 (0.609)	0.16 (0.021)	1.45 (0.231)	0.13 (0.298)	0.06 (0.188)
Non-citizen without Green Card	-0.05 (0.229)	-0.01 (0.898)	0.32 (0.008)	0.32 (0.285)	-0.02 (0.843)	-0.02 (0.868)
Length of residency in the US (years)	(0.012)	(0.518)	(0.077)	(0.254)	(<0.001)	(<0.001)
< 2	0.30 (0.010)	0.10 (0.453)	0.09 (0.513)	0.00 (.)	1.65 (<0.000)	0.83 (<0.000)
2-4	0.13 (0.007)	0.09 (0.193)	0.15 (0.054)	-1.41 (0.254)	-0.50 (<0.000)	-0.11 (0.332)
5-9	0.09 (0.021)	-0.02 (0.707)	0.15 (0.019)	0.00 (.)	0.04 (0.884)	0.33 (0.001)
10-14	0.03 (0.274)	-0.02 (0.661)	0.10 (0.049)	0.00 (.)	-0.03 (0.878)	0.10 (0.056)
≥ 15 (reference)	0.00 (.)	0.00 (.)	0.00 (.)	0.00 (.)	0.00 (.)	0.00 (.)
Language spoken at home	(<0.001)	(0.863)	(0.063)	(0.679)	(0.029)	(0.043)
English only (reference)	0.00 (.)	0.00 (.)	0.00 (.)	0.00 (.)	0.00 (.)	0.00 (.)
English + other language(s)	0.07 (<0.000)	0.02 (0.638)	0.13 (0.020)	0.15 (0.386)	0.06 (0.352)	0.03 (0.215)
Other language(s) only	0.06 (0.047)	0.01 (0.865)	0.11 (0.050)	-0.04 (0.942)	0.34 (0.011)	0.11 (0.015)

a. Outcome is secondary behavioral cancer risk profile, 1=low risk and 3=high risk.
Note: Design-based analyses in SUDAAN using raked weights and Jackknife Repeated Replication method.

health care, among males, there was no statistically significant difference in those who had experienced racism compared to those who had not; among females, those who had experienced racism on average had a higher risk profile (β=0.04) compared to those that had not. The effect of perceived racism on cancer risk profiles is also moderated by educational achievement; while there is no statistically significant difference for perceived racism in health care among those who had attended graduate school, the difference is significant among the other educational groups, with those who had experienced racism having higher risk profiles than those who had not.

Figure 12. Interaction of Perceived Racism in Health Care and Gender for Secondary Risk Profile.

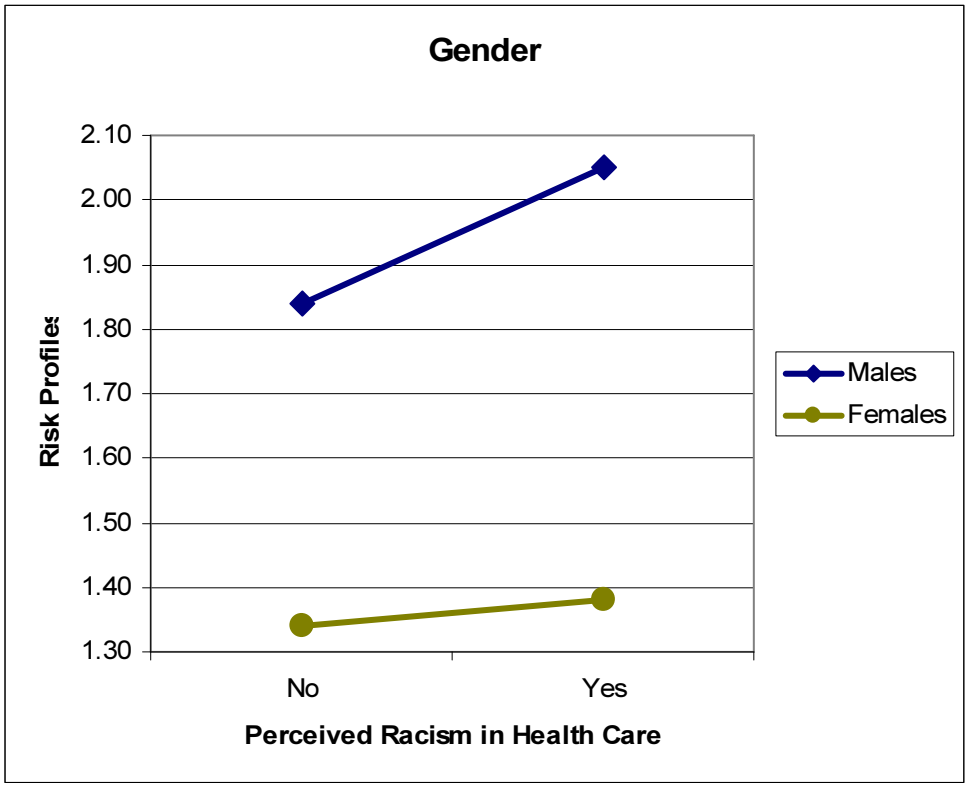
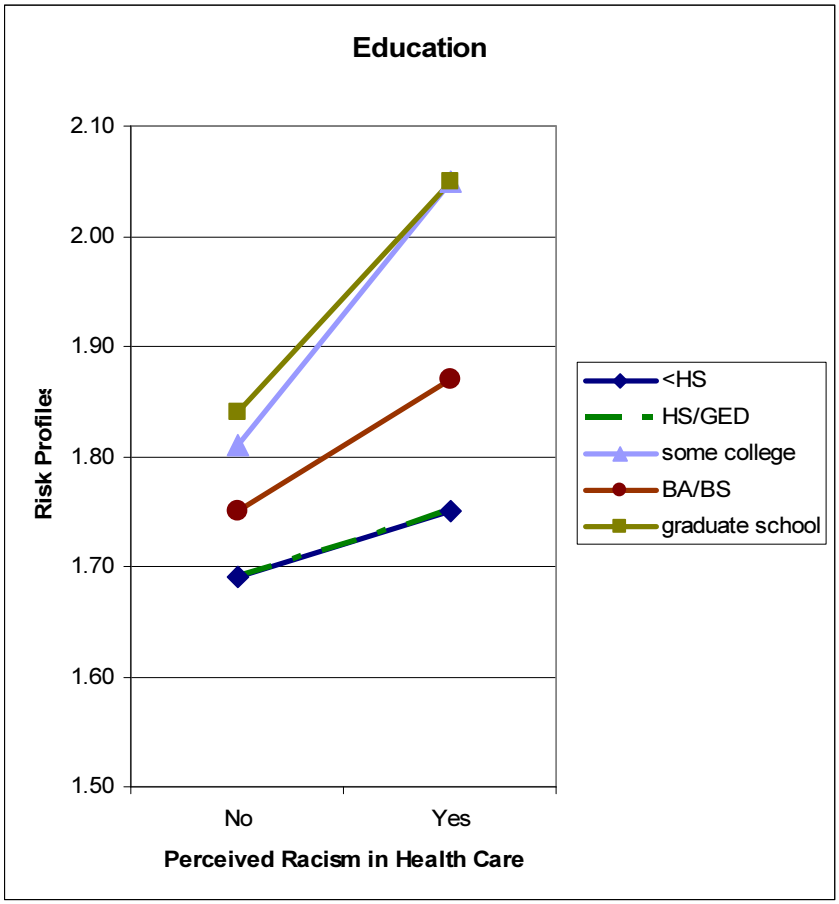


Figure 13. Interaction of Perceived Racism in Health care and Educational Achievement for Secondary Risk Profile.



Two demographic variables, race/ethnicity and age, had statistically significant main effects. For race/ethnicity, there were no statistically significant differences between Latinos (β= -0.02; p=0.346), AI/ANs (β=0.00; p=0.931), and African-Americans (β= -0.04; p=0.082) compared to Whites; APIs on average had a higher risk profile compared to Whites (β=0.19; p<0.001). For age, there was no statistically significant difference between those 18-22 (β= -0.02; p=0.346) compared to those 50-64; there appears to be a decreasing difference between those 23-39 (β= -0.43; p<0.001) and those 40-49 (β= -0.19; p<0.001) compared to those 50-64; those 65-102 also on average had a lower average risk profile (β= -0.12; p<0.001) compared to those 50-64.

For socioeconomic characteristics, poverty level had a statistically significant main effect on secondary cancer risk profile with an increase in percent of the FPL increasing risk profiles for those above 300% of the FPL. There were no statistically significant differences between those 0-99% of the FPL (β= -0.02; p=0.296) and those 100-199% of the FPL (β= -0.02; p=0.247) compared to those 200-299%; for those 300-399% of the FPL (β= -0.08; p<0.001) and those at least 400% of the FPL (β= -0.11; p<0.001) the average risk profiles decrease in comparison to those 200-299% of the FPL.

For access to health care, main effects are evident for insurance coverage, usual source of care, doctor visit within past year, and health care satisfaction. Those without insurance coverage on average had a risk profile that is higher than those who had insurance coverage (β=0.06; p=0.008). Those without a usual source of health care on average had a risk profile that is higher than those with a usual source of care (β=0.12; p<0.001). Those who had not visited a doctor within the past year on average had a higher profile than those who had visited a doctor (β=0.30; p<0.001). For health care satisfaction, there was no statistically significant difference between those who had not used health care within the past year (β=0.04; p=0.305) and those most satisfied with their health care services. For those who had used health care services, the trend was that as satisfaction decreased, average risk profiles increased with those who did not know or refused having the highest average risk profile. Compared to those who were most satisfied with, those moderately satisfied (β=0.04; p=0.001) and those dissatisfied (β=0.07; p=0.015) had increasing differences. Those who did not know how satisfied they were or refused to respond on average had a higher risk profile by almost one-third of a point (β=0.32; p<0.001).

For psychosocial factors, main effects were statistically significant for marital status and heavy smoking. Those who were married on average had the lowest risk profile, while those who were never married had the highest. Compared to those who were married, those who were widowed/divorced/living with partner/other on average had a higher risk profile (β=0.07; $p<0.001$) as were those who were never married (β=0.25; $p<0.001$). For heavy smoking, there was no statistically significant difference between those who smoked less than a pack per day and those who did not smoke (β=0.02; $p=0.160$); those who smoked at least a pack per day on average had a higher risk profile compared to those that did not smoke (β=0.11; $p<0.001$).

For immigration and acculturation factors, main effects were statistically significant for length of residency in the US and language spoken at home. Citizenship/immigration status is marginally significant ($p=0.058$). For length of residency in the US, the trend is that with increasing length of residency average risk profiles increased. Compared to those who had resided in the US for at least 15 years, for those who had resided in the US for less than 2 years, the difference was 0.30 ($p=0.10$); for those 2-4 years, the difference was 0.13 ($p=0.007$); for those 5-9, the difference was 0.09 ($p=0.021$). There was no statistically significant difference between those who had resided in the US for 10-14 years (β=0.03; $p=0.274$).

Potential confounders, mediators, and moderators

Based on the literature reviewed in the background chapter, the following variables were identified as potential moderators of the relationship between perceived racism and secondary cancer risk behavioral profiles: race/ethnicity, gender, age, educational achievement, poverty level, and immigration/citizenship status. The results

from the preliminary analyses of these potential moderators are available in Appendix G which demonstrate that race/ethnicity and gender, moderate the relationship between perceived racism in general and secondary risk profile; and race/ethnicity, gender age, poverty level and education moderate the relationship between perceived racism in health care and secondary risk profile. The effects of these moderators on the relationship between perceived racism and secondary cancer risk profiles were tested for statistically significance by adding them to the main effects model.

Of the interaction terms that were evaluated in the perceived racism and secondary cancer risk profiles model, two remained in the final fixed effects model: (1) perceived racism in health care and gender and (2) perceived racism in health care and educational achievement. The findings for these interactions terms are presented in Table 28Table 25 and discussed above in the section on the fixed effects model.

To assess confounders for perceived racism and primary cancer risk behavioral profiles, variables had to meet three standard statistics criteria previously described in the Study Design and Methods section. The following variables met these criteria: for perceived racism in general, gender, age, citizenship/immigration status, length of residency and language at home; for perceived racism in health care, race/ethnicity, marital status, citizenship/immigration status, length of residency, and language at home. Comparing the coefficients from the simple linear regression models and those from the best subset models provided some insight into the level of confounding in the relationship between cancer risk profiles and perceived racism. Results demonstrate that demographic characteristics and immigration/acculturation factors are confounders of the relationship between perceived racism in general and secondary risk profiles. Results

demonstrate that demographic characteristics are confounding the relationship between perceived racism in health care and secondary risk profiles.

Race/ethnicity-specific fixed effects models

In race/ethnicity stratified analyses, the relationship evident in the total sample fixed effects model presented above remains statistically significant only for APIs. For all other racial/ethnic groups, the relationship between perceived racism in general and secondary cancer risk is not statistically significant. Among, APIs, the trend appears to be with increased exposure to perceived racism in general average risk profiles decrease. The difference between those who rarely experienced perceived racism in general compared to those who had never experienced was not statistically significant (β= -0.02; p=0.625). The difference between those who had more frequently experienced racism and those who had never is -0.12 (p=0.001).

For perceived racism in health care, the interactions with gender and education did not remain statistically significant for most racial/ethnic groups. Gender moderates the relationship between perceived racism in health care and secondary cancer risk profile for APIs. Among API males, there is no statistically significant difference between those who had experienced racism and those who had not (β=0.34; p=0.205). Among API females, those who had experienced racism on average have a higher risk profile compared to those who had not experienced racism (β=0.07). Educational achievement moderates the relationship between perceived racism in health care and secondary cancer risk profile for Latinos. Among Latinos who had attended graduate school, those who experienced racism on average had a higher risk profile by almost three-quarters of a point compared to those who had not experienced racism (β=0.74; p=0.005). Among

Latinos with a bachelor's degree, those who had experienced racism on average had a higher risk profile compared to those who had not experienced racism (β=0.05). Among Latinos with some college experience, those who had experienced racism on average had a higher risk profile compared to those who had not experienced racism (β=0.17). Among Latinos with a high school diploma/GED, those who had experienced racism on average had a lower risk profile compared to those who had not experienced racism (β= -0.04). Among Latinos who had not completed high school, those who had experienced racism on average had a higher risk profile compared to those who had not experienced racism (β=0.08).

Age is a statistically significant explanatory factor of secondary cancer risk profile for all racial/ethnic groups. In general, for those younger than the reference group of 50-64 year olds, as age increases, average risk profiles increase. For those who are older than the reference group, on average risk profiles decrease.

Poverty level is a statistically significant explanatory factor of secondary cancer risk profile for Latinos, African-Americans and Whites. The relationship is similar as it was in the fixed effects model for the total population in the models for Latinos and Whites.

Insurance coverage is a statistically significant explanatory factor of secondary cancer risk profiles for Latinos and Whites; the relationship remains similar to the one in the model for the total population with no insurance coverage having increased risk profiles. Usual source of care is a statistically significant explanatory factor of secondary cancer risk profile for Latinos, APIs, and Whites. The relationship remains similar to the total model for Latinos and Whites; for APIs, the magnitude of the difference is twice

that in the total model. Doctor visit(s) within past year is a statistically significant explanatory factor of secondary cancer risk profile for Latinos, APIs, African-Americans and Whites; the relationship is similar across all these models and with that in the total model. Health care satisfaction is a statistically significant explanatory factor of secondary cancer risk profile for Latinos, African-Americans and Whites. While the relationship is similar to the total model in the models for African-Americans and for Whites, the relationship in the model for Latinos is different. Among Latinos, there are no statistically significant differences between those who rated their health care services as unsatisfactory or moderately satisfactory as well as those who did not utilize health care services; the only statistically significant difference is an increase in average risk profiles for those who had refused to answer this question or did not know the response.

Marital status is a statistically significant explanatory factor of secondary cancer risk profile for Latinos, APIs, African-Americans, and Whites. The relationships are similar for Latinos and Whites as in the total model. For APIs, the magnitude of the difference between those was widowed/divorced/living with a partner/other and those who were married is twice that of the difference in the total model. For African-Americans, the magnitude of the difference between those was never married and those who were married is half that of the difference in the total model. Heavy cigarette smoking is a statistically significant explanatory factor of secondary cancer risk profile for Whites and the relationships are similar to those in the model for the total sample.

Citizenship/immigration status is a statistically significant explanatory factor of secondary cancer risk profile for APIs. Average increases in risk profiles are evident for all groups compared to US-born citizens with differences increasing with each status

(US-born citizens to naturalized citizens to residents with green cards to residents without green cards). Length of residency in the US is a statistically significant explanatory factor of secondary cancer risk profile for African-Americans and Whites. For African-Americans, the statistically significant difference is for those who have resided in the US for less than 2 years with average risk profiles decreasing by half a point. For Whites, the relationship is similar to that in the total model with average risks decreasing as length of residency increases. Language spoken at home is a statistically significant explanatory factor for African-Americans and Whites. Among African-Americans, there is no statistically significant difference in average risk profiles between those who speak English and other language(s) and only English; those who spoke only other language(s) at home had a difference that is higher than those that only speak English and is 6 times the difference as in the total model. Among Whites, there is no statistically significant difference in average risk profiles between those who speak English and other language(s) and only English; those who spoke only other language(s) at home had a difference that is higher than those that only speak English and is almost two times the difference as in the total model.

Chapter 8: Results for Multilevel Analyses of Racism and Behavioral Cancer Risk Profiles

In addition to estimating the effects of perceived racism on cancer risk profiles, Research Question 3 focuses on assessing and estimating the effects of county-level factors, particularly race-based residential segregation. Race-based residential segregation is measured by Dissimilarity Index, Interaction Index and hypersegregation for African-Americans, Latinos, APIs, AI/ANs and Whites. Recall that Dissimilarity Index, which is one of the dimensions of segregation measures evenness, that is, how uniformly one racial/ethnic group is distributed between census tracts within a county. The Interaction Index, which is another dimension of segregation measures exposure, the probability of interaction between two persons of different racial/ethnic groups. Hypersegregation was dropped due to multi-collinearity with the other segregation measures. The outcomes, behavioral cancer risk profiles are measured at the individual level.

This section begins with results of the Intraclass Correlation Coefficients to assess whether Multilevel Modeling is feasible based on variance components for each level within the analyses. The results are then organized by outcomes for each aggregate racial/ethnic group with findings for primary risk profiles being presented first and then those for secondary risk profiles. Within each section, first results of variance components for each race-specific Fixed Effects model will be presented. For those models with variance at the county-level, random intercept models will be presented. Finally, results from random slopes of segregation will be presented. These results were

produced using model-based analyses without weights as described in detail in the Study Design and Methods chapter.

County variation

Intraclass Correlation Coefficients (ICCs) were calculated from the fully unconditional models for each outcome by each aggregate racial/ethnic group to assess variance components at the individual level and county level. These results are presented in Table 29. For Latinos, APIs, and Whites, there was some county-level variation for both primary and secondary cancer risk profiles. For African-Americans, there was county-level variation only for secondary cancer risk profiles. For American Indians/Alaska Natives, there was no county-level variation for both primary and secondary cancer risk profiles. Thus, multi-level modeling was only carried out for those groups with county-level variance and results are presented by race/ethnicity in the following sections.

Table 29. Intraclass Correlation Coefficients* for Behavioral Cancer Risk Profiles by Race/Ethncity.

Cancer Risk Profiles	Latinos	APIs	AI/ANs	African-Americans	Whites
Primary/Lifestyle Behaviors	0.0076	0.0139	0.0000	0.0000	0.0191
Secondary/Screening Behaviors	0.0138	0.0146	0.0000	0.0044	0.0060

*Intraclass Correlation Coefficients were calculated with unweighted data

Primary behavioral cancer risk profiles

Mixed effects model estimates among Latinos are presented in Table 30 for the primary risk profile model. Among Latinos, when the individual-level fixed effects model was fitted within a hierarchical structure, statistically significant variation in cancer risk profiles existed across counties ($\tau 00 = 0.03$; $p<0.001$). In the next model,

main effects of segregation measures were added. The Dissimilarity Index and Interaction Index did not affect primary cancer risk profiles. This model also had statistically significant variation in cancer risk profiles across counties ($\tau 00 = 0.03$; $p<0.001$). The last model for assessing random intercepts included adding county characteristics in addition to segregation to the fixed effects model. This model also had statistically significant variation in cancer risk profiles across counties ($\tau 00 = 0.02$; $p<0.010$). Of the three county correlates, the poverty variable had main effects on primary risk profiles with marginally significant increased risk for those living in counties with relatively moderate proportions ($\beta=0.04$; $p=0.054$) and statistically significant increased risk for those living in counties with relatively high proportions ($\beta=0.05$; $p=0.029$) of residents living at or below 100% of the Federal Poverty Line compared to those who lived in counties with relatively low proportions.

Mixed effects model estimates among APIs are presented in Table 31 for the primary risk profile model. Among APIs, when the individual-level fixed effects model was fitted within a hierarchical structure, there was statistically significant variation for cancer risk profiles across counties ($\tau 00 = 0.03$; $p<0.05$). In the next model, main effects of segregation measures were added. Dissimilarity Index and Interaction Index did not affect primary cancer risk profiles. This model also had statistically significant variation in cancer risk profiles across counties ($\tau 00 = 0.03$; $p<0.05$). The last model for assessing random intercepts included adding county characteristics in addition to segregation to the fixed effects model. There was no variation in cancer risk profiles across counties ($\tau 00 = 0.02$; $p\geq 0.05$) as the likelihood ratio test results were statistically insignificant. None of

the county characteristics had statistically significant main effects on primary risk profiles.

Mixed effects model estimates among Whites are presented in Table 32 for the primary risk profile model. Among Whites, when the individual-level fixed effects model was fitted within a hierarchical structure, there was statistically significant variation in cancer risk profiles across counties ($\tau 00 = 0.04$; $p<0.001$). In the next model, main effects of segregation measures were added. Dissimilarity Index and Interaction Index did not affect primary cancer risk profiles. This model also had statistically significant variation in cancer risk profiles across counties ($\tau 00 = 0.04$; $p<0.001$). The last model for assessing random intercepts included adding county characteristics in addition to segregation to the fixed effects model. There was statistically significant variation in cancer risk profiles across counties ($\tau 00 = 0.03$; $p<0.001$). Of the three county correlates added in this model, there were statistically significant main effects for poverty and for health professionals' shortage area. Those who lived in counties with relatively high proportions of residents at or below 100% of the FPL had statistically significant increased risk profiles ($\beta=0.03$; $p=0.025$) compared to those who lived in counties with relatively low proportions. In addition, those who lived in counties with some areas designated as having a health professional shortage had increased risk profiles ($\beta=0.03$; $p=0.033$).

Secondary behavioral cancer risk profiles

Mixed effects model estimates among Latinos are presented in Table 33 for the secondary risk profile model. Among Latinos, when the individual-level fixed effects model was fitted within a hierarchical structure, there was statistically significant

variation in cancer risk profiles across counties ($\tau 00 = 0.04$; $p<0.010$). In the next model, main effects of segregation measures were added. For Dissimilarity Index, those who lived in counties with moderate segregation had no statistically different average risk profile compared to those who lived in counties with low segregation. Those who lived in counties that were highly segregated had a decrease in average risk profile ($\beta= -0.14$; $p=0.004$) compare to those who lived in counties with low segregation. For Interaction Index there was no difference between those who lived in counties with moderate segregation compared to those who lived in counties with low segregation. Those who lived in counties with high segregation had an increase in average risk profile that is marginally significant ($\beta=0.10$; $p=0.066$). After controlling for segregation, there was no more variation in secondary risk profiles across counties ($\tau 00 = 0.01$; $p\geq 0.05$). The last model for assessing random intercepts included county characteristics in addition to segregation to the fixed effects model of individual characteristics. After adjusting for county characteristics of poverty, health professionals supply and rural/urban continuum status, the effects of Dissimilarity Index became marginally significant for those living in counties with high segregation ($\beta= -0.14$; $p=0.051$). The effect of the Interaction Index was no longer statistically significant for those who lived in counties with high segregation ($\beta=0.10$; $p=0.087$). There was no variation in risk profiles across counties ($\tau 00=0.00$; $p\geq 0.05$). None of the county correlates that were added in this last model had statistically significant main effects on secondary risk profiles.

Mixed effects model estimates among APIs are presented in Table 34 for the secondary risk profile model. Among APIs, when the individual-level fixed effects model was fitted within a hierarchical structure, there was statistically significant

variation in risk profiles across counties ($\tau 00 = 0.05$; $p<0.050$). In the next model, main effects of segregation measures were added. Dissimilarity Index and Interaction Index did not affect secondary cancer risk profiles. This model also had statistically significant variation in risk profiles across counties ($\tau 00 = 0.04$; $p<0.050$). The last model for assessing random intercepts included adding county characteristics in addition to segregation to the fixed effects model. There was no variation in risk profiles across counties ($\tau 00 = 0.00$; $p\geq 0.05$). None of the county correlates had statistically significant main effects on primary risk profiles.

Mixed effects model estimates among Whites are presented in Table 35 for the secondary risk profile model. Among Whites, when the individual-level fixed effects model was fitted within a hierarchical structure, there was no variation in risk profiles across counties ($\tau 00 = 0.01$; $p\geq 0.05$). In the next model, main effects of segregation measures were added. Dissimilarity Index and Interaction Index did not affect primary cancer risk profiles. This model also had no variation in risk profiles across counties ($\tau 00 = 0.00$; $p\geq 0.05$). The last model for assessing random intercepts included adding county characteristics in addition to segregation to the fixed effects model. This final model also had no variation in risk profiles across counties ($\tau 00 = 0.00$; $p\geq 0.05$). None of the county correlates had statistically significant main effects on secondary risk profiles.

Mixed effects model estimates among African-Americans are presented in Table 36 for the secondary risk profile model. Among African-Americans, when the individual-level fixed effects model was fitted within a hierarchical structure, there was variation in secondary risk profiles across counties ($\tau 00 = 0.05$; $p<0.050$). In the next model, main effects of segregation measures were added. For Dissimilarity Index, those

who lived in counties with moderate segregation had a decreased average risk profile compared to those who lived in counties with low segregation (β= -0.42; $p<0.001$). Those who lived in counties with high segregation had a decrease in average risk profile (β= -0.36; $p=0.003$) compared to those who lived in counties with low segregation. Interaction Index did not affect secondary cancer risk profiles. After adjusting for segregation, the model had no variation in secondary risk profiles across counties ($\tau 00$ = 0.00; $p \geq 0.05$). The last model for assessing random intercepts included adding county characteristics in addition to segregation to the fixed effects model. After adjusting for additional county characteristics, there was no variation in risk profiles across counties ($\tau 00$ = 0.00; $p \geq 0.05$). The effects of Dissimilarity Index remained similar as in the previous model (for moderate segregation, β= -0.45 & $p<0.001$; for high segregation β= -0.31 & $p=0.020$). None of the county correlates had statistically significant main effects on secondary risk profiles.

Table 30. Fixed Effects (Coefficients and p-values) and Random Effects of the Primary Risk Profile Model among Latinos (n=7901).

	Unconditional (Empty Model)	Individual Fixed Effects (IFE)	IFE + Segregation	IFE + Segregation + Area Correlates
Perceived Racism Coefficients (p-values)				
Perceived Racism in General				
Never (reference)		0	0	0
Rarely		-0.01 (0.568)	-0.01 (0.581)	-0.01 (0.563)
Sometimes/Often/All the time		0.03 (0.076)	0.03 (0.075)	0.03 (0.080)
Perceived Racism in Health Care				
No (reference)		0	0	0
Yes		0.23 (0.016)	0.23 (0.015)	0.23 (0.016)
Gender				
Male (reference)		0	0	0
Female		-0.23 (<0.001)	-0.23 (<0.001)	-0.23 (<0.001)
Perceived Racism in General*Gender				
Rarely*Female		0.02 (0.394)	0.02 (0.415)	0.02 (0.403)
Sometimes/Often/All the time*Female		0.00 (0.847)	0.00 (0.838)	0.00 (0.876)
Perceived Racism in Health Care*Gender				
Yes*Female		-0.04 (0.115)	-0.04 (0.116)	-0.04 (0.116)
Age (years)				
18-22		-0.20 (<0.001)	-0.20 (<0.001)	-0.20 (<0.001)
23-39		-0.03 (0.017)	-0.03 (0.016)	-0.03 (0.013)
40-49 (reference)		0	0	0
50-64		0.04 (0.013)	0.04 (0.013)	0.04 (0.015)
65-102		-0.03 (0.090)	-0.03 (0.086)	-0.03 (0.091)

Table 30 (continued)

	Unconditional (Empty Model)	Individual Fixed Effects (IFE)	IFE + Segregation	IFE + Segregation + Area Correlates
Perceived Racism in Health Care*Age				
Yes*18-22		-0.10 (0.044)	-0.10 (0.042)	-0.10 (0.052)
Yes*23-39		-0.05 (0.157)	-0.05 (0.156)	-0.05 (0.175)
Yes*50-64		-0.11 (0.014)	-0.11 (0.014)	-0.11 (0.015)
Yes*65-102		-0.09 (0.201)	-0.09 (0.203)	-0.09 (0.211)
Education				
< High School		0.18 (<0.001)	0.18 (<0.001)	0.18 (<0.001)
High School Diploma or GED		0.15 (<0.001)	0.15 (<0.001)	0.16 (<0.001)
Some college		0.15 (<0.001)	0.15 (<0.001)	0.15 (<0.001)
BA/BS		0.06 (0.031)	0.06 (0.031)	0.06 (0.028)
Graduate School (reference)		0	0	0
Perceived Racism in Health Care*Education				
Yes*< High School		-0.15 (0.112)	-0.15 (0.110)	-0.15 (0.110)
Yes*High School Diploma or GED		-0.14 (0.136)	-0.14 (0.136)	-0.14 (0.137)
Yes*Some college		-0.16 (0.088)	-0.17 (0.086)	-0.16 (0.089)
Yes*BA/BS		-0.07 (0.489)	-0.07 (0.478)	-0.07 (0.483)
County Characteristics Coefficients (p-values)				
Dissimilarity Index				
Low (reference)			0	0
Moderate			-0.02 (0.476)	-0.02 (0.457)
High			-0.05 (0.285)	-0.07 (0.151)
Interaction Index				
Low (reference)			0	0
Moderate			0.00 (0.954)	-0.01 (0.667)
High			0.02 (0.475)	0.01 (0.697)

Table 30 (continued)

	Unconditional (Empty Model)	Individual Fixed Effects (IFE)	IFE + Segregation	IFE + Segregation + Area Correlates
Proportion at ≤ 100% of FPL				
Low (reference)				0
Moderate				0.04 (0.054)
High				0.05 (0.029)
Health Professionals Shortage Area				
None (reference)				0
All areas				0.09 (0.403)
Some areas				-0.03 (0.162)
Rural/Urban Continuum				
Counties in metro areas of 1 million population or more (reference)				0
Counties in metro areas of 250,000 to 1 million population				-0.02 (0.424)
Counties in metro areas of fewer than 250,000 population				0.01 (0.678)
Urban population of 20,000 or more adjacent to a metro area				-0.05 (0.407)
Urban population of 20,000 or more, not adjacent to a metro area				-0.18 (0.066)
Urban population of 2,500 to 19,999, adjacent to a metro area				-0.07 (0.381)
Urban population of 2,500 to 19,999, not adjacent to a metro area				0.04 (0.715)
Completely rural or less than 2,500 urban population, adjacent to a metro area				0.67 (0.078)
Completely rural or less than 2,500 urban population, not adjacent to a metro area				--
Random Effects				
ICC	0.0076			
Random Intercept (τ00)	0.036	0.03	0.03	0.02
Likelihood Ratio Test	21.98***	21.02***	16.00***	6.32**

***p<0.001; **p<0.010; *p<0.05; ‡p≥0.05. Note: Model-based analyses using unweighted samples.

Table 31. Fixed Effects (Coefficients and p-values) and Random Effects of Primary Risk Profile Model among APIs (n=3646) .

	Unconditional (Empty Model)	Individual Fixed Effects (IFE)	IFE + Segregation	IFE + Segregation + Area Correlates
Perceived Racism Coefficients (p-values)				
Perceived Racism in General				
Never (reference)		0	0	0
Rarely		0.01 (0.508)	0.01 (0.505)	0.02 (0.470)
Sometimes/Often/All the time		0.00 (0.975)	0.00 (0.975)	0.00 (0.978)
Perceived Racism in Health Care				
No (reference)		0	0	0
Yes		0.08 (0.236)	0.08 (0.238)	0.08 (0.220)
Gender				
Male (reference)		0	0	0
Female		-0.28 (<0.001)	-0.28 (<0.001)	-0.28 (<0.001)
Perceived Racism in General*Gender				
Rarely*Female		0.03 (0.314)	0.03 (0.309)	0.03 (0.313)
Sometimes/Often/All the time*Female		0.03 (0.240)	0.03 (0.235)	0.04 (0.211)
Perceived Racism in Health Care*Gender				
Yes*Female		-0.03 (0.557)	-0.03 (0.566)	-0.03 (0.563)
Age (years)				
18-22		-0.13 (<0.001)	-0.13 (<0.001)	-0.13 (<0.001)
23-39		-0.01 (0.676)	-0.01 (0.681)	-0.01 (0.723)
40-49 (reference)		0	0	0
50-64		-0.03 (0.112)	-0.03 (0.112)	-0.03 (0.107)
65-102		-0.12 (<0.001)	-0.12 (<0.001)	-0.12 (<0.001)

Table 31 (continued)

	Unconditional (Empty Model)	Individual Fixed Effects (IFE)	IFE + Segregation	IFE + Segregation + Area Correlates
Perceived Racism in Health Care*Age				
Yes*18-22		0.13 (0.200)	0.13 (0.199)	0.12 (0.210)
Yes*23-39		0.04 (0.501)	0.04 (0.499)	0.03 (0.539)
Yes*50-64		-0.01 (0.911)	-0.01 (0.909)	-0.01 (0.877)
Yes*65-102		0.01 (0.851)	0.01 (0.851)	0.01 (0.854)
Education				
< High School		0.17 (<0.001)	0.17 (<0.001)	0.17 (<0.001)
High School Diploma or GED		0.12 (<0.001)	0.12 (<0.001)	0.12 (<0.001)
Some college		0.15 (<0.001)	0.15 (<0.001)	0.15 (<0.001)
BA/BS		0.07 (<0.001)	0.07 (<0.001)	0.07 (<0.001)
Graduate School (reference)		0	0	0
Perceived Racism in Health Care*Education				
Yes*< High School		-0.11 (0.203)	-0.11 (0.203)	-0.11 (0.190)
Yes*High School Diploma or GED		-0.08 (0.308)	-0.08 (0.305)	-0.08 (0.307)
Yes*Some college		-0.13 (0.073)	-0.13 (0.075)	-0.13 (0.073)
Yes*BA/BS		-0.03 (0.675)	-0.03 (0.678)	-0.03 (0.649)
County Characteristics Coefficients (p-values)				
Dissimilarity Index				
Low (reference)			0	0
Moderate			-0.02 (0.649)	-0.02 (0.663)
High			--	--
Interaction Index				
Low (reference)			0	0
Moderate			-0.02 (0.366)	0.02 (0.527)
High			--	--

Table 31 (continued)

	Unconditional (Empty Model)	Individual Fixed Effects (IFE)	IFE + Segregation	IFE + Segregation + Area Correlates
Proportion at ≤ 100% of FPL				
Low (reference)				0
Moderate				0.03 (0.197)
High				-0.02 (0.362)
Health Professionals Shortage Area				
None (reference)				0
All areas				--
Some areas				0.04 (0.067)
Rural/Urban Continuum				
Counties in metro areas of 1 million population or more (reference)				0
Counties in metro areas of 250,000 to 1 million population				0.04 (0.131)
Counties in metro areas of fewer than 250,000 population				0.03 (0.519)
Urban population of 20,000 or more adjacent to a metro area				0.17 (0.196)
Urban population of 20,000 or more, not adjacent to a metro area				-0.16 (0.259)
Urban population of 2,500 to 19,999, adjacent to a metro area				-0.19 (0.442)
Urban population of 2,500 to 19,999, not adjacent to a metro area				0.03 (0.844)
Completely rural or less than 2,500 urban population, adjacent to a metro area				0.01 (0.974)
Completely rural or less than 2,500 urban population, not adjacent to a metro area				--
Random Effects				
ICC	0.0139			
Random Intercept (τ00)	0.04	0.03	0.03	0.02
Likelihood Ratio Test	9.14**	4.78*	4.25*	0.52‡

***p<0.001; **p<0.010; *p<0.05; ‡p≥0.05. Note: Model-based analyses using unweighted samples.

Table 32. Fixed Effects (Coefficients and p-values) and Random Effects of the Primary Risk Profile Model among Whites (n=20989).

	Unconditional (Empty Model)	Individual Fixed Effects (IFE)	IFE + Segregation	IFE + Segregation + Area Correlates
Perceived Racism Coefficients (p-values)				
Perceived Racism in General				
Never (reference)		0	0	0
Rarely		-0.01 (0.235)	-0.01 (0.234)	-0.01 (0.245)
Sometimes/Often/All the time		0.02 (0.041)	0.02 (0.042)	0.02 (0.043)
Perceived Racism in Health Care				
No (reference)		0	0	0
Yes		0.11 (0.083)	0.11 (0.083)	0.11 (0.081)
Gender				
Male (reference)		0	0	0
Female		-0.16 (<0.001)	-0.16 (<0.001)	-0.16 (<0.001)
Perceived Racism in General*Gender				
Rarely*Female		0.03 (0.012)	0.03 (0.012)	0.03 (0.012)
Sometimes/Often/All the time*Female		0.02 (0.220)	0.02 (0.222)	0.02 (0.233)
Perceived Racism in Health Care*Gender				
Yes*Female		-0.06 (0.089)	-0.06 (0.089)	-0.06 (0.090)
Age (years)				
18-22		-0.17 (<0.001)	-0.17 (<0.001)	-0.17 (<0.001)
23-39		-0.02 (0.003)	-0.02 (0.003)	-0.02 (0.003)
40-49 (reference)		0	0	0
50-64		0.04 (<0.001)	0.04 (<0.001)	0.04 (<0.001)
65-102		-0.04 (<0.001)	-0.04 (<0.001)	-0.04 (<0.001)

Table 32 (continued)

	Unconditional (Empty Model)	Individual Fixed Effects (IFE)	IFE + Segregation	IFE + Segregation + Area Correlates
Perceived Racism in Health Care*Age				
Yes*18-22		0.04 (0.657)	0.04 (0.663)	0.03 (0.691)
Yes*23-39		0.00 (0.948)	0.00 (0.951)	0.00 (0.925)
Yes*50-64		-0.07 (0.094)	-0.07 (0.094)	-0.07 (0.092)
Yes*65-102		-0.03 (0.556)	-0.03 (0.557)	-0.04 (0.534)
Education				
< High School		0.20 (<0.001)	0.21 (<0.001)	0.20 (<0.001)
High School Diploma or GED		0.18 (<0.001)	0.18 (<0.001)	0.18 (<0.001)
Some college		0.15 (<0.001)	0.15 (<0.001)	0.15 (<0.001)
BA/BS		0.04 (<0.001)	0.04 (<0.001)	0.04 (<0.001)
Graduate School (reference)		0	0	0
Perceived Racism in Health Care*Education				
Yes*< High School		0.10 (0.185)	0.10 (0.185)	0.10 (0.193)
Yes*High School Diploma or GED		-0.02 (0.689)	-0.02 (0.691)	-0.03 (0.676)
Yes*Some college		0.00 (0.978)	0.00 (0.979)	0.00 (0.975)
Yes*BA/BS		0.05 (0.488)	0.05 (0.489)	0.05 (0.493)
County Characteristics Coefficients (p-values)				
Dissimilarity Index				
Low (reference)			0	0
Moderate			-0.01 (0.676)	0.00 (0.892)
High			--	--
Interaction Index				
Low (reference)			0	0
Moderate			--	--
High			-0.02 (0.250)	-0.01 (0.306)

Table 32 (continued)

	Unconditional (Empty Model)	Individual Fixed Effects (IFE)	IFE + Segregation	IFE + Segregation + Area Correlates
Proportion at ≤ 100% of FPL				
Low (reference)				0
Moderate				0.02 (0.209)
High				0.03 (0.025)
Health Professionals Shortage Area				
None (reference)				0
All areas				-0.09 (0.253)
Some areas				0.03 (0.033)
Rural/Urban Continuum				
Counties in metro areas of 1 million population or more (reference)				0
Counties in metro areas of 250,000 to 1 million population				0.01 (0.399)
Counties in metro areas of fewer than 250,000 population				0.02 (0.280)
Urban population of 20,000 or more adjacent to a metro area				0.03 (0.172)
Urban population of 20,000 or more, not adjacent to a metro area				-0.03 (0.476)
Urban population of 2,500 to 19,999, adjacent to a metro area				0.03 (0.248)
Urban population of 2,500 to 19,999, not adjacent to a metro area				-0.03 (0.305)
Completely rural or less than 2,500 urban population, adjacent to a metro area				-0.08 (0.059)
Completely rural or less than 2,500 urban population, not adjacent to a metro area				--
Random Effects				
ICC	0.0191			
Random Intercept (τ00)	0.05	0.04	0.04	0.03
Likelihood Ratio Test	187.26***	66.28***	66.63***	44.53***

***p<0.001; **p<0.010; *p<0.05; ‡p≥0.05. Note: Model-based analyses using unweighted samples.

Table 33. Fixed Effects (Coefficients and p-values) and Random Effects of the Secondary Risk Profile Model among Latinos (n=5218).

	Unconditional (Empty Model)	Individual Fixed Effects (IFE)	IFE + Segregation	IFE + Segregation + Area Correlates
Perceived Racism Coefficients (p-values)				
Perceived Racism in General				
Never (reference)		0	0	0
Rarely		-0.01 (0.578)	-0.01 (0.546)	-0.01 (0.554)
Sometimes/Often/All the time		0.00 (0.889)	0.00 (0.920)	0.00 (0.931)
Perceived Racism in Health Care				
No		0	0	0
Yes		0.56 (0.001)	0.56 (0.001)	0.56 (0.001)
Gender				
Male (reference)		0	0	0
Female		-0.67 (<0.001)	-0.66 (<0.001)	-0.67 (<0.001)
Perceived Racism in Health Care*Gender				
Yes*Female		-0.19 (0.009)	-0.19 (0.010)	-0.19 (0.010)
Education				
< High School		0.14 (0.001)	0.14 (0.001)	0.14 (0.002)
High School Diploma or GED		0.15 (<0.001)	0.15 (<0.001)	0.15 (<0.001)
Some college		0.10 (0.013)	0.10 (0.015)	0.10 (0.016)
BA/BS		0.13 (0.005)	0.13 (0.005)	0.13 (0.005)
Graduate School (reference)		0	0	0
Perceived Racism in Health Care*Education				
Yes*< High School		-0.41 (0.010)	-0.41 (0.010)	-0.41 (0.011)
Yes*High School Diploma or GED		-0.50 (0.002)	-0.50 (0.002)	-0.49 (0.002)
Yes*Some college		-0.34 (0.039)	-0.34 (0.038)	-0.34 (0.040)
Yes*BA/BS		-0.42 (0.019)	-0.42 (0.019)	-0.42 (0.020)

Table 33 (continued)

	Unconditional (Empty Model)	Individual Fixed Effects (IFE)	IFE + Segregation	IFE + Segregation + Area Correlates
County Characteristics Coefficients (p-values)				
Dissimilarity Index				
Low (reference)			0	0
Moderate			-0.07 (0.086)	-0.08 (0.126)
High			-0.14 (0.004)	-0.14 (0.051)
Interaction Index				
Low (reference)			0	0
Moderate			0.06 (0.201)	0.07 (0.198)
High			0.10 (0.066)	0.10 (0.087)
Proportion at ≤ 100% of FPL				
Low (reference)				0
Moderate				0.00 (0.936)
High				0.02 (0.594)
Health Professionals Shortage Area				
None (reference)				
All areas				0
Some areas				-0.14 (0.449)
				-0.03 (0.278)
Rural/Urban Continuum				
Counties in metro areas of 1 million population or more (reference)				
Counties in metro areas of 250,000 to 1 million population				0
Counties in metro areas of fewer than 250,000 population				0.02 (0.495)
Urban population of 20,000 or more adjacent to a metro area				0.01 (0.769)
Urban population of 20,000 or more, not adjacent to a metro area				0.04 (0.715)
Urban population of 2,500 to 19,999, adjacent to a metro area				-0.06 (0.731)

Table 33 (continued)

	Unconditional (Empty Model)	Individual Fixed Effects (IFE)	IFE + Segregation	IFE + Segregation + Area Correlates
Urban population of 2,500 to 19,999, not adjacent to a metro area				0.02 (0.852)
Completely rural or less than 2,500 urban population, adjacent to a metro area				0.10 (0.547)
Completely rural or less than 2,500 urban population, not adjacent to a metro area				-0.78 (0.153)
				--
Random Effects				
ICC	0.0138			
Random Intercept (τ00)	0.08	0.04	0.01	0
Likelihood Ratio Test	16.16***	7.50**	0.14‡	0.00‡

***p<0.001; **p<0.010; *p<0.05; ‡p≥0.05. Note: Model-based analyses using unweighted samples.

Table 34. Fixed Effects (Coefficients and p-values) and Random Effects of the Secondary Risk Profile Model among APIs (n=2568).

	Unconditional (Empty Model)	Individual Fixed Effects (IFE)	IFE + Segregation	IFE + Segregation + Area Correlates
Perceived Racism Coefficients (p-values)				
Perceived Racism in General				
Never (reference)		0	0	0
Rarely		-0.02 (0.634)	-0.02 (0.616)	-0.02 (0.584)
Sometimes/Often/All the time		-0.07 (0.025)	-0.07 (0.024)	-0.07 (0.024)
Perceived Racism in Health Care				
No		0	0	0
Yes		0.15 (0.306)	0.15 (0.306)	0.16 (0.274)
Gender				
Male (reference)		0	0	0
Female		-0.64 (<0.001)	-0.64 (<0.001)	-0.64 (<0.001)
Perceived Racism in Health Care*Gender				
Yes*Female		-0.19 (0.097)	-0.20 (0.093)	-0.21 (0.075)
Education				
< High School		0.11 (0.050)	0.11 (0.052)	0.12 (0.034)
High School Diploma or GED		0.10 (0.039)	0.10 (0.039)	0.10 (0.027)
Some college		0.00 (0.969)	0.00 (0.965)	0.01 (0.903)
BA/BS		0.07 (0.069)	0.07 (0.071)	0.07 (0.053)
Graduate School (reference)		0	0	0
Perceived Racism in Health Care*Education				
Yes*< High School		-0.10 (0.560)	-0.10 (0.565)	-0.10 (0.566)
Yes*High School Diploma or GED		-0.02 (0.891)	-0.02 (0.895)	-0.02 (0.894)
Yes*Some college		0.16 (0.303)	0.16 (0.305)	0.16 (0.313)
Yes*BA/BS		-0.10 (0.508)	-0.10 (0.516)	-0.09 (0.541)

Table 34 (continued)

	Unconditional (Empty Model)	Individual Fixed Effects (IFE)	IFE + Segregation	IFE + Segregation + Area Correlates
County Characteristics Coefficients (p-values)				
Dissimilarity Index				
Low (reference)			0	0
Moderate			0.09 (0.301)	0.07 (0.489)
High			--	--
Interaction Index				
Low (reference)			0	0
Moderate			0.01 (0.856)	0.01 (0.910)
High			--	--
Proportion at ≤ 100% of FPL				
Low (reference)				0
Moderate				-0.05 (0.271)
High				-0.01 (0.782)
Health Professionals Shortage Area				
None (reference)				
All areas				0
Some areas				--
				0.06 (0.102)
Rural/Urban Continuum				
Counties in metro areas of 1 million population or more (reference)				
Counties in metro areas of 250,000 to 1 million population				0
Counties in metro areas of fewer than 250,000 population				-0.02 (0.659)
Urban population of 20,000 or more adjacent to a metro area				-0.08 (0.370)
Urban population of 20,000 or more, not adjacent to a metro area				-0.24 (0.305)
Urban population of 2,500 to 19,999, adjacent to a metro area				-0.15 (0.613)

Table 34 (continued)

	Unconditional (Empty Model)	Individual Fixed Effects (IFE)	IFE + Segregation	IFE + Segregation + Area Correlates
Urban population of 2,500 to 19,999, not adjacent to a metro area				-0.04 (0.930)
Completely rural or less than 2,500 urban population, adjacent to a metro area				0.15 (0.692)
Completely rural or less than 2,500 urban population, not adjacent to a metro area				0.60 (0.178)
				--
Random Effects				
ICC	0.0146			
Random Intercept (τ00)	0.09	0.05	0.04	0.00
Likelihood Ratio Test	17.75***	4.44*	3.80*	0.00‡

***p<0.001; **p<0.010; *p<0.05; ‡p≥0.05. Note: Model-based analyses using unweighted samples.

Table 35. Fixed Effects (Coefficients and p-values) and Random Effects of the Secondary Risk Profile Model among Whites (n=16334).

	Unconditional (Empty Model)	Individual Fixed Effects (IFE)	IFE + Segregation	IFE + Segregation + Area Correlates
Perceived Racism Coefficients (p-values)				
Perceived Racism in General				
Never (reference)		0	0	0
Rarely		-0.01 (0.576)	0.00 (0.652)	0.00 (0.653)
Sometimes/Often/All the time		-0.02 (0.150)	-0.02 (0.186)	-0.02 (0.190)
Perceived Racism in Health Care				
No		0	0	0
Yes		0.00 (0.995)	0.00 (0.997)	0.00 (0.965)
Gender				
Male (reference)		0	0	0
Female		-0.39 (<0.001)	-0.39 (<0.001)	-0.39 (<0.001)
Perceived Racism in Health Care*Gender				
Yes*Female		-0.03 (0.659)	-0.03 (0.651)	-0.03 (0.665)
Education				
< High School		0.18 (<0.001)	0.18 (<0.001)	0.18 (<0.001)
High School Diploma or GED		0.11 (<0.001)	0.11 (<0.001)	0.11 (<0.001)
Some college		0.07 (<0.001)	0.07 (<0.001)	0.07 (<0.001)
BA/BS		0.03 (0.009)	0.03 (0.009)	0.03 (0.010)
Graduate School (reference)		0	0	0
Perceived Racism in Health Care*Education				
Yes*< High School		-0.01 (0.930)	-0.01 (0.944)	-0.01 (0.958)
Yes*High School Diploma or GED		0.05 (0.569)	0.05 (0.575)	0.06 (0.531)
Yes*Some college		0.05 (0.552)	0.05 (0.556)	0.05 (0.540)
Yes*BA/BS		0.09 (0.394)	0.09 (0.389)	0.09 (0.395)

Table 35 (continued)

	Unconditional (Empty Model)	Individual Fixed Effects (IFE)	IFE + Segregation	IFE + Segregation + Area Correlates
County Characteristics Coefficients (p-values)				
Dissimilarity Index				
Low (reference)			0	0
Moderate			-0.02 (0.064)	-0.01 (0.579)
High			--	--
Interaction Index				
Low (reference)			0	0
Moderate			--	--
High			-0.00 (0.821)	0.01 (0.527)
Proportion at ≤ 100% of FPL				
Low (reference)				0
Moderate				0.00 (0.795)
High				0.02 (0.094)
Health Professionals Shortage Area				
None (reference)				0
All areas				-0.07 (0.511)
Some areas				0.01 (0.560)
Rural/Urban Continuum				
Counties in metro areas of 1 million population or more (reference)				0
Counties in metro areas of 250,000 to 1 million population				-0.01 (0.377)
Counties in metro areas of fewer than 250,000 population				-0.01 (0.553)
Urban population of 20,000 or more adjacent to a metro area				0.04 (0.077)
Urban population of 20,000 or more, not adjacent to a metro area				0.01 (0.866)
Urban population of 2,500 to 19,999, adjacent to a metro area				0.03 (0.443)

Table 35 (continued)

	Unconditional (Empty Model)	Individual Fixed Effects (IFE)	IFE + Segregation	IFE + Segregation + Area Correlates
Urban population of 2,500 to 19,999, not adjacent to a metro area				0.01 (0.685)
Completely rural or less than 2,500 urban population, adjacent to a metro area				0.05 (0.398)
Completely rural or less than 2,500 urban population, not adjacent to a metro area				--
Random Effects				
ICC	0.006			
Random Intercept (τ00)	0.05	0.01	0.00	0.00
Likelihood Ratio Test	19.90***	0.15‡	0.17‡	0.00‡

***p<0.001; **p<0.010; *p<0.05; ‡p≥0.05. Note: Model-based analyses using unweighted samples.

Table 36. Fixed Effects (Coefficients and p-values) and Random Effects of the Secondary Risk Profile Model among African-Americans (n=1826).

	Unconditional (Empty Model)	Individual Fixed Effects (IFE)	IFE + Segregation	IFE + Segregation + Area Correlates
Perceived Racism Coefficients (p-values)				
Perceived Racism in General				
Never (reference)		0	0	0
Rarely		-0.05 (0.167)	-0.05 (0.171)	-0.05 (0.181)
Sometimes/Often/All the time		-0.07 (0.043)	-0.07 (0.041)	-0.07 (0.049)
Perceived Racism in Health Care				
No		0	0	0
Yes		0.13 (0.302)	0.15 (0.230)	0.14 (0.262)
Gender				
Male (reference)		0	0	0
Female		-0.53 (<0.001)	-0.52 (<0.001)	-0.52 (<0.001)
Perceived Racism in Health Care*Gender				
Yes*Female		-0.12 (0.226)	-0.12 (0.197)	-0.12 (0.219)
Education				
< High School		0.11 (0.056)	0.12 (0.032)	0.12 (0.033)
High School Diploma or GED		0.01 (0.805)	0.03 (0.541)	0.03 (0.556)
Some college		0.05 (0.268)	0.06 (0.183)	0.05 (0.206)
BA/BS		0.09 (0.055)	0.10 (0.042)	0.09 (0.050)
Graduate School (reference)		0	0	0
Perceived Racism in Health Care*Education				
Yes*< High School		0.07 (0.609)	0.06 (0.657)	0.06 (0.659)
Yes*High School Diploma or GED		-0.04 (0.747)	-0.05 (0.668)	-0.05 (0.688)
Yes*Some college		-0.02 (0.859)	-0.03 (0.759)	-0.03 (0.770)
Yes*BA/BS		-0.02 (0.903)	-0.04 (0.775)	-0.03 (0.808)

Table 36 (continued)

	Unconditional (Empty Model)	Individual Fixed Effects (IFE)	IFE + Segregation	IFE + Segregation + Area Correlates
County Characteristics Coefficients (p-values)				
Dissimilarity Index				
Low (reference)			0	0
Moderate			-0.42 (<0.001)	-0.45 (<0.001)
High			-0.36 (0.003)	-0.31 (0.020)
Interaction Index				
Low (reference)			0	0
Moderate			0.02 (0.712)	0.00 (0.984)
High			-0.01 (0.851)	-0.05 (0.618)
Proportion at ≤ 100% of FPL				0
Low (reference)				0.10 (0.074)
Moderate				0.03 (0.521)
High				
Health Professionals Shortage Area				
None (reference)				0
All areas				--
Some areas				-0.01 (0.834)
Rural/Urban Continuum				
Counties in metro areas of 1 million population or more (reference)				0
Counties in metro areas of 250,000 to 1 million population				0.07 (0.190)
Counties in metro areas of fewer than 250,000 population				0.01 (0.883)
Urban population of 20,000 or more adjacent to a metro area				-0.56 (0.110)
Urban population of 20,000 or more, not adjacent to a metro area				0.29 (0.548)
Urban population of 2,500 to 19,999, adjacent to a metro area				--

Table 36 (continued)

	Unconditional (Empty Model)	Individual Fixed Effects (IFE)	IFE + Segregation	IFE + Segregation + Area Correlates
Urban population of 2,500 to 19,999, not adjacent to a metro area				-0.07 (0.768)
Completely rural or less than 2,500 urban population, adjacent to a metro area				--
Completely rural or less than 2,500 urban population, not adjacent to a metro area				--
Random Effects				
ICC	0.0044			
Random Intercept (τ00)	0.04	0.05	0.00	0.00
Likelihood Ratio Test	2.94*	3.07*	0.00‡	0.00‡

***p<0.001; **p<0.010; *p<0.05; ‡p≥0.05. Note: Model-based analyses using unweighted samples.

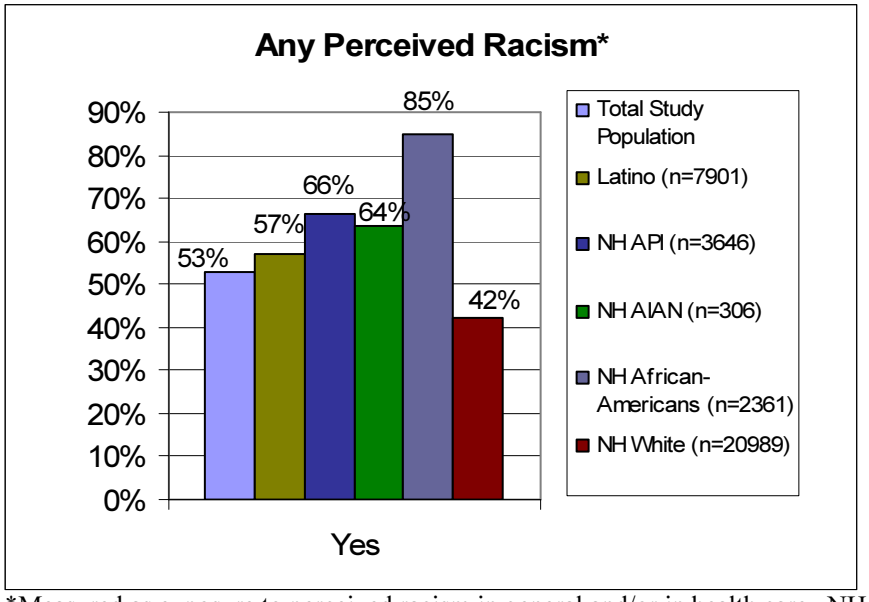
Chapter 9: Discussion

Research Question 1: Perceived racism

Prevalence of perceived racism

Among non-institutionalized California residents (who had not been previously diagnosed with cancer, were not pregnant, and were from the five main aggregate racial/ethnic groups), the prevalence of perceived racism varied. More than half of this population reported having experienced racism in general and approximately seven percent reported having experienced racism within the health care context. In addition, the prevalence of perceived racism varied by aggregate racial/ethnic group (see Figure 14).

Figure 14. Prevalence of any perceived racism by aggregate racial/ethnic groups.



*Measured as exposure to perceived racism in general and/or in health care. NH=Non-Hispanic.

For frequency of perceived racism in general, the range for rarely perceived racism was 24% among Latinos to 35% among Asian/Pacific Islanders; the range for more frequently

perceived racism was approximately 12% among Whites to 56% among African-Americans (see Figure 15). The range for prevalence of perceived racism in health care by aggregate racial/ethnic group was approximately 3% among Whites to 13% among Latinos and African-Americans (see Figure 16).

Figure 15. Prevalence of percieved racism in general by aggregate racial/ethnic groups.

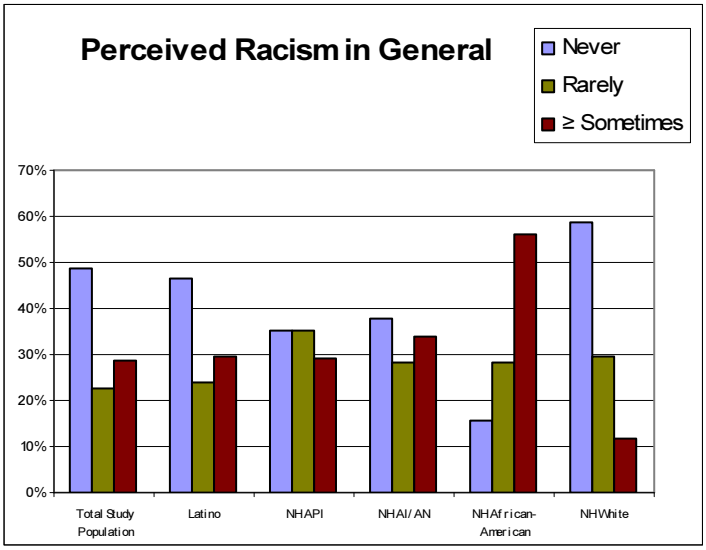
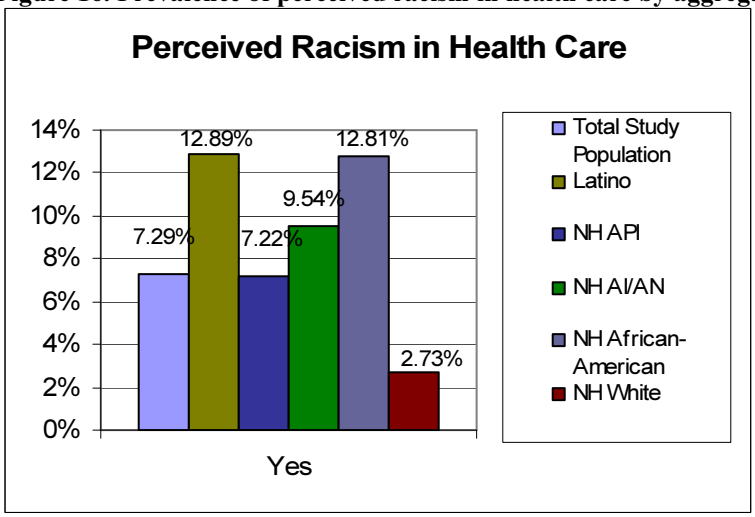


Figure 16. Prevalence of perceived racism in health care by aggregate racial/ethnic groups.



Further variation was evident within some of the aggregate racial/ethnic groups demonstrating the heterogeneity within these aggregate racial/ethnic groups. For example, within Latinos, the range for more frequently perceived racism in general was approximately 19% among Latino Europeans to 37% among Guatemalans; the range for perceived racism in health care was about 8% among Latino Europeans and Other Latinos to 19% among Salvadorans. Within Asian Pacific Islanders, the range for more frequently perceived racism in general was 19% for Cambodians/Other Asians to 45% for Southeast Asians; the range for perceived racism in health care was approximately 4% for Japanese and South Asians to 20% for Cambodians/Other Asians.

As expected from findings in previous studies of the self-reported prevalence of perceived racism in general, African-Americans had a higher prevalence of perceived racism compared to Whites (Barnes LL et al., 2004; Watson JM et al., 2002), with Latinos having a prevalence of perceived racism between that of African-Americans and Whites (Levin S et al., 2002; Krieger N et al., 2005). While the ranking among racial/ethnic groups are consistent across studies, a wide range of perceived racism prevalence rates has been reported in the literature. The findings from this study tend to be more conservative (lower) for the total population as well as for each of the racial/ethnic minority groups and less conservative for Whites. These differences may be attributed to study differences including varying population characteristics (e.g., age and gender as well as geographic location and setting), survey methodology (e.g., telephone, face-to-face interview or self-administered), as well as measurement/question to assess perceived racism (e.g., one question vs. scales). In particular, studies utilizing self-administered surveys as well as those utilizing scaled measures of perceived racism tend

to have reported higher prevalence rates, perhaps due to minimizing effects of social desirability and increasing reliability.

As expected from findings in previous studies of the self-reported prevalence of perceived racism in health care, African-Americans had a higher prevalence of perceived racism compared to Whites (Watson JM et al., 2002; LaVeist TA, Nickerson KJ, & Bowie JV, 2000), with Latinos and other racial/ethnic groups having a prevalence of perceived racism between that of African-Americans and Whites (Krieger N et al., 2005; Kessler RC et al., 1999). This study had prevalence rates that were similar to rates found in studies with similar measures and among general populations (Kessler RC et al., 1999; Krieger N et al., 2005); studies with patients as their samples reported much higher prevalence for perceived racism in health care (LaVeist TA et al., 2000; Bird ST, Bogart LM, & Delahanty DL, 2004).

Currently, limited data on the prevalence of perceived racism among Asians and Pacific Islanders and American Indians/Alaska Natives has been reported without combining these groups into a single other category. For APIs, there is some data on perceived racism among API Vietnam Veterans and Asian immigrant/refugee populations in countries outside of the United States (Noh S et al., 1999; Loo CM et al., 2001; Cortis JD, 2000) with only one study of Chinese Americans in Southern California that reported prevalence of 21% for perceived racism in general (Gee GC, 2002). There were no data on the prevalence of perceived racism among American Indians/Alaska Natives.

Independent/community characteristics associated with perceived racism

Most individual characteristics in this study were associated with the odds of having perceived racism (either in general and/or in health care). For health-related characteristics, poor self-reported health status and increased primary risk profiles were associated with increased odds of perceived racism; increased secondary risk profiles were associated with decreased odds of perceived racism. For demographic characteristics, in general those under 40 years had increased odds of perceived racism and those over 50 years had decreased odds of perceived racism; females had decreased odds of perceived racism; and all aggregate non-White racial/ethnic groups had increased odds of perceived racism. For socioeconomic characteristics, increased educational achievement was associated with increased odds of perceived racism, as was increased employment status. For poverty level, the extremes were associated with decreased odds of perceived racism with increased odds for those in the middle of the spectrum. Limited or no access to health care was associated with increased odds of perceived racism across multiple characteristics.

For psychosocial factors, increased social support and resources were associated with decreased odds of perceived racism; unhealthy coping mechanisms were associated with increased odds in perceived racism; and having competing priorities, such as food security and home safety, were also associated with increased odds of perceived racism. Having neighborhood resources such as a neighborhood watch and safe park/open space were associated with decreased odds of perceived racism. For immigration/acculturation factors, naturalized citizens had increased odds of perceived racism. Acculturation with respect to language spoken and length of residency showed associations with increased

odds of perceived racism for more acculturated groups (i.e., those who spoke English and those who had resided in the US for longer).

Based on previous empirical studies, it was expected that the following subgroups were more likely to have perceived racism: younger adults (Kessler RC et al., 1999), uninsured (Blanchard J & Lurie N, 2004), those dissatisfied with health care services (Bird ST et al., 2004; LaVeist TA et al., 2000), those with poorer health (Bird ST et al., 2004), those with limited/no social support (Clark R, 2003), and those who were not married (Kessler RC et al., 1999). The results from this study provide evidence in further support of these associations. No associations between the following variables have been reported in previous studies: Body Mass Index (Clark R, 2003) and primary language (Blanchard J & Lurie N, 2004). The results from this study suggest that there is a positive association between primary risk profiles and perceived racism as well as between speaking in English and another language at home and perceived racism.

Conflicting results for gender and perceived racism are evident in the literature. Some studies reported males were more likely (Bennett GG et al., 2005; Krieger N & Sydney S, 1996), others reported that females were more likely (Levin S et al., 2002; Kessler RC et al., 1999) while still others reported similar levels for both genders (Kessler RC et al., 1999; Blanchard J & Lurie N, 2004). For income and education, associations with perceived racism varied by measures used and populations included in the analyses. For education, studies reported no differences (Blanchard J & Lurie N, 2004) or a trend towards those who are more educated being more likely to perceive racism (Kessler RC et al., 1999); for income some studies reported no differences (Clark R, 2003); others reported those with lower income levels were more likely to report

perceived racism (Watson JM et al., 2002; Kessler RC et al., 1999). The results from this study demonstrate that males were more likely to have perceived racism. Results from this study demonstrated increasing odds of perceived racism with increased educational achievement, and a more curvilinear relationship for income, with either extreme having decreased odds of perceived racism.

Mixed results were evident for associations between county characteristics and perceived racism. For county segregation measured by the Dissimilarity Index across all groups, those living in counties with increased segregation had increased odds of perceived racism for all aggregate racial/ethnic groups except AI/ANs. For county segregation measured by the Interaction Index across all groups, those living in counties with increased segregation had increased odds of perceived racism for Interaction Indices of Latinos, APIs, and African-Americans but had decreased odds of perceived racism for Interaction Indices of AI/ANs and Whites. Those living in counties characterized as hypersegregated for African-Americans or Latinos had increased odds of perceived racism. For other county characteristics, those living in counties with health professional shortage areas had decreased odds of perceived racism and those living in counties designated as having a relatively high proportion of residents at or below 100% of the Federal Poverty Line had increased odds of perceived racism. For the rural/urban continuum, those in metropolitan counties or completely rural counties had increased odds of perceived racism compared to those living in urban areas.

The results from this study also demonstrate variation of these associations through analyses stratified by aggregate racial/ethnic group. The following variables remain associated with perceived racism (in the same direction as for the total

population) across at least three of the racial/ethnic groups: gender, education, employment, problem with health care provider, social cohesion, and primary risk profile. The following variables remain associated with perceived racism but are not associated in the same direction across at least three of the racial/ethnic groups: age, poverty level, health care satisfaction, food security, language spoken at home and length of residency in the US, safe park/open space and health status. These patterns can offer additional insight to processes that are more universal regardless of racial/ethnic group and others that are more specific to racial/ethnic groups.

While these results provide insight into bivariate associations between individual and community characteristics, further research is needed to establish if these associations are specific to California populations (compared to groups nationwide). In addition, larger sample sizes for subgroups could also provide additional opportunities to understand experiences within racial/ethnic group. Lastly, multifactorial analyses may be useful to understand relationships between these characteristics and their effect on perceived racism.

Research Question 2: cancer risk profiles and perceived racism

Few studies were identified in the literature review that had evaluated the association between perceived racism and cancer risk behaviors. Most had evaluated the association between perceived racism and individual cancer risk behaviors with only one study that included a behavioral cancer risk profile. A previous literature review on the relationship between racism and health in community studies found evidence of the positive associations between smoking and racism as well as alcohol consumption and racism (Williams DR et al., 2003). Another study of African-American college students

evaluated the association between racism and tobacco use and found a positive association (Bennett GG et al., 2005). Bivariate relationships between BMI and perceived racism have been found not to be statistically significant (Clark R, 2003). For secondary cancer risk profiles, one study evaluated the association between perceived racism and optimal cancer screening, defined as being up-to-date on screenings for colon cancer (Fecal Occult Blood Test), cervical cancer, and breast cancer (mammography) (Blanchard J & Lurie N, 2004). Results demonstrated no statistically significant association between perceived racism and cancer screening.

In this study, after accounting for demographic characteristics, socioeconomic characteristics, psychosocial factors, neighborhood resources, and immigration/ acculturation factors in multiple linear regression equations, overall, exposure to perceived racism remained associated with increased cancer risk profiles. For primary behavioral cancer risk profiles, the effect of perceived racism in general was moderated by gender and the effect of perceived racism in health care was moderated by gender, age, and education. These fixed effects demonstrated positive associations between the exposure and outcome across the various subgroups (i.e., these were quantitative interactions). Among males and females, there was an increase in risk profile associated with exposure to perceived racism in general or in health care with males having had an accelerated rate of change. Among all age subgroups, there is an increase in risk profile associated with exposure to perceived racism in health care, with those in the younger age groups (<40 years) having had accelerated rates of change. Among all educational achievement subgroups, there is an increase in risk profile associated with exposure to perceived racism in health care, with decelerating rates of change from less than high

school through some college and an accelerated rate of change for those who completed their bachelor's degree.

For secondary cancer risk profile, increased exposure to perceived racism in general was associated with a decrease in secondary risk profile; the effect of perceived racism in health care was moderated by gender and education. Among males and females, there was an increase in risk profile associated with exposure to perceived racism in health care with males having a more accelerated rate of change. Among all educational achievement subgroups, there was an increase in risk profile associated with exposure to perceived racism in health care; rates of change were accelerating from the less than high school group through those who attended some graduate school with the exception of those who had completed their bachelor's degree.

The main constructs with which perceived racism may affect health/health behaviors include SES, health care access, psychosocial factors, immigration/ acculturation factors, neighborhood as well as demographic factors. Table 37 lists the factors assessed in this study and categorizes them as moderators, potential mediators and confounders/correlates of the relationship between perceived racism and cancer risk profiles. The results of this study lend further evidence to the theories/hypotheses that the following factors do moderate the relationship between perceived racism and cancer risk profiles: gender, education, and age. In addition, the following factors were identified as confounding the relationship between perceived racism and cancer risk profiles: access to health care, marital status, religious participation, social resources, coping mechanism, citizenship/immigration status, length of residency, language at home as well as age and gender. Potential mediators include poverty level and employment

status. In this study immigration status was not found to be a moderator, nor did the results demonstrate a role for most factors from the competing priorities and neighborhood resources subsets.

Table 37. Pathways through which perceived racism affects cancer risk profiles.

Behavioral Cancer Risk Profiles	**Moderators**	**Potential Mediators**	**Confounders/Correlates**
Primary Risk ***Perceived Racism in General***	Gender	Employment	Race/ethnicity Poverty Level (%FPL) Marital status Religious participation Average social resources Neighborhood watch Citizenship/ immigration status Length of residency Language at home
Perceived Racism in Health Care	Gender Age Education		
Secondary Risk ***Perceived Racism in General***		Poverty level	Race/ethnicity Gender Age Marital Status Cigarette smoking Insurance coverage Usual source of care Doctor visit Satisfaction with health care Citizenship/ immigration status Length of residency Language at home
Perceived Racism in Health Care	Gender Education		

The study findings for this research question also demonstrate that primary and secondary behavioral cancer risk profiles share some common factors, but also have some that are unique to each of them. For example, employment status was associated only with primary risk profiles while access to health care factors were only associated with secondary risk profiles. Among the psychosocial factors, a broader set of factors were more relevant to primary risk profiles (e.g., marital status, religious participation, and social resources) compared to secondary risk profiles (e.g., marital status). These findings may be useful in understanding barriers/facilitators for these different sets of

behaviors, with lifestyle behaviors (which need to be maintained daily) requiring more socioeconomic and psychosocial cues compared with screening behaviors which require more health care system cues.

Study results also demonstrate variation of these models across racial/ethnic groups. The effects of perceived racism in general and perceived racism in health care on primary behavioral risk profiles were not moderated by gender, age, or education among Latinos, American Indian/Alaska Natives and African-Americans. Among Asians and Pacific Islanders, only education moderated the effect of perceived racism in health care on primary risk profile. Where there were statistically significant interactions within aggregate racial/ethnic groups, they tended to be qualitative interactions. There are no differences in risk profiles by exposure to perceived racism in health care among APIs who have at least graduated high school; among APIs who had not completed high school, there is a decrease in risk profile associated with exposure to perceived racism in health care. Among Whites, only gender moderated the effect of perceived racism in general on primary risk profile. There is no difference in risk profiles by exposure to perceived racism in general among White males; among White females, those who were exposed to perceived racism in general are associated with increasing risk profiles.

In the race/ethnicity stratified models for secondary behavioral risk profiles, the main effect of perceived racism in general varied; there was no association between perceived racism in general and secondary risk profiles among Latinos, American Indian/Alaska Natives, African-Americans and Whites. Among Asians and Pacific Islanders, those who more frequently perceived racism were associated with a decrease in their average secondary risk profile after adjusting for all other variables in the model;

there was no difference between those who had rarely perceived racism and those who had never perceived racism. The effect of perceived racism in health care on secondary behavioral risk profiles were not moderated by gender and education among American Indian/Alaska Natives, African Americans and Whites. Among Latinos, the effect of perceived racism in health care on secondary risk profiles is moderated by gender and educational achievement. Among Latino males and females, exposure to perceived racism in health care increased risk profiles with an accelerated rate of change among the males compared to the females. Among Latinos, there were no differences in risk profiles by exposure to perceived racism among those who had less than a high school education, completed high school/GED, attended some college or completed their bachelor's degree; among Latinos who had attended graduate school there was an increase in risk profiles for those who had perceived racism in health care. Among Asians and Pacific Islanders, the effect of perceived racism in health care on secondary risk profiles is marginally moderated by gender. Increased risk profiles with exposure to perceived racism appears to be the trend with accelerated rate of change among males.

Further research into these models of the association between perceived racism and cancer risk profiles will be useful. First, additional factors such as marital status should be evaluated as a potential moderator. Second, potential mediators identified in this study should be evaluated further. Lastly, models for each racial/ethnic group should be built and evaluated with consideration of modeling within group variation as well as by stratifying for immigration/acculturation factors.

Research Question 3: added effects of contextual factors

For primary behavioral cancer risk profiles, there was evidence of unexplained variation at the county-level among Latinos, Asians and Pacific Islanders and Whites. Among Latinos, APIs, and Whites, there was no effect of segregation for either measure, Dissimilarity Index or Interaction Index, on primary risk profile. Among Latinos and Whites, there remained some unexplained variance at the county-level after accounting for key county characteristics (e.g., health care resources, poverty and rural/urban status).

For secondary behavioral cancer risk profiles, there was evidence of unexplained variation at the county-level among Latinos, Asians and Pacific Islanders, African-Americans and Whites. Among APIs and Whites, there were no associations between segregation and secondary risk profiles. Among Latinos, there was a marginally significant effect of high segregation measured by the Dissimilarity Index which was associated with a decrease in risk profiles. There was no effect of segregation measured by the Interaction Index associated with secondary risk profiles. Among African-Americans, moderate and high segregation measured by Dissimilarity Index were associated with decreased secondary risk profiles. There were no associations between segregation measured by the Interaction Index and secondary risk profiles. After accounting for segregation, no more unexplained county-level variance was evident across all the models (for all racial/ethnic groups).

Previous studies on segregation and health have found protective effects of segregation among Latinos and APIs with assumptions that in moderately or highly segregated communities, communication and social support may be facilitating protective health behaviors and thus, health outcomes (Gee GC, 2002; Kagawa-Singer M, 2001;

Acevedo-Garcia D et al., 2003). While there is little evidence of a protective effect for African-Americans in previous literature, one hypothesis that should be investigated in this case is the correlation of cancer screening outreach activities in communities that are segregated. Additional research should also be conducted building similar models for each racial/ethnic group using multilevel analyses from the beginning (as opposed to assessing additional effects) as these models may have unstable estimates due to being over-parameterized.

Study limitations

This study has several limitations. The first is that because the study design is cross-sectional, causal inferences are not possible as temporality between the exposure and outcome were not established i.e., it was not evident whether the exposure to perceived racism occurred prior to the cancer risk behaviors. For example, in this study, it is feasible that the exposure to perceived racism in health care occurred at the same time as screening participation and was not a determinant of screening participation but a consequence of it. Thus, while it is may be expected that perceived racism would increase cancer risk profiles, the analysis may show that perceived racism decreased cancer risk profiles because this data is cross-sectional. However, assessing associations among correlates have provided important hypotheses for future studies using cohort designs where the temporality of exposure and outcome is more clearly determined. Future studies should focus on establishing causal relationships as well as evaluating direct and indirect pathways of this relationship.

Second, as all the individual level variables were self-reported there is the possibility that social desirability was at play at some level (Haas JS et al., 2004). There

is evidence from other studies that self-reported risk behaviors are often under-reported and health promoting behaviors are over-reported (Gordon NP, Hiatt RA, & Lampert DI, 1993; Hiatt RA, Perez-Stable EJ, Quesenberry Jr. C, & et al, 1995). Thus, the associations demonstrated in these findings may be weaker than they really are. However, recall that the exposure in this study may have also been underreported (as described at the beginning of this chapter). In addition, measures of both perceived racism and cancer risk profiles were limited in capturing the various dimensions of these constructs. Perceived racism measures were not constructed within the 2003 CHIS questionnaire to fully assess the breadth of perceived racism. These measures were separated within the questionnaire in different sections and did not systematically assess racism in multiple life domains, nor its intensity, frequency, etc., as is recommended (California Health Interview Survey, 2005e; Krieger N, 2000). For cancer risk profiles, in addition to the existing measures on walking and Body Mass Index better measures of physical inactivity and inclusion of dietary habits would have provided a more accurate assessment of the diet, activity and energy balance triad. To reduce social desirability threats, one approach could include the use of computer-assisted telephone interview technology that can enable the interviewee to enter responses directly into the phone increasing more accurate reporting of these risk behaviors and personal experiences.

Lastly, the study findings will not be generalizable beyond California, as the sampling frame and racial/ethnic distribution and experience in California is not representative of that nationally. In addition, while prevalence of perceived racism were reported, the data on the effects of perceived racism on cancer risk profiles among

American Indian/Alaska Natives is unstable and should be interpreted with caution as the unweighted sample size was quite small to estimate the range of parameters.

Conclusion

First, the findings from this study demonstrate that the perceived racism is experienced by all aggregate racial/ethnic groups in California. The prevalence of perceived racism had greater variation within some of these aggregate groups (e.g., Latinos and APIs) than between them. In addition, the findings identified some common characteristics across racial/ethnic groups of those who had experienced racism as well as characteristics that varied by racial/ethnic group. Next, this study establishes an association between perceived racism and behavioral cancer risk profiles. For primary risk profiles, the association was positive, i.e., increased exposure to perceived racism was associated with increased risk. For secondary risk profiles, the association was mixed with a negative association between perceived racism in general and secondary risk and a positive association between perceived racism in health care and secondary risk. Lastly, results from the multilevel analyses demonstrate that there were additional county-level effects that contributed to behavioral cancer risk profiles. Among African-Americans in particular, segregation was inversely associated with cancer risk profiles.

Together, these findings set the stage for further research into the effects of racism (both perceived racism and race-based residential segregation) on behavioral cancer risk factors that may be contributing to cancer disparities. This research underscores the importance of considering social determinants of health behaviors and understanding not just individual characteristics that shape these behaviors but also contextual effects. Further research into the association of racism and cancer risk profiles is needed to

establish causality, to evaluate additional pathways, and to begin to address some public health policy and practice solutions to prevent racism and its negative consequences on health.

Reference List

1. Area Resource File (ARF). (2001). Rockville, MD: US Department of Health and Human Services, Health Resources and Services Administration, Bureau of Health Professions.

2. Census CD 2000 Long Form. (2002). East Brunswick, NJ: GeoLytics, Inc.

3. Abel EK. (2004). "Only the best class of immigration." Public health policy toward Mexicans and Filipinos in Los Angeles, 1910-1940. American Journal of Public Health, 94(6), 932-9.

4. Acevedo-Garcia D. (2001). Zip code-level risk factors for tuberculosis: neighborhood environment and residential segregation in New Jersey, 1985-1992. American Journal of Public Health, 91(5), 734-741.

5. Acevedo-Garcia D, & Lochner KA. (2003). Residential Segregation and Health (Chapter 12). Kawachi I, & Berkman LF (ed.), Neighborhoods & Health . New York: Oxford University Press .

6. Acevedo-Garcia D, Lochner KA, Osypuk TL, & Subramanian SV . (2003). Future directions in residential segregation and health research: a multilevel approach. American Journal of Public Health, 93(2), 215-221.

7. American Cancer Society. (1997). Cancer Facts and Figures 1997. Atlanta: American Cancer Society.

8. American Cancer Society. (2004). Cancer Facts & Figures 2004. Atlanta: American Cancer Society.

9. American Cancer Society. (2005a). Cancer Facts and Figures 2005. Atlanta: American Cancer Society.

10. American Cancer Society. Cancer Control Month Focuses on Advances Against Cancer Cancer. Control Month Turns Spotlight on Advances Against Cancer [Web Page]. URL http://www.cancer.org/docroot/NWS/content/NWS_5_1x_Cancer_Control_Month_Focuses_on_Advances_Against_Cancer.asp [2005b, February 27].

11. American Cancer Society, California Division and Public Health Institute, & California Cancer Registry. (2004). Oakland, CA: American Cancer Society, California Division.

12. Baker F. (1998). Behavioral science applied to cancer screening. Current Opionion in Oncology, 10, 455-460.

13. Barnes LL, Mendes de Leon CF, Wilson RS, Bienias JL, Bennett DA, & Evans DA. (2004). Racial differences in perceived discrimination in a community population of older Blacks and Whites. Journal of Aging and Health, 16(3), 315-337.

14. Bennett GG, Yaus Wolin K, Robinson EL, Fowler S, & Edwards CL. (2005). Perceived racial/ethnic harassment and tobacco use among African American young adults. American Journal of Public Health, 95(2), 238-240.

15. Berkman LF, & Glass T. (2000). Chapter 7. Social integration, social networks, social support and health. Berkman L, & Kawachi I (eds), Social Epidemiology . New York: Oxford University Press, Inc.

16. Bird ST, & Bogart LM. (2001). Perceived race-based and socioeconomic status (SES)-based discrimination in interactions with health care providers. Ethnicity & Disease, 11, 554-563.

17. Bird ST, Bogart LM, & Delahanty DL. (2004). Health-related correlates of perceived discrimination in HIV care. AIDS Patient Care and STDs, 18(1), 19-26.

18. Birt CM, & Dion KL. (1987). Relative deprivation theory and responses to discrimination in a gay male and lesbian sample. British Journal of Social Psychology, 26, 139-145.

19. Blanchard J, & Lurie N. (2004). R-E-S-P-E-C-T: Patient reports of disrespect in the health care setting and its impact on care. The Journal of Family Practice, 53(9), 721-730.

20. Bradby H. (2003). Describing ethnicity in health research. Ethnicity & Health, 8(1), 5-13.

21. Bradley EH, McGraw SA, Curry L, Buckser A, King KL, Kasl SV, & Andersen R. (2002). Expanding the Andersen model: the role of psychosocial factors in long-term care use . Health Services Research , 37(5), 1221-1242.

22. Brody J. (2005 February). How Cancer Rose to the Top of the Charts. New York Times.

23. Broman CL. (1996-1997). The health consequences of racial discrimination: a study of African Americans. Ethnicity & Disease, 6, 148-153.

24. California Department of Finance, & Demographic Research Unit. California Current Population Survey Basic Report, March 2003 Data. [Web Page]. URL http://www.dof.ca.gov [2005, February 6].

25. California Department of Health Services Tobacco Control Section. (2004) California Tobacco Control Update 2004 [Web Page]. URL http://www.dhs.ca.gov/tobacco/html/publications.htm [2005, January 31].

26. California Health Interview Survey. (2002-2004). CHIS 2003 Adult Questionnaire (Respondents Age 18 and Older) Version 11 February 12, 2004. Los Angeles, CA: Regents of the University of California.

27. California Health Interview Survey. (2005a). *CHIS 2003 Methodology Series: Report 1 Sample Design*. Los Angeles, CA: UCLA Center for Health Policy Research.

28. California Health Interview Survey. (2005b). *CHIS 2003 Methodology Series: Report 3 Data Processing Procedures*. Los Angeles, CA: UCLA Center for Health Policy Research.

29. California Health Interview Survey. (2005c). *CHIS 2003 Methodology Series: Report 4 Response Rates*. Los Angeles, CA: UCLA Center for Health Policy Research.

30. California Health Interview Survey. (2005d). *CHIS 2003 Methodology Series: Report 5 Weighting and Variance Estimation*. Los Angeles, CA: UCLA Center for Health Policy Research.

31. California Health Interview Survey. (2005e). CHIS 2003 Adult Public Use File, Release 1 [computer file]. Los Angeles, CA: UCLA Center for Health Policy Research.

32. California Health Interview Survey. (2005f). *CHIS 2003 Methodology Series: Report 2 Data Collection Methods*. Los Angeles, CA: UCLA Center for Health Policy Research.

33. Carlson ED, & Chamberlain RM. (2004). The Black-White perception gap and health disparities research. Public Health Nursing, 21(4), 372-9.

34. Centers for Disease Control and Prevention. (1993). Use of race and ethnicity in public health surveillance: summary of the CDC/ATSDR workshop. MMWR, 42(RR-10).

35. Centers for Disease Control and Prevention. Preventing and Controlling Cancer: The Nation's Second Leading Cause of Death. At A Glance. 2004 [Web Page]. URL http://www.cdc.gov/nccdphp/aag/aag_dcpc.htm [2005, February 27].

36. Centers for Disease Prevention and Control. Behavioral Risk Factor Surveillance System [Web Page]. URL http://www.cdc.gov/brfss/index.htm. [18 June 2006].

37. Clark R. (2003). Self-reported racism and social support predict blood pressure reactivity in Blacks. Annals of Behavioral Medicine, 25(2), 127-136.

38. Cockburn M, & Deapen D (eds). (2004). Cancer Incidence and Mortality in California: Trends by Race/Ethnicity, 1988-2001. Los Angeles, CA: University of Southern California.

39. Collins AC, & Williams DR. (1999). Segregation and mortality: the deadly effects of racism. Sociological Forum, 14(3), 495-523.

40. Collins CA. (1999). Racism and health: segregation and causes of death amenable to medical intervention in major U.S. cities. Annals New York Academy of Sciences, 896, 396-398.

41. Cortis JD. (2000). Perceptions and experiences with nursing care: a study of Pakistani (Urdu) communities in the United Kingdom. Journal of Transcultural Nursing, 11(2), 111-118.

42. Curry SJ, Byers T, Hewit M (eds.), & Institute of Medicine . (2003). Fulfilling the Potential of Cancer Prevention and Early Detection. Washington, D.C.: The National Academies Press.

43. Darden JT, & Kamel SM. (2000). Black residential segregation in the city and suburbs of Detroit: Does socioeconomic status matter? Journal of Urban Affairs, 22(1), 1-13.

44. Diez-Roux AV . (2002). A glossary for multilevel analysis. Journal of Epidemiology and Community Health, 56, 588-594.

45. Earle CC, Venditti LN, & Neumann PJ et al. (2000). Who gets chemotherapy for metastatic lung cancer? CHEST, 117, 1239–1246.

46. Ellison GL, Coker Al, Hebert JR, Sanderson M, Royal CD, & Weinrich SP. (2001). Psychosocial stress and prostate cancer: a theoretical model. Ethnicity & Disease, 11, 484-495.

47. Ender P. Linear Statistical Models Course/Regression Notes/Collinearity [Web Page]. URL http://www.gseis.ucla.edu/courses/ed230bc1/notes2/multi.html.

48. Fang J, Madhavan S, Bosworth W, & Alderman MH. (1998). Residential segregation and mortality in New York City. Social Science & Medicine, 47(3), 469-476.

49. Freeman HP. (1993). Poverty, race, racism and survival. Annals of Epidemiology, 3(2), 145-9.

50. Freeman HP. (2004). Poverty, culture, and social injustice. Determinants of cancer disparities. CA: A Cancer Journal for Clinicians, 54(2), 72-77.

51. Freeman HP, & Chu KC. (2005). Determinants of cancer disparities: barriers to cancer screening, diagnosis, and treatment. Surgical Oncology Clinics of North America, 14, 655-669.

52. Fuller KE. (2003). Health disparities: reframing the problem. Medical Science Monitor, 9(3), SR9-15.

53. Gee GC. (2002). A multilevel analysis of the relationship between institutional and individual racial discrimination and health status. American Journal of Public Health, 92(4), 615-623.

54. Glaeser EL, & Vigdor JL. (2001). Racial segregation in the 2000 Census: promising news. Washington, DC: The Brookings Institution.

55. Glanz K, Croyle RT, Chollette VY, & Pinn VW. (2003). Cancer-related health disparities in women. American Journal of Public Health, 93(2), 292-8.

56. Gordon NP, Hiatt RA, & Lampert DI. (1993). Concordance of self-reported data and medical record audit for six cancer screening procedures. Journal of the National Cancer Institute, 85(7), 566-70.

57. Haas JS, Phillips KA, Sonneborn D, McCulloch CE, Baker LC, Kaplan CP, Peres-Stable EJ, & Liang S. (2004). Variation in access to health care for different racial/ethnic groups by the racial/ethnic composition of an individual's county of residence. Medical Care, 42(7), 707-714.

58. Harras A, Edwards BK, Blot WJ, & Gloeckler Ries LA. (1996). Cancer Rates and Risks (4th edition). Bethesda, MD: US DHHS Public Health Service, NIH, NCI--Cancer Statistics Branch.

59. Haynes MA, & Smeldey BD (eds.). (1999). The Unequal Burden of Cancer: An Assessment of NIH Research and Programs for Ethnic Minorities and the Medically Underserved. Washington, D.C.: National Academy Press.

60. Hengstler P, Battegay E, Cornuz J, Bucher H, & Battegay M. (2002). Evidence for prevention and screening: recommendations in adults. Swiss Medical Weekly, 132, 363-373.

61. Hiatt RA, Klabunde C, Breen N, Swan J, & Ballard-Barbash R. (2002). Cancer screening practices from National Health Interview Surveys: past, present and future. Journal of the National Cancer Institute, 94(24), 1837-46.

62. Hiatt RA, Perez-Stable EJ, Quesenberry Jr. C, & et al. (1995). Agreement between self-reported early cancer detection practices and medical audits among Hispanic and non-Hispanic White health plan members in Northern California. Preventive Medicine, 24, 278-285.

63. Hosmer DW, & Lemeshow S. (2000). Applied Logistic Regression (2nd edition). New York: John Wiley & Sons, Inc.

64. Iceland J, Weinberg DH, & Steinmetz E. (2002). Racial and ethnic residential segregation in the United States: 1980-2000. Washington, DC: U.S. Government Printing Office.

65. Jackson SA, Anderson RT, Johnson NJ, & Sorlie PD. (2000). The relation of residential segregation to all-cause mortality: a study in Black and White. American Journal of Public Health, 90(4), 615-617.

66. Jones CP. (2000). Levels of racism: a theoretic framework and a gardener's tale. American Journal of Public Health, 90(8), 1212-15.

67. Kagawa-Singer M. (2001). From genes to social science: impact of the simplistic interpretation of race, ethnicity, and culture on cancer outcome. Cancer, 91(1 Supplement), 226-232.

68. Karlsen S, & Nazroo JY. (2002). Relation between racial discrimination, social class, and health among ethnic minority groups. American Journal of Public Health, 92(4), 624-631.

69. Kendall J, & Hatton D. (2002). Racism as a source of health disparity in families with children with attention defecit hyperactivity disorder. Advances in Nursing Science, 25(2), 22-39.

70. Kessler RC, Mickelson KD, & Williams DR. (1999). The prevalence, distribution, and mental health correlates of perceived discrimination in the United States. Journal of Health and Social Behavior, 40(3), 208-230.

71. King G, & Williams DR. (1995). Chapter 4. Race and health: a multidimensional approach to African-American health. Amick III BC, Levine S, Tarlov AR, & Walsh DC (eds), Society and Health . New York: Oxford University Press, Inc.

72. Korn EL, & Gaubard BI. (1999). Analysis of Health Surveys. New York: John Wiley & Sons, Inc.

73. Krieger N. (1990). Racial and gender discrimination: risk factors for high blood pressure? Social Science and Medicine, 30(12), 1273-1281.

74. Krieger N. (2000). Chapter 3. Discrimination and health. Berkman L, & Kawachi I (eds), Social Epidemiology . New York: Oxford University Press, Inc.

75. Krieger N. (2001). The ostrich, the albatross, and public health: an ecosocial perspective--or why an explicit focus on health consequences of discrimination and deprivation is vital for good science and public health practice. Public Health Reports, 116, 419-23.

76. Krieger N. (2003). Does racism harm health? Did child abuse exist before 1962? On explicit questions, critical science, and current controversies: an ecosocial perspective. American Journal of Public Health, 93(2), 194-9.

77. Krieger N, Smith K, Naishadham D, hartman C, & Barbeau EM. (2005). Experiences of discrimination: validity and reliability of a self-report measure for population health research on racsim and health. Social Science & Medicine, 61(7), 1576-1596.

78. Krieger N, & Sydney S. (1996). Racial discrimination and blood pressure: the CARDIA study of young black and white adults. American Journal of Public Health, 86(10), 1370-1378.

79. LaVeist TA. (1992). The political empowerment and health status of African Americans: mapping a new territory. American Journal of Sociology, 97, 1080-1095.

80. LaVeist TA, Nickerson KJ, & Bowie JV. (2000). Attitudes about racism, medical mistrust, and satisfaction with care among African American and White cardiac patients. Medical Care Research and Review, 57(Supplement 1), 146-161.

81. LaVeist TA, & Wallace JM. (2000). Health risk and inequitable distribution of liquor stores in Africa American neighborhood. Social Science & Medicine, 51, 613-617.

82. Lee ES, & Forthofer RN. (2006). Analyzing Complex Survey Data (2nd ed.). Thousand Oaks, CA: Sage Publications, Inc.

83. Levin S, Sinclair S, Veniegas RC, & Taylor PL. (2002). Perceived discrimination in the context of multiple group memberships. Psychological Science, 13(6), 557-560.

84. Lewis Mumford Center, & Logan J. (2001). Ethnic Diversity Grows, Neighborhood Integration Lags Behind. Albany, NY: University of Albany.

85. Link BG, & Phelan J. (1995). Social conditions as fundamental causes of disease. Journal of Health and Social Behavior, (Extra Issue), 80-94.

86. Logan JR, & Zhang W. (2004). Ch.6. Identifying ethnic neighborhoods with Census data: group concentration and spatial clustering. Goodchild MR, & Janelle DG (eds.), Spatially integrated social science . New York: Oxford University Press.

87. Loo CM, Fairbank JA, Scurfield RM, Ruch LO, King DW, Adams LJ, & Chemtob CM. (2001). Measuring exposure to racism: development and validation of a Race-Related Stressor Scale (RRSS) for Asian American Vietnam Veterans. Psychological Assessment, 13(4), 503-520.

88. Lopez EDS, Eng E, Randall-David E, & Robinson N. (2005). Quality-of-Life Concerns of African American Breast Cancer Survivors Within Rural North Carolina: Blending the Techniques of Photovoice and Grounded Theory. Qualitative Health Research, 15(1`), 99-115.

89. Luke DA. (2004). Multilevel modeling. Quantitative application in the social sciences . Thousand Oaks, CA: Sage Publications, Inc.

90. Macintyre S, & Ellaway A. (2000). Chapter 14. Ecological approaches: rediscovering the role of the physical and social environment. Berkman L, & Kawachi I (eds), Social Epidemiology . New York: Oxford University Press, Inc.

91. Mandelblatt JS, Kerner JF, & Hadley J et al. (2002). Variations in Breast Carcinoma Treatment in Older Medicare Beneficiaries. Is it Black and White? Cancer, 95(7), 1401-1414.

92. Massey DS, & Denton NA. (1988). The dimensions of residential segregation. Social Forces, 67(2), 281-315.

93. Massey DS, White, MJ, & Phua VC. (1996). The dimensions of segregation revisited. Sociological Methods & Research, 25(2), 172-206.

94. McDonald CJ. (2001). The American Cancer Society addressing disparities and the disproportionate burden of cancer. Cancer, 91 (1 Supplement), 195-198.

95. Meissner HI, Vernon SW, Rimer BK, Wilson KM, Rakowski W, Briss PA, & Smith RA. (2004). The future of research that promotes cancer screening. Cancer, 101(5 Supplement), 1251-9.

96. Michaels D. (1983). Occupational Cancer in the Black population: the health effects of job discrimination. Journal of the National Medical Association, 75(10), 1014-1018.

97. National Cancer Institute. Cancer Prevention Overview [Web Page]. URL http://www.nci.nih.gov/cancertopics/pdq/prevention/overview/healthprofessional [2005a, February 27].

98. National Cancer Institute. 2004 Plans & Priorities for Cancer Research [Web Page]. URL http://plan.cancer.gov/ [2005b, May 2].

99. National Cancer Institute, Behavioral Research, & Cancer Control and Population Sciences. Constructs and Measures Web Resource [Web Page]. URL http://cancercontrol.cancer.gov/brp/constructs.html.

100. National Research Council. (2004). Measuring Racial Discrimination. Panel on Methods for Assesing Discrimination. Rebecca M. Blank, Marilyn Dabady, and Constance F. Citro, Editors. Committee on National Statistics, Division of Behavioral and Social Sciences and Education. Washington, DC: The National Academy of Press.

101. Nazroo JY. (2003). The structuring of ethnic inequalities in health: economic position, racial discrimination, and racism. American Journal of Public Health, 93(2), 277-84.

102. Noh S, Beiser M, Kaspar V, Hou F, & Rummens J. (1999). Perceived racial discrimination, depression, and coping: a study of Southeast Asian refugees in Canada. Journal of Health and Social Behavior, 40(3), 193-207.

103. O'Campo P. (2003). Invited commentary: advancing theory and methods for multilevel models of residential neighborhoods and health. American Journal of Epidemiology, 157(1), 9-13.

104. Ogedegbe G, Cassells AN, Robinson CM, DuHamel K, Tobin JN, Sox CH, & Dietrich AJ. (2005). Perceptions of barriers and facilitators of cancer early detection among low-income minority women in community health centers. Journal of the National Medical Association, 97(2), 162-170.

105. Oppenheimer GM. (2001). Paradigm lost: race, ethnicity, and the search for a new population taxonomy. American Journal of Public Health, 91(7), 1049-1055.

106. Perez TE. (2001). Health and civil rights. Cancer, 91(1 Supplement), 217-220.

107. Peterson & Krivo. (1999). Racial segregation, the concentration of disadvantage, and Black and White homicide victimization. Sociological Forum , 14(3), 465-493.

108. Pinto BM, & Trunzo JJ. (2005). Health behaviors during and after a cancer diagnosis. Cancer, 104(11 Suppl), 2614-23.

109. Rakowski W, & Breslau ES. (2004). Perspectives on behavioral and social science research on cancer screening. Cancer, 101(5 Supplement), 1118-30.

110. Rao RS, Graubard BI, Breen N, & Gastwirth JL. (2004). Understanding the factors underlying disparities in cancer screening rates using the Peters-Belson approach. Results from the 1998 National Health Interview Survey. Medical Care, 42(8), 789-800.

111. Rosenbaum S , Markus A, & Darnell J. (2000). U.S. civil rights policy and access to health care by minority Americans: implications for a changing health care system. Medical Care Research and Review, 57(Supplement 1), 236-259.

112. Satcher D. (2001). The unequal burden of cancer. Cancer, 91(1 Supplement), 205-207.

113. Schulz AJ, Williams DR, Israel BA, & Lempert LB. (2002). Racial and spatial relations as fundamental determinants of health in Detroit. The Milbank Quarterly, 80(4), 677-707.

114. Shinagawa S . (2000). The Excess Burden of Breast Carcinoma in Minority and Medically Underserved Communities: Application, Research, and Redressing Institutional Racism. Cancer Supplement, 88(5), 1217-1223.

115. Smedley M, Stith AY, and Nelson AR, & (eds). Committee on Understaning and Eliminating Racial and Ethnic Disparities in Health Care. Board on Health Sciences Policy. Institute of Medicine of the National Academies. (2003). Unequal Treatment: Confronting Racial and Ethnic Disparities in Health Care. Washington, D.C.: The National Academies Press.

116. Snijders T, & Bosker R. (1999). Multilevel analysis: an introduction to basic and advanced multilevel modeling. Thousand Oaks, CA: Sage Publications, Inc.

117. State of California. Welcome to California. [Web Page]. URL http://www.ca.gov/state/portal/myca_homepage.jsp [2005, February 6].

118. Tabulation Working Group, & Interagency Committee for the Review of Standards for Data on Race and Ethnicity. (2000).

119. The Agency for Healthcare Research and Quality. U.S. Preventive Services Task Force (USPSTF) [Web Page]. URL http://www.ahrq.gov/clinic/uspstfix.htm [2005, May 1].

120. The California Endowment. Giving voices to the voiceless. Language Barriers & Health Access Issues of Black Immigrants of African Descent [Web Page]. URL http://www.calendow.org/reference/publications/pdf/cultural/TCE0121-2005_Voices%20of%20the%20Voiceless2.pdf [2005, May 1].

121. The Henry J. Kaiser Family Foundation . Statehealthfacts.org/California: At-a-glance [Web Page]. URL http://www.statehealthfacts.org/. [18 June 2006].

122. The Regents of the University of California. Current Policies: Policy on future admissions, employment and contracting resolution rescinding SP-1 and SP2 [Web Page]. URL http://www.universityofcalifornia.edu/regents/policies/6031.html [2005, May 1].

123. Thomas SB. (2001). Health Policy and Ethics Forum. American Journal of Public Health, 91(7), 1046-8.

124. U.S. Census Bureau. (2000). "California--County. GCT-P6. Race and Hispanic or Latino: 2000". Generated by Salma Shariff-Marco using American Factfinder. URL http://factfinder.census.gov/. [06 February 2005].

125. U.S. Census Bureau. (2002) "Poverty 2000" [Web Page]. Last Revised: 22 August 2002. URL http://www.census.gov/hhes/poverty/threshld/thresh00.html.

126. U.S. Census Bureau. American Factfinder. (2005). generated by Salma Shariff-Marco using American Factfinder. <http://factfinder.census.gov/>. [21 December 2005].

127. U.S. Census Bureau, Population Division, Population Projections Branch (2002) "National Population Projections" [Web Page]. Last Revised: 02 August 2002. URL http://www.census.gov/population/www/projections/natsum-T5.html [2005, February 5].

128. United States Department of Agriculture. Economic Research Service [Web Page]. URL http://www.ers.usda.gov/. [12 June 2006].

129. Ward E, Jemal A, Cokkinides V, Singh GK, Cardinez C, Ghafoor A, & Thun M. (2004). Cancer disparities by race/ethnicity and socioeconomic status. CA: A Cancer Journal for Clinicians, 54, 78-93.

130. Watson JM, Scarinci IC, Klesges RC, Slawson D, & Beech BM. (2002). Race, socioeconomic status, and perceived discrimination among healthy women. Journal of Women's Health & Gender-Based Medicine, 11(5), 441-451.

131. Wilkinson R , & Marmot M (eds). (1998). Social Determinants of Health. The Solid Facts. Copenhagen: World Health Organization.

132. Williams DR . (1997). Race and health: basic questions, emerging directions. Annals of Epidemiology, 7(5), 322-33.

133. Williams DR . (1999). Race, socioeconomic status, and health. The added effects of racism and discrimination. Annals New York Academy of Science, 896, 173-88.

134. Williams DR , & Collins C. (2001). Racial residential segregation: a fundamental cause of racial disparities in health. Public Health Reports, 116, 404-416.

135. Williams DR , Neighbors HW, & Jackson JS. (2003). Racial/ethnic discrimination and health: findings from community studies. American Journal of Public Health, 93(2), 200-8.

136. Willis DP. (2001). Them and us: the politics of population taxonomy. American Journal of Public Health, 91(7), 1048-9.

137. Wilson C. (2003). Cancer deaths, California 2001. California Department of Health Services, Center for Health Statistics: Data Summary, (No. DS03-11000).

138. Womeodu RJ, & Bailey JE. (1996). Barriers to cancer screening. Medical Clinics of North America, 80(1), 115-133.

139. World Health Organization. Cancer [Web Page]. URL http://www.who.int/cancer/en/ [2005, February 27].

APPENDIX A: California County Racial/Ethnic Composition

Counties	Total population	% Black	% Hispanic	% Asian	% Native Hawaiian & Other	% Native American	% minority	% White	% Total
Total	33,871,648	6.68%	32.38%	10.92%	0.35%	0.98%	51.31%	59.55%	110.85%
Alameda	1,443,741	14.93%	18.97%	20.45%	0.63%	0.63%	55.62%	48.79%	104.41%
Alpine	1,208	0.58%	7.78%	0.33%	0.08%	18.87%	27.65%	73.68%	101.32%
Amador	35,100	3.87%	8.91%	1.00%	0.10%	1.78%	15.66%	85.79%	101.45%
Butte	203,171	1.39%	10.50%	3.32%	0.15%	1.90%	17.26%	84.52%	101.78%
Calaveras	40,554	0.75%	6.82%	0.85%	0.09%	1.74%	10.25%	91.19%	101.44%
Colusa	18,804	0.55%	46.54%	1.21%	0.39%	2.33%	51.03%	64.29%	115.33%
Contra Costa	948,816	9.36%	17.68%	10.96%	0.37%	0.61%	38.98%	65.50%	104.48%
Del Norte	27,507	4.30%	13.92%	2.32%	0.08%	6.43%	27.06%	78.86%	105.92%
El Dorado	156,299	0.52%	9.32%	2.13%	0.13%	1.00%	13.10%	89.71%	102.81%
Fresno	799,407	5.30%	43.99%	8.05%	0.13%	1.60%	59.06%	54.30%	113.36%
Glenn	26,453	0.59%	29.64%	3.38%	0.13%	2.09%	35.82%	71.78%	107.60%
Humboldt	126,518	0.88%	6.49%	1.65%	0.19%	5.72%	14.93%	84.71%	99.65%
Imperial	142,361	3.95%	72.22%	1.99%	0.08%	1.87%	80.12%	49.37%	129.50%
Inyo	17,945	0.16%	12.58%	0.91%	0.08%	10.04%	23.77%	80.06%	103.83%
Kern	661,645	6.02%	38.39%	3.37%	0.15%	1.51%	49.43%	61.60%	111.03%
Kings	129,461	8.30%	43.61%	3.07%	0.19%	1.68%	56.86%	53.68%	110.54%
Lake	58,309	2.11%	11.39%	0.83%	0.16%	3.04%	17.53%	86.25%	103.77%
Lassen	33,828	8.84%	13.84%	0.74%	0.43%	3.26%	27.11%	80.81%	107.92%
Los Angeles	9,519,338	9.78%	44.56%	11.95%	0.28%	0.81%	67.39%	48.71%	116.10%
Madera	123,109	4.12%	44.28%	1.27%	0.17%	2.61%	52.45%	62.23%	114.68%
Marin	247,289	2.89%	11.06%	4.53%	0.16%	0.43%	19.06%	84.03%	103.10%
Mariposa	17,130	0.67%	7.76%	0.71%	0.13%	3.51%	12.78%	88.93%	101.71%
Mendocino	86,265	0.62%	16.48%	1.20%	0.15%	4.76%	23.20%	80.76%	103.97%
Merced	210,554	3.83%	45.34%	6.80%	0.19%	1.19%	57.35%	56.21%	113.56%
Modoc	9,449	0.69%	11.51%	0.61%	0.07%	4.21%	17.10%	85.94%	103.04%
Mono	12,853	0.47%	17.69%	1.11%	0.09%	2.40%	21.77%	84.17%	105.94%

Counties	Total population	% Black	% Hispanic	% Asian	% Native Hawaiian & Other	% Native American	% minority	% White	% Total
Monterey	401,762	3.75%	46.79%	6.03%	0.45%	1.05%	58.06%	55.92%	113.98%
Napa	124,279	1.32%	23.67%	2.97%	0.23%	0.84%	29.04%	79.98%	109.02%
Nevada	92,033	0.28%	5.65%	0.78%	0.09%	0.88%	7.68%	93.39%	101.07%
Orange	2,846,289	1.67%	30.76%	13.59%	0.31%	0.70%	47.04%	64.81%	111.85%
Placer	248,399	0.82%	9.67%	2.95%	0.16%	0.89%	14.47%	88.59%	103.06%
Plumas	20,824	0.62%	5.65%	0.53%	0.10%	2.55%	9.45%	91.78%	101.23%
Riverside	1,545,387	6.24%	36.21%	3.69%	0.25%	1.18%	47.56%	65.58%	113.14%
Sacramento	1,223,499	9.96%	16.01%	11.03%	0.59%	1.09%	38.68%	64.02%	102.69%
San Benito	53,234	1.08%	47.93%	2.40%	0.19%	1.16%	52.75%	65.17%	117.92%
San Bernardino	1,709,434	9.09%	39.16%	4.69%	0.30%	1.17%	54.40%	58.91%	113.31%
San Diego	2,813,833	5.74%	26.69%	8.88%	0.48%	0.86%	42.65%	66.52%	109.17%
San Francisco	776,733	7.79%	14.10%	30.84%	0.49%	0.45%	53.67%	49.66%	103.33%
San Joaquin	563,598	6.69%	30.53%	11.41%	0.35%	1.13%	50.10%	58.13%	108.23%
San Luis Obispo	246,681	2.03%	16.29%	2.66%	0.12%	0.95%	22.05%	84.60%	106.65%
San Mateo	707,161	3.51%	21.88%	20.04%	1.33%	0.44%	47.20%	59.49%	106.69%
Santa Barbara	399,347	2.30%	34.22%	4.09%	0.18%	1.20%	41.99%	72.72%	114.71%
Santa Clara	1,682,585	2.80%	23.98%	25.56%	0.34%	0.67%	53.36%	53.83%	107.18%
Santa Cruz	255,602	0.97%	26.79%	3.44%	0.15%	0.96%	32.31%	75.09%	107.40%
Shasta	163,256	0.75%	5.51%	1.87%	0.11%	2.77%	11.01%	89.32%	100.34%
Sierra	3,555	0.20%	5.99%	0.17%	0.08%	1.88%	8.33%	94.18%	102.50%
Siskiyou	44,301	1.31%	7.57%	1.19%	0.13%	3.90%	14.09%	87.07%	101.16%
Solano	394,542	14.91%	17.64%	12.75%	0.78%	0.79%	46.87%	56.37%	103.23%
Sonoma	458,614	1.42%	17.34%	3.07%	0.20%	1.18%	23.21%	81.60%	104.81%
Stanislaus	446,997	2.58%	31.74%	4.22%	0.34%	1.27%	40.14%	69.33%	109.47%
Sutter	78,930	1.91%	22.21%	11.26%	0.20%	1.55%	37.13%	67.52%	104.65%
Tehama	56,039	0.57%	15.83%	0.79%	0.10%	2.10%	19.38%	84.79%	104.18%
Trinity	13,022	0.45%	3.97%	0.47%	0.12%	4.85%	9.84%	88.87%	98.72%
Tulare	368,021	1.59%	50.77%	3.27%	0.11%	1.56%	57.30%	58.08%	115.38%

Counties	Total population	% Black	% Hispanic	% Asian	% Native Hawaiian & Other	% Native American	% minority	% White	% Total
Tuolumne	54,501	2.10%	8.16%	0.72%	0.17%	1.82%	12.97%	89.45%	102.42%
Ventura	753,197	1.95%	33.42%	5.35%	0.22%	0.94%	41.88%	69.93%	111.81%
Yolo	168,660	2.03%	25.91%	9.85%	0.30%	1.16%	39.25%	67.67%	106.92%
Yuba	60,219	3.16%	17.35%	7.50%	0.20%	2.61%	30.83%	70.64%	101.46%

Source: (US Census Bureau, 2000).

APPENDIX B: Distributions of cancer cases and deaths in California

1. Distribution of cancer cases by anatomic site in California, 1988-2001**

Site	Chinese	Filipino	Japanese	Korean	Vietnamese	South Asian	Latino	non-Latino Black	non-Latino White
Male									
Melanoma of the skin	0.20%	0.3%	0.3%	0.2%	0.3%	0.7%	1.2%	0.2%	4.8%
Oral cavity and pharynx	5.6%	3.0%	1.6%	2.9%	5.4%	3.9%	2.5%	3.2%	3.3%
Lung and bronchus	16.50%	18.8%	12.7%	16.3%	19.2%	7.7%	10.3%	17.9%	15.9%
Colon and rectum	16.0%	11.9%	18.9%	13.9%	10.2%	10.1%	10.2%	10.1%	11.2%
Stomach	5.4%	2.6%	8.3%	17.1%	6.8%	2.5%	4.0%	2.8%	1.9%
Pancreas	2.6%	2.3%	3.2%	3.0%	2.6%	1.9%	2.3%	2.4%	2.2%
Prostate	19.4%	29.5%	27.6%	9.1%	10.8%	29.3%	26.8%	35.0%	29.3%
Urinary Bladder	2.6%	1.9%	3.0%	2.8%	1.8%	3.2%	2.4%	1.9%	4.4%
Non-Hodgkin Lymphoma	4.1%	5.0%	4.5%	3.4%	5.3%	7.0%	5.9%	3.3%	4.4%
Leukemia	2.8%	3.2%	2.3%	2.6%	3.6%	6.1%	4.6%	2.2%	2.9%
Total	75.2%	78.5%	82.4%	71.3%	66.0%	72.4%	70.2%	79.0%	80.3%
Female									
Melanoma of the skin	0.3%	0.2%	0.3%	0.5%	0.3%	0.5%	1.6%	0.2%	3.5%
Oral cavity and pharynx	3.0%	2.1%	1.4%	1.3%	2.6%	3.0%	1.2%	1.6%	1.8%
Breast	28.1%	36.2%	32.7%	21.2%	22.9%	35.5%	28.9%	30.7%	32.5%
Lung and bronchus	11.2%	7.3%	8.8%	8.1%	9.4%	4.0%	7.0%	13.4%	13.9%
Colon and rectum	14.8%	9.1%	16.8%	12.4%	9.8%	6.9%	8.6%	13.4%	11.4%
Stomach	4.3%	1.9%	6.0%	11.0%	5.0%	1.9%	2.8%	2.5%	1.1%
Pancreas	2.2%	2.1%	3.0%	3.2%	2.6%	1.5%	2.5%	3.5%	2.4%
Ovary	4.1%	4.0%	3.6%	3.4%	3.9%	5.8%	4.0%	2.8%	3.6%
Cervix Uteri	3.2%	4.6%	2.0%	7.3%	9.9%	4.1%	7.7%	3.5%	1.7%
Corpus Uteri	4.7%	6.1%	5.4%	2.8%	3.4%	5.7%	5.3%	4.3%	6.0%
Urinary Bladder	1.3%	0.5%	1.2%	0.9%	0.8%	0.6%	0.9%	1.3%	1.5%
Non-Hodgkin Lymphoma	3.4%	4.0%	3.7%	2.3%	4.1%	4.5%	4.1%	2.7%	3.5%
Leukemia	1.9%	2.4%	1.7%	2.3%	2.9%	3.5%	3.4%	2.2%	2.2%
Total	82.5%	80.5%	86.6%	76.7%	77.6%	77.5%	78.0%	82.1%	85.1%

2. Distribution of cancer deaths by anatomic site in California, 1988-2001**

Site	Chinese	Filipino	Japanese	Korean	Vietnamese	South Asian	Latino	non-Latino Black	non-Latino White
Male									
Melanoma of the skin	0.2%	0.2%	0.4%	0.2%	0.1%	0.6%	0.8%	0.1%	2.3%
Oral cavity and pharynx	4.6%	2.3%	1.2%	1.5%	3.9%	4.8%	1.8%	2.6%	2.0%
Lung and bronchus	27.4%	30.1%	23.8%	23.8%	27.5%	14.7%	20.7%	32.0%	20.6%
Colon and rectum	11.1%	10.5%	15.5%	8.5%	5.5%	7.5%	9.3%	9.4%	10.0%
Stomach	7.2%	3.6%	12.8%	18.6%	7.3%	4.0%	6.7%	4.2%	2.6%
Pancreas	4.9%	4.4%	6.9%	4.9%	4.6%	6.3%	5.5%	4.8%	4.9%
Prostate	4.5%	11.6%	8.1%	2.4%	2.4%	9.5%	10.3%	15.9%	12.2%
Urinary Bladder	1.5%	1.3%	1.9%	1.5%	1.4%	3.8%	1.7%	1.6%	3.2%
Non-Hodgkin Lymphoma	3.8%	5.3%	4.3%	2.2%	4.2%	5.1%	5.3%	2.4%	4.3%
Leukemia	3.6%	4.7%	3.5%	3.2%	4.4%	9.3%	6.0%	3.2%	4.3%
Total	68.8%	74.0%	78.4%	66.8%	61.3%	65.6%	68.1%	76.2%	66.4%
Female									
Melanoma of the skin	0.3%	0.3%	0.1%	0.2%	0.4%	0.4%	0.7%	0.2%	1.4%
Oral cavity and pharynx	2.3%	1.6%	0.9%	0.6%	1.8%	1.9%	0.8%	1.2%	1.3%
Breast	12.9%	20.4%	12.9%	8.8%	11.5%	23.8%	17.2%	18.8%	17.0%
Lung and bronchus	21.7%	15.5%	17.3%	14.8%	18.4%	7.7%	12.9%	21.3%	25.7%
Colon and rectum	12.4%	9.0%	14.4%	9.7%	8.1%	4.8%	8.5%	11.8%	10.4%
Stomach	6.3%	3.3%	9.9%	14.6%	8.1%	3.3%	5.2%	3.2%	1.8%
Pancreas	5.2%	5.3%	7.5%	7.4%	5.5%	3.6%	6.0%	6.5%	5.4%
Ovary	4.5%	5.6%	5.5%	4.0%	3.9%	8.4%	5.7%	3.7%	5.7%
Cervix Uteri	2.6%	3.9%	1.8%	3.9%	5.9%	2.7%	4.5%	2.8%	1.3%
Corpus Uteri	2.0%	2.6%	2.1%	1.5%	1.5%	3.1%	2.7%	3.0%	2.3%
Urinary Bladder	1.1%	0.7%	1.2%	0.7%	0.8%	0.2%	0.9%	1.4%	1.4%
Non-Hodgkin Lymphoma	3.5%	4.3%	3.8%	2.1%	3.6%	4.6%	4.4%	2.2%	4.0%
Leukemia	3.0%	4.3%	2.7%	3.4%	5.1%	5.9%	4.9%	2.8%	3.3%
Total	77.8%	76.8%	80.1%	71.7%	74.6%	70.4%	74.4%	78.9%	81.0%

**Sources:: (Cockburn M & Deapen D (eds), 2004)

APPENDIX C: County Sampling Information.

1. County Sampling Frame

Geographic strata	County (Counties)	Sample Size
1	Los Angeles	10,084
2	Alameda	3,989
3	San Diego	2,279
4	Orange	2,142
5	Santa Clara	1,296
6	San Bernardino	1,211
7	Riverside	1,160
8	Sacramento	1,039
9	Contra Costa	800
10	San Francisco	800
11	Fresno	600
12	San Mateo	600
13	Ventura	600
14	Butte	500
15	El Dorado	500
16	Imperial	500
17	Kern	500
18	Kings	500
19	Madera	500
20	Marin	500
21	Merced	500
22	Napa	500
23	Placer	500
24	San Joaquin	500
25	San Luis Obispo	500
26	Santa Barbara	500
27	Santa Cruz	500
28	Shasta	500
29	Solano	500
30	Sonoma	500
31	Stanislaus	500
32	Tulare	500
33	Yolo	500
34	Humboldt, Del Norte	500
35	Monterey, San Benito	500

Geographic strata	County (Counties)	Sample Size
36	Siskiyou, Trinity, Lassen, Modoc	400
37	Mendocino, Lake	400
38	Tehama, Colusa, Glenn	400
39	Sutter, Yuba	400
40	Nevada, Sierra, Plumas	400
41	Tuolumne, Mariposa, Calaveras, Mono, Amador, Alpine, Inyo	400

Source: (California Health Interview Survey, 2005a).

2. Population percentage for counties stratified for race/ethnicity-specific analyses.

% Latino	Counties in Latino Analyses	% API	Counties in API analyses	% AI/AN	Counties in AI/AN analyses	% African-American	Counties in African-American analyses	% White	Counties in White analyses
17.26%	1	20.86%	1	0.37%	1	14.62%	1	40.94%	1
6.13%	0	0.41%	0	15.56%	0	0.58%	0	71.77%	1
8.30%	1	1.01%	0	1.53%	0	3.84%	0	82.39%	1
9.50%	1	3.42%	1	1.62%	1	1.33%	1	80.01%	1
6.02%	1	0.88%	0	1.50%	0	0.74%	0	87.45%	1
43.65%	1	1.53%	0	1.68%	1	0.47%	0	47.96%	1
15.99%	1	11.15%	1	0.38%	1	9.15%	1	57.90%	1
13.29%	1	2.32%	0	5.79%	1	4.24%	0	70.14%	1
8.49%	1	2.19%	1	0.81%	1	0.48%	1	84.92%	1
41.58%	1	7.97%	1	0.78%	1	5.04%	1	39.72%	1
27.93%	1	3.35%	1	1.66%	1	0.44%	0	62.56%	1
5.76%	1	1.77%	1	5.31%	1	0.82%	1	81.59%	1
69.47%	1	1.77%	1	1.22%	1	3.62%	1	20.21%	1
10.89%	1	0.96%	1	9.35%	1	0.11%	0	74.41%	1
36.34%	1	3.31%	1	0.89%	1	5.72%	1	49.45%	1
41.26%	1	3.15%	1	1.01%	1	8.05%	1	41.57%	1
10.48%	1	0.94%	1	2.42%	1	2.07%	1	80.49%	1
13.14%	1	1.12%	1	2.83%	1	8.80%	0	70.63%	1
41.97%	1	12.06%	1	0.27%	1	9.47%	1	31.09%	1
41.37%	1	1.33%	1	1.38%	1	3.83%	1	46.62%	1
10.01%	1	4.61%	1	0.25%	1	2.81%	1	78.55%	1
7.08%	1	0.80%	1	3.09%	1	0.65%	0	84.87%	1
15.24%	1	1.29%	1	3.99%	1	0.55%	0	74.86%	1
42.57%	1	6.80%	1	0.53%	1	3.61%	1	40.65%	1
10.93%	1	0.69%	0	3.60%	0	0.62%	0	81.10%	1
16.92%	1	1.17%	0	2.08%	0	0.41%	1	76.53%	1
44.28%	1	6.16%	1	0.44%	0	3.51%	1	40.33%	1
22.09%	1	3.13%	1	0.52%	1	1.23%	1	69.14%	1

% Latino	Counties in Latino Analyses	% API	Counties in API analyses	% AI/AN	Counties in AI/AN analyses	% African-American	Counties in African-American analyses	% White	Counties in White analyses
5.06%	1	0.84%	1	0.72%	1	0.25%	1	90.29%	1
28.90%	1	13.77%	1	0.30%	1	1.50%	1	51.26%	1
8.77%	1	3.01%	1	0.68%	1	0.76%	1	83.43%	1
5.16%	0	0.61%	0	2.13%	1	0.62%	1	88.71%	1
34.01%	1	3.78%	1	0.66%	1	5.98%	1	51.04%	1
14.35%	1	11.39%	1	0.74%	1	9.65%	1	57.76%	1
44.96%	1	2.33%	0	0.52%	1	0.89%	1	46.05%	1
36.60%	1	4.83%	1	0.57%	1	8.79%	1	44.00%	1
24.88%	1	9.15%	1	0.54%	1	5.49%	1	55.04%	1
12.80%	1	31.13%	1	0.26%	1	7.57%	1	43.63%	1
28.01%	1	11.31%	1	0.63%	1	6.41%	1	47.37%	1
15.08%	1	2.66%	1	0.60%	1	1.92%	1	76.15%	1
20.13%	1	21.13%	1	0.22%	1	3.36%	1	49.83%	1
31.96%	1	4.08%	1	0.53%	1	2.10%	1	56.86%	1
22.27%	1	25.66%	1	0.31%	1	2.64%	1	44.23%	1
25.04%	1	3.43%	1	0.46%	1	0.85%	1	65.52%	1
4.83%	1	1.94%	1	2.47%	1	0.72%	1	86.43%	1
5.23%	0	0.23%	0	1.58%	0	0.17%	0	90.30%	1
6.77%	1	1.29%	1	3.62%	1	1.26%	1	83.32%	1
15.72%	1	13.25%	1	0.56%	1	14.60%	1	49.24%	1
15.93%	1	3.19%	1	0.76%	1	1.33%	1	74.50%	1
29.53%	1	4.38%	1	0.78%	1	2.38%	1	57.27%	1
20.66%	1	11.29%	1	1.19%	1	1.80%	1	60.22%	1
14.81%	1	0.84%	1	1.80%	1	0.50%	1	78.47%	1
3.52%	0	0.56%	1	4.48%	1	0.41%	0	86.55%	1
48.06%	1	3.18%	1	0.82%	1	1.39%	1	41.82%	1
7.47%	1	0.84%	0	1.59%	1	2.08%	0	85.09%	1
31.54%	1	5.42%	1	0.42%	1	1.79%	1	56.75%	1
23.94%	1	9.98%	1	0.69%	1	1.86%	1	58.07%	1
15.81%	1	7.60%	1	2.17%	1	2.98%	1	65.30%	1

APPENDIX D: Final Study Variables

1. 2003 California Health Interview Survey (California Health Interview Survey, 2005e; California Health Interview Survey, 2002-2004)

Final Study Variables (name)	Response options	CHIS Variable	CHIS Questionnaire	CHIS Data Dictionary Label
Primary Cancer Prevention (PRI_PREV)	1.00-3.00 (1=lowest risk profile; 3=highest)			
Secondary Cancer Prevention (SX_PREV)	1.00-3.00 (1=lowest risk profile; 3=highest)			
Cigarette Smoking (SMK_3)	1=never smoked 100 or more cigs in lifetime; 2=100 or more cigs in lifetime and not current smoker; 3=100 or more cigs in lifetime and current smoker	SMOKING	[AE15 Altogether, have you smoked at least 100 or more cigarettes in your entire lifetime?] [AE15A Do you now smoke cigarettes every day, some days, or not at all?] [AD32 On the average, how many cigarettes do you now smoke a day?] [AE16 In the past 30 days, when you smoked, how many cigarettes did you smoke per day (on the days you smoked)?]	CURRENT SMOKING HABITS
Physical Inactivity (WLK_3)	0=unable to walk; 1=walked at least 10min for transportation AND fun/ exercise; 2= walked for fun OR	ad37; ad40	[AD37 During the past 7 days, did you walk to get some place that took you at least 10 minutes?] [AD40 Sometimes you may walk for fun, relaxation, exercise, or to walk the dog. During the past 7 days, did you walk for at least 10 minutes for any of these	

	exercise; 3=did not walk for either		reasons? {Please do not include walking for transportation.}]	
Obesity (BMI_3)	1=underweight/normal; 2=overweigh; 3=obese	RBMI	[AE17 How tall are you without shoes?] [AE18 {When not pregnant, how/How} much do you weigh without shoes?]	BMI DESCRIPTIVE
Alcohol Consumption (ALC_3)	1=no drinks in past 30 days; 2=1-2 drinks/day; 3=3-20 drinks/day	ae11; ae13	[AE11 During the past 30 days, have you had at least one drink of any alcoholic beverage such as beer, wine, wine coolers, or liquor?] [AE13 On the days when you drank, about how many drinks did you drink on the average? **[IF NEEDED, SAY: A drink is 1 can or bottle of beer, 1 glass of wine, 1 can or bottle of wine cooler, 1 cocktail, or 1 shot of liquor.]**]	HAD AT LEAST ONE ALCOHOLIC DRINK IN PAST 30 DAYS; # OF ALCOHOLIC DRINKS PER DAY
Breast Ca Screening (MAM_SX40)	1=screened within past 2 years; 2=screened over 2 years ago; 3=never screened	MAM_SCRN	[AD14 Have you ever had a mammogram? **[IF NEEDED, SAY: "A mammogram is an x-ray taken of each breast separately by a machine that flattens or squeezes each breast."]**] [AD17 How long ago did you have your most recent mammogram?]	HAD MAMMOGRAM IN PAST 2 YRS
Cervical Ca Screening (PAP_SX18)	1=screened within past 3 years; 2=screened over 3 years ago; 3=never screened	PAP_SCRN	[AD4 Have you ever had a Pap smear? **[IF NEEDED, SAY: "A pap smear is a routine cancer test in which the doctor takes a cell sample from the cervix with a small stick or brush and sends it to the lab. This is not a test for sexually transmitted diseases."]**] [AD6 How long ago did you have your most recent Pap smear test?]	HAD PAP SCREEN PAST 3 YRS

CRC Screening (CRC_SX50)	1=screened within past 5 years; 2=screened over 5 years ago; 3=never screened	CRC_SCRN	[AF14 Have you ever had a Sigmoidoscopy, Colonoscopy, or a Proctoscopy? These are exams in which a health care professional inserts a tube into the rectum to look for signs of cancer or other problems. **[IF NEEDED, SAY: "For a Sigmoidoscopy a flexible tube is inserted into the rectum to look for problems. A Colonoscopy is similar, but uses a longer tube, and you are usually given medication through a needle in your arm to make you sleepy and told to have someone else drive you home. A Proctoscopy is an older exam that uses a rigid tube."]**] [AF16 How long ago did you have your most recent exam?]	COLONOSCOPY/SIG/FOB T IN PAST 5 YRS
Prostate Ca Screening (PSA_SX50)	1=screened within past year; 2=screened over 1 year ago; 3=never screened	PSA_SCRN	[AF30 A PSA test is a blood test to detect prostate cancer. Have you ever heard of a PSA test? **[IF NEEDED, SAY: "A PSA test is a prostate-specific antigen test."]**] [AF31 Have you ever had a PSA test?] [AF33 When did you have your most recent PSA test?]	HAD PROSTATE SCREENING PAST YEAR
Perceived Racism, Global (G_RACISM)	1=never; 2=rarely; 3=sometimes/ often/all the time	AG4	[AG4 Thinking about your race or ethnicity, how often have you felt treated badly or unfairly because of your race or ethnicity? Would you say …]	FREQUENCY OF BEING TREATED BADLY BECAUSE OF RACE OR ETHNICITY
Perceived Racism, Health Care (H_RACISM)	1=no; 2=yes	AJ17	[AJ17 Was there ever a time when you would have gotten better medical care if you had belonged to a different race or ethnic group?]	WOULD HAVE GOTTEN BETTER MEDICAL CARE IF DIFFERENT RACE/ETHNIC

Perceived Racism Index (PRACISM, PRI_4)	1=no exposure; 2=racism in general; 3=racism in health care; 4=racism in both contexts			
Education (EDU_5)	1=Grade 1-11; 2=HS; 3=Some college/ Vocational/AA/AS degree; 4=BA/BS degree; 5=graduate school+	AHEDUC	[AH47 What is the highest grade of education you have completed and received credit for?]	EDUCATIONAL ATTAINMENT
Employment (EMP_3)	1=employed full-time or part-time; 2=employed but not at work; 3=unemployed	EMP	[AK1 Which of the following were you doing last week?]	EMPLOYMENT STATUS
(Household) Poverty level (POVLL_5)	1=0-99% FPL; 2=100-199% FPL; 3=200-299% FPL; 4=300-399% FPL; 5=400% and above 1=0-100% FPL; 2=101-200% FPL; 3=201-300% FPL; 4=301% FPL and above 0%-116.28%	POVLL; POVLL2	[AK18A I need to ask just one last, very specific question about income. Was your total annual household income before taxes less than or more than ${POVRT100}?] [AK18B {I need to ask just one last, very specific question about income.} Was your total annual household income before taxes less than or more than ${POVRT200}?] ${POVRT130}? ${POVRT300}?	POVERTY LEVEL (categorical); POVERTY LEVEL AS TIMES OF 100% FPL
(Wealth) Home ownership	1=own; 2=rent; 3=other arrangement	AK25	[AK25 Do you own or rent your home?]	OWN OR RENT HOME

Insurance Status, Current	1=covered; 2=not covered	INS	[AI1 Medicare is a health insurance program for people 65 years and older or persons with certain disabilities. At this time, are you covered by Medicare? **[NOTE: Include Medicare managed care plans as well as the original Medicare plan.]**]	CURRENTLY INSURED
Insurance Status, past 12 months	1=currently uninsured; 2=uninsured any time in past 12 months; 3=insured all the time in past 12 months	INSANY		ANY INS IN LAST 12 MOS
Primary Care Resources—Usual source of care	1=Yes; 2=No	USUAL	[AH1 Is there a place that you USUALLY go to when you are sick or need advice about your health? **[NOTE: CIRCLE "3" OR "4" ONLY IF VOLUNTEERED. DO NOT PROBE.]**]	HAVE USUAL PLACE TO GO TO WHEN SICK OR NEEDING HEALTH ADVICE
Utilization	1=1 or more visits within past 12 months; 2=0 visits	DOCT_YR	[AH5 During the past 12 months, how many times have you seen a medical doctor?]	ADULT VISITED DOCTOR DURING PAST 12 MOS
Physician Relationship (PHYS_SAT)	1=a problem; 2=not a problem; 3=didn't need to get a doctor/ nurse	AJ12	[AJ12 A personal doctor or nurse is the health provider who knows you best. This can be a general doctor, a specialist, a nurse practitioner, or a physician assistant. In the last 12 months, how much of a problem, if any, was it to get a personal doctor or nurse you are happy with? Was it…]	PROBLEM FINDING PERSONAL DOCTOR/NURSE HAPPY W/ IN PAST 12 MOS
Problem accessing care (DELAY)	1=a problem; 2=not a problem; 3=didn't need test/treatment	AJ14	[AJ14 In the last 12 months, how much of a problem, if any, was it to get the care, tests or treatment you or a doctor believed necessary? Was it…]	DEGREE OF PROBLEM TO GET NECESSARY HEALTH CARE IN PAST 12 MOS

Health Care Satisfaction	0=refused/don't know; 1=no health care in last 12 months; 2=<5; 3=5-7; 4=8-10	AJ16	Using any number from 0 to 10 where 0 is the worst health care possible and 10 is the best health care possible, what number would you use to rate all your health care in the last 12 months? **[AJ16]** _____ RESPONDENT'S NUMBER FROM 0 (WORST) TO 10 (BEST)	
Social Support/ Resources: Religious Participation	1=Yes; 2=No	AE49	[AE49 During the past 7 days, did you go to church, temple, or another place of worship for services or other activities?]	WENT TO PLACE OF WORSHIP IN PAST 7 DAYS
Social Support/ Resources: Average Social Resources (SOC_RES)	1 to 5 (1=none of the time, 5=all of the time)	AE43-AE46	How often is someone available… To help with daily chores if you are sick? Would you say… To get together with for relaxation? To understand you problems? To love you and make you feel wanted?	AVAILABILITY OF SOMEONE TO HELP WITH DAILY CHORES WHEN SICK; AVAILABILITY OF SOMEONE TO GET TOGETHER WITH FOR RELAXATION; AVAILABILITY OF SOMEONE TO UNDERSTAND YOUR PROBLEMS; AVAILABILITY OF SOMEONE TO LOVE YOU AND MAKE YOU FEEL WANTED;
Social Support/ Resources: Marital Status	1=married; 2=other/widowed/separated/ divorced/living with partner; 3=never married	MARIT	[AH43 Are you now married, living with a partner in a marriage-like relationship, widowed, divorced, separated, or never married?]	MARITAL STATUS

Coping Mechanisms: Binge Drinking	1=yes; 2=no	BINGE	[AE14 Considering all types of alcoholic beverages, during the past 30 days about how many times did you have 5 or more drinks on an occasion?]	BINGE DRINKING AMONG ADULTS PAST MONTH;
Coping Mechanisms : Heavy Cigarette Smoking (NUMCIG20)	1=none; 2=<20; 3=20+	NUMCIG		# OF CIGARETTES PER DAY;
Other Stressors/ Competing Priorities: Food Security (FSLEVCB2)	1=food secure or >200% of FPL; 2=food insecure	FSLEVCB	[AM3 Please tell me yes or no. In the last 12 months, since {DATE 12 MONTHS AGO}, did you or other adults in your household ever cut the size of your meals or skip meals because there wasn't enough money for food?]	FOOD SECURITY STATUS (2 LVLS);
Other Stressors/ Competing Priorities: Cockroaches in home	1=yes; 2=no	AB50	[AB50 In the past 12 months, have you seen cockroaches inside your home? **[IF R ASKS WHY WE ARE ASKING THIS QUESTION, SAY: "Cockroaches can cause allergic reactions and asthma symptoms in some people."]**]	SEEN COCKROACHES INSIDE HOME IN PAST 12 MOS
Other Stressors/ Competing Priorities: Home broken into	1=yes; 2=no	AM16	[AM16 While you have lived in your neighborhood, has your home ever been broken into?]	HOME EVER BROKEN INTO IN CURRENT NEIGHBORHOOD;
Immigration Status	1=US Born Citizen; 2=Naturalized Citizen; 3=Resident w/green card; 4=resident without green card	CITIZEN1	[AH39 The next questions are about citizenship and immigration. Your answers are confidential and will not be reported to the INS. Are you a citizen of the United States?] [AH40 Are you a permanent resident with a green card?]	CITIZENSHIP AND IMMIGRATION STATUS (4 LVLS)

Acculturation, Language at home (LANGH_3)	1=English only, 2=English and other language(s), 3=other language(s) only	LANGHOME	[AH36 What languages do you speak at home? **[CODE ALL THAT APPLY.]** **[PROBE: "Any others?"]**]	LANGUAGE SPOKEN AT HOME
Acculturation, length of residency (YRSUSALL)	1= <=1yr; 2=2-4; 3=5-9; 4=10-14; 5=15+	YRUS	[AH41 About how many years have you lived in the United States? **[FOR LESS THAN A YEAR, ENTER 1 YEAR]**]	YEARS LIVED IN THE US
Park (PARKSAFE)	0=no park near by; 1=safe during day and night; 2=safe during day or night, 3=unsafe during day and night	AM25; am26	[AM25 The park or playground closest to where I live is safe during the day. **[IF NEEDED, SAY: "Do you strongly agree, agree, disagree or strongly disagree?"]** **[NOTE: DO NOT PROBE A DON'T KNOW RESPONSE]**] [AM26 The park or playground closest to where I live is safe at night.]	CLOSEST PARK OR PLAYGROUND SAFE DURING THE DAY; CLOSEST PARK OR PLAYGROUND SAFE AT NIGHT
Neighborhood Watch	1=yes; 2=no	AM17	Does your neighborhood have a crime prevention program or neighborhood watch?	NEIGHBORHOOD HAS CRIME PREVENTION PROGRAM/NEIGHBORHOOD WATCH
Social Cohesion (SOC_COH)	1 to 4 (4=strongly agree, 1=strongly disagree)	AM19-AM24 (Positive)	Tell me if you strongly agree, agree, disagree, or strongly disagree with the following statements: People in my neighborhood are willing to help each other. People in this neighborhood can be trusted. Most people in this neighborhood know each other. **[IF NEEDED, SAY: "Do you strongly agree, agree, disagree or strongly disagree?"]** **[NOTE: DO NOT PROBE A DON'T KNOW RESPONSE]**	PEOPLE IN NEIGHBORHOOD WILLING TO HELP EACH OTHER; PEOPLE IN NEIGHBORHOOD CAN BE TRUSTED; PEOPLE IN NEIGHBORHOOD KNOW EACH OTHER;
	1 to 4 (1=strongly agree, 4=strongly	AM19-AM24 (Negative)	Tell me if you strongly agree, agree, disagree, or strongly disagree with the following statements:	PEOPLE IN NEIGHBORHOOD DO

	disagree)		People in this neighborhood generally do not get along with each other. People in this neighborhood do not share the same values. Many people in this neighborhood are afraid to go out at night.	NOT GET ALONG WITH EACH OTHER; PEOPLE IN NEIGHBORHOOD DO NOT SHARE VALUES; PEOPLE IN NEIGHBORHOOD ARE AFRAID TO GO OUT AT NIGHT;
Age (AGE_5, AGE_3)	18 to 102 AGE_5 (1=18-22; 2=23-39; 3=40-49; 4=50-64; 5=65+) AGE_3 (1=18-39, 2=40-49, 3=50-102)	SRAGE	[AI3 What is your age, please?]	AGE
Gender	1=male; 2=female	SRSEX	[AA3 Are you male or female?]	Gender
Race/Ethnicity (ETHRACE)	1=Latino, 2=NH API, 3=NH AIAN, 4=NH BLACK, 5=NH WHITE	RACEDOF; RACECEN	[AA4 Are you Latino or Hispanic?] [AA5 And what is your Latino or Hispanic ancestry or origin? Such as Mexican, Salvadoran, Cuban, Honduran -- and if you have more than one, tell me all of them.] [AA5A {You said you are Latino or Hispanic. Also} please tell me which one or more of the following you would use to describe yourself. Would you describe yourself as Native Hawaiian, Other Pacific Islander, American Indian, Alaska Native, Asian, Black, African American, or White?] [AA5E You said Asian, and what specific ethnic group are you, such as Chinese, Filipino, Vietnamese? If you are more than one, tell me all of them.] [AA5E1 You said you are Pacific Islander. What	RACE-DEPARTMENT OF FINANCE DEFINITION; RACE-CENSUS 2000 DEFINITION

			specific ethnic group are you, such as Samoan, Tongan, or Guamanian? If you are more than one, tell me all of them.] [AA5F You said that you are: [INSERT MULTIPLE RESPONSES FROM AA5, AA5A, AA5E AND AA5E1]. Of these, which do you most identify with?]	
Latino Subgroups	1=Mexican; 2=Salvadoran; 3=Guatemalan; 4=Central American; 5=Puerto Rican; 6=Latino European; 7=South American; 8=Other Latino, 9=2+ Latino Types	Latin9tp		LATIN/HISPANIC SUBTYPES (9 LVLS)
Asian Subgroups	1=Chinese; 2=Japanese; 3=Korean; 4=Filipino; 5=South Asian; 6=Vietnamese; 7=Southeast Asian; 8=Cambodian/Other Asian; 9=2+ Asian Types	Asian9		ASIAN SUBTYPES (9 TYPES) (PUF RECODE)
Rural/Urban	1=Urban 2=Rural	ur_rhp		RURAL AND URBAN – RHP
Health Status	1=Excellent; 2=Very Good; 3=Good; 4=Fair; 5=Poor	AB1	[AB1 Would you say that in general your health is excellent, very good, good, fair or poor?]	GENERAL HEALTH CONDITION

Quality of Life: Unhealthy days for physical health and mental health	0 to 30	HRQOL ae31, ae32	[AE31 Now, I am going to ask about your health over the past 30 days. Thinking about your physical health, which includes physical illness and injury, for how many days during the past 30 days was your physical health not good? **[IF NEEDED, SAY: "On how many days was your physical health not good?"]**] [AE32 Now thinking about your mental health, which includes stress, depression, and problems with emotions, for how many days during the past 30 days was your mental health not good? **[IF NEEDED, SAY: "Mental health includes stress, feeling sad or not feeling like yourself. On how many days was your mental health not good?]**]	UNHEALTHY DAYS; # OF DAYS PHYSICAL HEALTH NOT GOOD IN PAST 30 DAYS; # OF DAYS MENTAL HEALTH NOT GOOD IN PAST 30 DAYS
Excluded Respondent (Exclude1, Exclude2)				
Previous Cancer Diagnosis	1=yes; 2=no	AF1	Has a doctor ever told you that you had a cancer of any kind?	DOCTOR EVER TOLD HAVE CANCER
Pregnancy	1=Yes; 2=No	AD13	To your knowledge, are you now pregnant?	CURRENTLY PREGNANT
Proxy Interview	1=yes; 2=no	Proxy		A PROXY INTERVIEW
Race/Ethnicity (ETHRACE)	6=some other race; 7=2+ races	RACEDOF; RACECEN	[AA4 Are you Latino or Hispanic?] [AA5 And what is your Latino or Hispanic ancestry or origin? Such as Mexican, Salvadoran, Cuban, Honduran -- and if you have more than one, tell me all of them.] [AA5A {You said you are Latino or Hispanic. Also} please tell me which one or more of the following you would use	RACE-DEPARTMENT OF FINANCE DEFINITION; RACE-CENSUS 2000 DEFINITION

			to describe yourself. Would you describe yourself as Native Hawaiian, Other Pacific Islander, American Indian, Alaska Native, Asian, Black, African American, or White?] [AA5E You said Asian, and what specific ethnic group are you, such as Chinese, Filipino, Vietnamese? If you are more than one, tell me all of them.] [AA5E1 You said you are Pacific Islander. What specific ethnic group are you, such as Samoan, Tongan, or Guamanian? If you are more than one, tell me all of them.] [AA5F You said that you are: [INSERT MULTIPLE RESPONSES FROM AA5, AA5A, AA5E AND AA5E1]. Of these, which do you most identify with?]	

2. Area Level Variables

Final Study Variables (name)	Response options	Original/ Derivation	Variable Source
County Level Variables			
Dissimilarity Index: Black	1= low segregation (≤ 0.30) 2= moderate segregation (0.31-0.59) 3= high segregation (≥ 0.60)		(Census Summary File 1A)
Dissimilarity Index: Latinos	1= low segregation (≤ 0.30) 2= moderate segregation (0.31-0.59) 3= high segregation (≥ 0.60)		(Census Summary File 1A)
Dissimilarity Index: API	1= low segregation (≤ 0.30) 2= moderate segregation (0.31-0.59) *3= high segregation (≥ 0.60)*		(Census Summary File 1A)
Dissimilarity Index: AIAN	1= low segregation (≤ 0.30) 2= moderate segregation (0.31-0.59) 3= high segregation (≥ 0.60)		(Census Summary File 1A)
Dissimilarity Index: White	1= low segregation (≤ 0.30) 2= moderate segregation (0.31-0.59) *3= high segregation (≥ 0.60)*		(Census Summary File 1A)
Interaction Index: Black	1= low segregation (≥ 0.70) 2= moderate segregation (0.41-0.69) 3= high segregation (≤ 0.40)		(Census Summary File 1A)
Interaction Index: Latinos	1= low segregation (≥ 0.70) 2= moderate segregation (0.41-0.69) 3= high segregation (≤ 0.40)		(Census Summary File 1A)
Interaction Index: API	1= low segregation (≥ 0.70) 2= moderate segregation (0.41-0.69) *3= high segregation (≤ 0.40)*		(Census Summary File 1A)
Interaction Index: AIAN	1= low segregation (≥ 0.70) 2= moderate segregation (0.41-0.69) 3= high segregation (≤ 0.40)		(Census Summary File 1A)
Interaction Index: White	*1= low segregation (≥ 0.70)* 2= moderate segregation (0.41-0.69) 3= high segregation (≤ 0.40)		(Census Summary File 1A)

Hypersegregation: Black	0= no 1= yes	Dissimilarity Index =3 and Exposure Index =3	(Census Summary File 1A)
Hypersegregation: Latinos	0= no 1= yes	Dissimilarity Index =3 and Exposure Index =3	(Census Summary File 1A)
Hypersegregation: API	*0=no*		(Census Summary File 1A)
Hypersegregation: AIAN	*0=no*		(Census Summary File 1A)
Hypersegregation: White	*0=no*		(Census Summary File 1A)
Rural/Urban Continuum	*Metro counties* 1=counties in metro areas of 1 million population or more; 2= counties in metro areas of 250,000 to 1 million population; 3=counties in metro areas of fewer than 250,000 population; *Non-metro counties* 4=urban population of 20,000 or more adjacent to a metro area; 5=urban population of 20,000 or more, not adjacent to a metro area; 6=urban population of 2,500 to 19,999, adjacent to a metro area; 7=urban population of 2,500 to 19,999, not adjacent to a metro area; 8=completely rural or less than 2,500 urban population, adjacent to a metro area; 9=completely rural or less than 2,500 urban population, not adjacent to a metro area		USDA, Economic Research Service
Health Professions Shortage Area for Primary Medical Care (HPSA_PC)	0=none of the county is facing a shortage; 1=whole county is facing a shortage; 2=1 or more parts of the county is facing a shortage		Area Resource File
Proportion at or below 100% of Federal Poverty Line	0=low 1=moderate 2=high	Set of variables of those at various levels of the FPL,<50-200%	GeoLytics (US Census 2000 Long Form)

Sources: (U.S. Census Bureau, 2005; Area Resource File (ARF), 2001; Census CD 2000 Long Form, 2002; United States Department of Agriculture, 2006)

APPENDIX E: Individual-level Main Effects Models for each Perceived Racism Exposure.

1. Primary Risk Profile.

	Perceived Racism in General		Perceived Racism in Health Care	
Variables	**Coefficients**	**p-values**	**Coefficients**	**p-values**
R-squared	0.159		0.159	
Intercept	1.72	0.000	1.72	0.000
Perceived Racism in General		(<0.001)		
Never	0.00	.		
Rarely	0.01	0.336		
Sometimes/Often/All the time	0.03	0.000		
Perceived Racism in Health Care				(0.004)
No			0.00	.
Yes			0.04	0.004
Demographics				
Race/Ethnicity		(<0.001)		(<0.001)
Latino	-0.01	0.171	-0.01	0.286
API	-0.09	0.000	-0.09	0.000
AIAN	0.04	0.193	0.04	0.145
African-American	0.00	0.740	0.01	0.212
White	0.00	.	0.00	.
Age (years)		(<0.001)		(<0.001)
18-22	-0.18	0.000	-0.18	0.000
23-39	-0.02	0.008	-0.02	0.007
40-49	0.00	.	0.00	.
50-64	0.02	0.007	0.02	0.008
65-102	-0.04	0.000	-0.04	0.000
Gender		(<0.001)		(<0.001)
Male	0.00	.	0.00	.
Female	-0.19	0.000	-0.19	0.000
Socioeconomic characteristics				
Poverty Level (% FPL)		(0.012)		(0.008)
0-99	-0.04	0.001	-0.04	0.000
100-199	0.00	0.698	0.00	0.662
200-299	0.00	.	0.00	.
300%-399	-0.01	0.286	-0.01	0.269
≥ 400	-0.02	0.060	-0.02	0.055
Employment Status		(<0.001)		(<0.001)
Employed	0.00	.	0.00	.
Employed/not working	-0.03	0.005	-0.03	0.005
Unemployed	-0.05	0.000	-0.05	0.000
Education		(<0.001)		(<0.001)
< High School	0.20	0.000	0.20	0.000
High School Diploma or GED	0.16	0.000	0.16	0.000

Some college	0.16	0.000	0.16	0.000
BA/BS	0.05	0.000	0.05	0.000
Graduate School	0.00	.	0.00	.
Psychosocial Factors				
Marital Status		(<0.001)		(<0.001)
Married	0.00	.	0.00	.
	0.05	0.000	0.05	0.000
Never Married	0.00	0.654	0.00	0.614
Religious Participation		(<0.001)		(<0.001)
Yes	0.00	.	0.00	.
No	0.09	0.000	0.09	0.000
Average Social Resources		(<0.001)		(<0.001)
	0.01	0.001	0.01	0.001
Neighborhood Resources				
Neighborhood Watch		(<0.001)		(<0.001)
Yes	0.00	.	0.00	.
No	0.02	0.000	0.02	0.000
Positive Social Cohesion				
Immigration and Acculturation				
Citizenship and Immigration Status		(<0.001)		(<0.001)
US-born citizen	0.00	.	0.00	.
Naturalized Citizen	-0.06	0.000	-0.06	0.000
Non-citizen with Green Card	-0.04	0.012	-0.04	0.008
Non-citizen without Green Card	-0.05	0.009	-0.06	0.005
Years in the US		(<0.001)		(<0.001)
≤ 1	-0.16	0.000	-0.16	0.000
2-4	-0.09	0.000	-0.09	0.000
5-9	-0.06	0.007	-0.06	0.005
10-14	-0.06	0.000	-0.06	0.000
≥ 15	0.00	.	0.00	.
Language at home		(0.001)		(<0.001)
English only	0.00	.	0.00	.
English + other language(s)	-0.01	0.533	0.00	0.634
Other language(s) only	-0.05	0.001	-0.05	0.001

2. Secondary Risk Profile.

	Perceived Racism in General		Perceived Racism in Health care	
Variables	**Coefficients**	**p-values**	**Coefficients**	**p-values**
R-squared	0.320		0.319	
Intercept	1.85	0.000	1.84	0.000
Perceived Racism in General		(0.007)		
Never	0.00	.		
Rarely	-0.01	0.293		
Sometimes/Often/All the time	-0.05	0.002		
Perceived Racism in Health Care				(0.180)
No			0.00	.
Yes			-0.02	0.180
Demographics				
Race/Ethnicity		(<0.001)		(<0.001)
Latino	-0.02	0.350	-0.02	0.181
API	0.20	0.000	0.19	0.000
AIAN	0.01	0.917	0.00	0.945
African-American	-0.03	0.120	-0.05	0.008
White	0.00	.	0.00	.
Age (years)		(<0.001)		(<0.001)
18-22	0.01	0.682	0.01	0.677
23-39	-0.44	0.000	-0.44	0.000
40-49	-0.19	0.000	-0.20	0.000
50-64	0.00	.	0.00	.
65-102	-0.12	0.000	-0.11	0.000
Gender		(<0.001)		(<0.001)
Male	0.00	.	0.00	.
Female	-0.51	0.000	-0.51	0.000
Socioeconomic characteristics				
Poverty Level (% FPL)		(<0.001)		(<0.001)
0-99	-0.03	0.262	-0.03	0.289
100-199	-0.02	0.263	-0.02	0.277
200-299	0.00	.	0.00	.
300%-399	-0.09	0.000	-0.09	0.000
≥ 400	-0.11	0.000	-0.11	0.000
Employment Status				
Employed				
Employed/not working				
Unemployed				
Education		(<0.001)		(<0.001)
< High School	0.11	0.000	0.11	0.000
High School Diploma or GED	0.11	0.000	0.11	0.000
Some college	0.08	0.000	0.08	0.000
BA/BS	0.06	0.001	0.06	0.001
Graduate School	0.00	.	0.00	.

Health Care Access				
Insurance Status		(0.009)		(0.009)
Yes	0.00	.	0.00	.
No	0.06	0.009	0.06	0.009
Usual Source of Care		(<0.001)		(<0.001)
Yes	0.00	.	0.00	.
No	0.12	0.000	0.12	0.000
Doctor Visit within past year		(<0.001)		(<0.001)
Yes	0.00	.	0.00	.
No	0.30	0.000	0.31	0.000
Health Care Rating		(<0.001)		(<0.001)
Missing response	0.32	0.000	0.32	0.000
No health care	0.05	0.275	0.05	0.285
<5	0.07	0.017	0.07	0.023
5-7	0.03	0.002	0.03	0.003
8-10	0.00	.	0.00	.
Psychosocial Factors				
Marital Status		(<0.001)		(<0.001)
Married	0.00	.	0.00	.
	0.07	0.000	0.07	0.000
Never Married	0.25	0.000	0.25	0.000
Heavy Cigarette Smoking		(<0.001)		(<0.001)
None	0.00	.	0.00	.
< 20	0.02	0.156	0.02	0.165
≥ 20	0.11	0.000	0.11	0.000
Immigration and Acculturation				
Citizenship and Immigration Status		(0.050)		(0.042)
US-born citizen	0.00	.	0.00	.
Naturalized Citizen	0.00	0.943	0.00	0.956
Non-citizen with Green Card	0.03	0.197	0.04	0.177
Non-citizen without Green Card	-0.06	0.165	-0.06	0.172
Years in the US		(0.010)		(0.008)
≤ 1	0.30	0.008	0.31	0.007
2-4	0.14	0.006	0.14	0.005
5-9	0.09	0.023	0.10	0.019
10-14	0.03	0.303	0.03	0.292
≥ 15	0.00	.	0.00	.
Language at home		(<0.001)		(<0.001)
English only	0.00	.	0.00	.
English + other language(s)	0.07	0.000	0.07	0.000
Other language(s) only	0.06	0.039	0.06	0.039

APPENDIX F: Individual-level Main Effects Models for Both Perceived Racism Exposures Stratified by Race/Ethnicity.

1. Primary Risk Profile.

	BOTH		LATINO (N=7901)		API (N=3646)		AI/AN (N=306)	
Variables	**Coefficients**	**p-values**	**Coefficients**	**p-values**	**Coefficients**	**p-values**	**Coefficients**	**p-values**
R-squared	0.159		0.187		0.193		0.227	
Intercept	1.71	(<0.001)	1.80	(<0.001)	1.55	(<0.001)	1.78	(<0.001)
Perceived Racism in General		(0.007)						
Never	0.00	(.)	0.00	(.)	0.00	(.)	0.00	(.)
Rarely	0.01	0.380	-0.01	0.647	0.02	0.391	-0.03	0.682
Sometimes/Often/All the time	0.03	0.002	0.03	0.049	0.01	0.479	-0.04	0.505
Perceived Racism in Health Care		(0.030)						
No	0.00	(.)	0.00	(.)	0.00	(.)	0.00	(.)
Yes	0.03	0.030	0.02	0.275	0.00	0.995	-0.12	0.148
Demographics								
Race/Ethnicity		(<0.001)						
Latino	-0.01	0.157						
API	-0.09	(<0.001)						
AIAN	0.04	0.201						
African-American	0.00	0.796						
White	0.00	(.)						
Age (years)		(<0.001)						
18-22	-0.18	(<0.001)	-0.20	(<0.001)	-0.10	0.017	0.08	0.557
23-39	-0.02	0.007	-0.03	0.041	0.01	0.739	0.16	0.046
40-49	0.00	(.)	0.00	(.)	0.00	(.)	0.00	(.)
50-64	0.02	0.006	0.03	0.238	-0.04	0.127	0.02	0.790
65-102	-0.04	(<0.001)	-0.04	0.054	-0.10	0.001	-0.18	0.113

Gender		(<0.001)						
Male	0.00	(.)	0.00	(.)	0.00	(.)	0.00	(.)
Female	-0.19	(<0.001)	-0.23	(<0.001)	-0.27	(<0.001)	-0.09	0.096
Socioeconomic characteristics								
Poverty Level (% FPL)		(0.009)						
0-99	-0.04	(<0.001)	-0.05	0.024	0.04	0.132	-0.17	0.189
100-199	-0.00	0.657	-0.03	0.168	0.08	0.006	-0.02	0.873
200-299	0.00	(.)	0.00	(.)	0.00	(.)	0.00	(.)
300%-399	-0.01	0.292	-0.01	0.741	0.04	0.208	-0.06	0.632
≥ 400	-0.02	0.066	0.01	0.774	0.05	0.062	0.03	0.780
Employment Status		(<0.001)						
Employed	0.00	(.)	0.00	(.)	0.00	(.)	0.00	(.)
Employed/not working	-0.03	0.005	-0.05	0.034	-0.07	0.091	0.08	0.592
Unemployed	-0.05	(<0.001)	-0.09	(<0.001)	-0.02	0.233	0.20	0.041
Education		(<0.001)						
< High School	0.20	(<0.001)	0.19	(<0.001)	0.19	(<0.001)	0.01	0.929
High School Diploma or GED	0.16	(<0.001)	0.14	(<0.001)	0.13	(<0.001)	-0.02	0.883
Some college	0.16	(<0.001)	0.14	(<0.001)	0.16	(<0.001)	-0.07	0.514
BA/BS	0.05	(<0.001)	0.05	0.094	0.08	0.002	-0.01	0.912
Graduate School	0.00	(.)	0.00	(.)	0.00	(.)	0.00	(.)
Psychosocial Factors								
Marital Status		(<0.001)						
Married	0.00	(.)	0.00	(.)	0.00	(.)	0.00	(.)
	0.05	(<0.001)	0.02	0.238	0.04	0.061	0.08	0.293
Never Married	0.00	0.635	-0.02	0.170	0.02	0.352	0.02	0.836
Religious Participation		(<0.001)						
Yes	0.00	(.)	0.00	(.)	0.00	(.)	0.00	(.)
No	0.09	(<0.001)	0.09	(<0.001)	0.05	0.002	0.01	0.909
Average Social Resources		(<0.001)						
	0.01	0.001	0.01	0.345	0.02	0.001	0.00	0.988
Neighborhood								

Resources								
Neighborhood Watch		(<0.001)						
Yes	0.00	(.)	0.00	(.)	0.00	(.)	0.00	(.)
No	0.02	(<0.001)	0.05	(<0.001)	0.02	0.315	0.11	0.053
Immigration and Acculturation								
Citizenship and Immigration Status		(<0.001)						
US-born citizen	0.00	(.)	0.00	(.)	0.00	(.)	0.00	(.)
Naturalized Citizen	-0.06	(<0.001)	-0.09	(<0.001)	-0.01	0.751	0.05	0.805
Non-citizen with Green Card	-0.04	0.009	-0.10	(<0.001)	0.11	0.004	-0.66	0.439
Non-citizen without Green Card	-0.06	0.006	-0.12	(<0.001)	0.11	0.015	-1.12	(<0.001)
Years in the US		(<0.001)						
≤ 1	-0.16	0.000	-0.18	0.002	-0.21	0.001	0.00	(.)
2-4	-0.09	(<0.001)	-0.09	0.007	-0.17	(<0.001)	-0.26	0.761
5-9	-0.06	0.007	-0.05	0.082	-0.16	(<0.001)	1.16	0.174
10-14	-0.06	(<0.001)	-0.05	0.027	-0.10	0.004	-0.27	0.364
≥ 15	0.00	(.)	0.00	(.)	0.00	(.)	0.00	(.)
Language at home		(0.001)						
English only	0.00	(.)	0.00	(.)	0.00	(.)	0.00	(.)
English + other language(s)	-0.01	0.506	0.00	0.831	-0.03	0.189	-0.01	0.931
Other language(s) only	-0.05	0.001	-0.01	0.785	-0.10	0.001	0.28	0.062

	African-Americans (N=2361)		White (N=20989)	
Variables	**Coefficients**	**p-values**	**Coefficients**	**p-values**
R-squared	0.161		0.121	
Intercept	1.68	(<0.001)	1.69	(<0.001)
Perceived Racism in General				
Never	0.00	(.)	0.00	(.)
Rarely	0.05	0.093	0.00	0.804
Sometimes/Often/All the time	0.06	0.041	0.02	0.205
Perceived Racism in Health Care				
No	0.00	(.)	0.00	(.)
Yes	0.01	0.822	0.08	0.001
Demographics				
Race/Ethnicity				
Latino				
API				
AIAN				
African-American				
White				
Age (years)				
18-22	-0.33	(<0.001)	-0.16	(<0.001)
23-39	-0.06	0.023	-0.02	0.058
40-49	0.00	(.)	0.00	(.)
50-64	0.05	0.036	0.03	0.001
65-102	-0.10	0.020	-0.03	0.004
Gender				
Male	0.00	(.)	0.00	(.)
Female	-0.09	(<0.001)	-0.15	(<0.001)
Socioeconomic characteristics				
Poverty Level (% FPL)				
0-99	-0.11	0.001	0.00	0.899

100-199	-0.01	0.753	0.01	0.263
200-299	0.00	(.)	0.00	(.)
300%-399	-0.09	0.020	-0.01	0.402
≥ 400	-0.04	0.182	-0.03	0.013
Employment Status				
Employed	0.00	(.)	0.00	(.)
Employed/not working	-0.01	0.783	-0.03	0.060
Unemployed	0.01	0.540	-0.04	(<0.001)
Education				
< High School	0.12	0.026	0.25	(<0.001)
High School Diploma or GED	0.11	0.005	0.18	(<0.001)
Some college	0.08	0.029	0.16	(<0.001)
BA/BS	-0.02	0.666	0.04	(<0.001)
Graduate School	0.00	(.)	0.00	(.)
Psychosocial Factors				
Marital Status				
Married	0.00	(.)	0.00	(.)
	0.04	0.060	0.05	(<0.001)
Never Married	0.03	0.441	-0.01	0.550
Religious Participation				
Yes	0.00	(.)	0.00	(.)
No	0.10	(<0.001)	0.10	(<0.001)
Average Social Resources				
	0.03	0.012	0.01	0.201
Neighborhood Resources				
Neighborhood Watch				
Yes	0.00	(.)	0.00	(.)
No	0.01	0.563	0.02	0.001
Immigration and Acculturation				
Citizenship and Immigration Status				
US-born citizen	0.00	(.)	0.00	(.)

Naturalized Citizen	-0.08	0.239	-0.02	0.227
Non-citizen with Green Card	-0.04	0.733	0.00	0.938
Non-citizen without Green Card	-0.46	0.001	0.05	0.494
Years in the US				
≤ 1	0.27	0.034	-0.19	0.223
2-4	-0.11	0.305	-0.16	0.003
5-9	0.06	0.650	0.00	0.993
10-14	-0.12	0.578	-0.02	0.741
≥ 15	0.00	(.)	0.00	(.)
Language at home				
English only	0.00	(.)	0.00	(.)
English + other language(s)	-0.05	0.144	-0.01	0.641
Other language(s) only	-0.11	0.127	-0.02	0.577

2. Secondary Risk Profile.

	BOTH		LATINO (N=5218)		API (N=2568)		AI/AN (N=226)	
Variables	**Coefficients**	**p-values**	**Coefficients**	**p-values**	**Coefficients**	**p-values**	**Coefficients**	**p-values**
R-squared	0.320		0.356		0.360		0.353	
Intercept	1.85	(<0.001)	2.10	(<0.001)	1.93	(<0.001)	1.69	(<0.001)
Perceived Racism in General		(0.010)						
Never	0.00	(.)	0.00	(.)	0.00	(.)	0.00	(.)
Rarely	-0.01	0.305	-0.04	0.203	-0.02	0.554	0.04	0.813
Sometimes/Often/All the time	-0.04	0.003	-0.02	0.491	-0.12	0.001	-0.07	0.654
Perceived Racism in Health Care		(0.467)						
No	0.00	(.)	0.00	(.)	0.00	(.)	0.00	(.)
Yes	-0.01	0.467	-0.03	0.338	0.05	0.506	-0.06	0.802
Demographics								
Race/Ethnicity		(<0.001)						
Latino	-0.02	0.358						
API	0.20	(<0.001)						
AIAN	0.01	0.915						
African-American	-0.03	0.130						
White	0.00	(.)						
Age (years)		(<0.001)						
18-22	0.01	0.689	0.00	0.952	0.38	0.005	0.15	0.829
23-39	-0.44	(<0.001)	-0.46	(<0.001)	-0.32	(<0.001)	-0.64	(<0.001)
40-49	-0.19	(<0.001)	-0.19	(<0.001)	-0.20	(<0.001)	-0.31	0.108
50-64	0.00	(.)	0.00	(.)	0.00	(.)	0.00	(.)
65-102	-0.12	(<0.001)	-0.10	0.026	-0.08	0.070	-0.16	0.396
Gender		(<0.001)						
Male	0.00	(.)	0.00	(.)	0.00	(.)	0.00	(.)
Female	-0.51	(<0.001)	-0.69	(<0.001)	-0.69	(<0.001)	-0.29	0.199
Socioeconomic characteristics								
Poverty Level (% FPL)		(<0.001)						
0-99	-0.03	0.267	-0.06	0.112	-0.07	0.300	0.04	0.888
100-199	-0.02	0.270	-0.05	0.080	-0.08	0.210	-0.03	0.903

200-299	0.00	(.)	0.00	(.)	0.00	(.)	0.00	(.)
300%-399	-0.09	(<0.001)	-0.15	0.006	-0.12	0.088	-0.24	0.294
≥ 400	-0.11	(<0.001)	-0.13	0.001	-0.11	0.035	-0.30	0.210
Education		(<0.001)						
< High School	0.11	(<0.001)	0.10	0.072	0.15	0.010	0.18	0.493
High School Diploma or GED	0.11	(<0.001)	0.11	0.050	0.13	0.031	0.27	0.131
Some college	0.08	(<0.001)	0.08	0.129	0.05	0.344	0.24	0.147
BA/BS	0.06	0.001	0.07	0.192	0.10	0.027	0.24	0.441
Graduate School	0.00	(.)	0.00	(.)	0.00	(.)	0.00	(.)
Health Care Access								
Insurance Status		(0.008)						
Yes	0.00	(.)	0.00	(.)	0.00	(.)	0.00	(.)
No	0.06	0.008	0.09	0.006	0.04	0.423	-0.17	0.441
Usual Source of Care		(<0.001)						
Yes	0.00	(.)	0.00	(.)	0.00	(.)	0.00	(.)
No	0.12	(<0.001)	0.09	0.030	0.22	0.003	0.31	0.227
Doctor Visit within past year		(<0.001)						
Yes	0.00	(.)	0.00	(.)	0.00	(.)	0.00	(.)
No	0.30	(<0.001)	0.23	(<0.001)	0.30	(<0.001)	0.42	0.203
Health Care Rating		(<0.001)						
Missing response	0.32	(<0.001)	0.31	(<0.001)	0.26	0.012	-0.11	0.804
No health care	0.05	0.271	0.05	0.436	0.08	0.538	0.42	0.388
<5	0.07	0.016	0.07	0.300	0.01	0.874	0.37	0.055
5-7	0.03	0.001	-0.01	0.650	0.02	0.388	0.04	0.843
8-10	0.00	(.)	0.00	(.)	0.00	(.)	0.00	(.)
Psychosocial Factors								
Marital Status		(<0.001)						
Married	0.00	(.)	0.00	(.)	0.00	(.)	0.00	(.)
	0.07	(<0.001)	0.04	0.066	0.15	(<0.001)	0.00	0.972
Never Married	0.25	(<0.001)	0.34	(<0.001)	0.40	(<0.001)	0.18	0.403
Heavy Cigarette Smoking		(<0.001)						
None	0.00	(.)	0.00	(.)	0.00	(.)	0.00	(.)
< 20	0.02	0.152	0.01	0.743	0.08	0.306	-0.01	0.955

≥ 20		0.11	(<0.001)	-0.20	0.038	-0.06	0.704	0.19	0.441
Immigration and Acculturation									
Citizenship and Immigration Status			(0.051)						
US-born citizen		0.00	(.)	0.00	(.)	0.00	(.)	0.00	(.)
Naturalized Citizen	-0.00		0.949	-0.01	0.817	0.13	0.024	0.07	0.921
Non-citizen with Green Card		0.03	0.191	0.01	0.739	0.16	0.020	1.43	0.195
Non-citizen without Green Card		-0.06	0.172	-0.02	0.783	0.31	0.009	0.24	0.415
Years in the US			(0.010)						
≤ 1		0.30	0.009	0.10	0.436	0.10	0.486	0.00	(.)
2-4		0.14	0.006	0.09	0.175	0.16	0.039	-1.32	0.229
5-9		0.09	0.022	-0.02	0.686	0.15	0.017	0.00	(.)
10-14		0.03	0.300	-0.02	0.631	0.09	0.064	0.00	(.)
≥ 15		0.00	(.)	0.00	(.)	0.00	(.)	0.00	(.)
Language at home			(<0.001)						
English only		0.00	(.)	0.00	(.)	0.00	(.)	0.00	(.)
English + other language(s)		0.07	(<0.001)	0.02	0.589	0.13	0.013	0.13	0.378
Other language(s) only		0.06	0.038	0.01	0.769	0.12	0.042	-0.07	0.901

	African-American (N=1826)		White (N=16334)	
Variables	**Coefficients**	**p-values**	**Coefficients**	**p-values**
R-squared	0.325		0.319	
Intercept	1.82	(<0.001)	1.76	(<0.001)
Perceived Racism in General				
Never	0.00	(.)	0.00	(.)
Rarely	-0.05	0.439	-0.01	0.597
Sometimes/Often/All the time	-0.07	0.236	-0.03	0.098
Perceived Racism in Health Care				
No	0.00	(.)	0.00	(.)
Yes	0.02	0.719	0.03	0.583
Demographics				
Race/Ethnicity				
Latino				
API				
AIAN				
African-American				
White				
Age (years)				
18-22	-0.07	0.579	-0.06	0.213
23-39	-0.38	(<0.001)	-0.41	(<0.001)
40-49	-0.16	0.001	-0.19	(<0.001)
50-64	0.00	(.)	0.00	(.)
65-102	0.07	0.298	-0.15	(<0.001)
Gender				
Male	0.00	(.)	0.00	(.)
Female	-0.51	(<0.001)	-0.42	(<0.001)
Socioeconomic characteristics				
Poverty Level (% FPL)				
0-99	0.09	0.241	0.02	0.635

100-199	0.00	0.963	0.02	0.406
200-299	0.00	(.)	0.00	(.)
300%-399	-0.07	0.340	-0.05	0.043
≥ 400	-0.11	0.102	-0.08	(<0.001)
Education				
< High School	0.08	0.289	0.18	(<0.001)
High School Diploma or GED	0.00	0.953	0.13	(<0.001)
Some college	0.08	0.171	0.07	(<0.001)
BA/BS	0.20	0.004	0.03	0.053
Graduate School	0.00	(.)	0.00	(.)
Health Care Access				
Insurance Status				
Yes	0.00	(.)	0.00	(.)
No	0.13	0.208	0.07	0.024
Usual Source of Care				
Yes	0.00	(.)	0.00	(.)
No	-0.07	0.444	0.13	(<0.001)
Doctor Visit within past year				
Yes	0.00	(.)	0.00	(.)
No	0.30	(<0.001)	0.36	(<0.001)
Health Care Rating				
Missing response	0.48	0.001	0.32	(<0.001)
No health care	-0.04	0.716	0.06	0.282
<5	-0.01	0.890	0.08	0.019
5-7	0.10	0.027	0.04	0.002
8-10	0.00	(.)	0.00	(.)
Psychosocial Factors				
Marital Status				
Married	0.00	(.)	0.00	(.)
	0.02	0.579	0.08	(<0.001)
Never Married	0.11	0.004	0.15	(<0.001)
Heavy Cigarette Smoking				
None	0.00	(.)	0.00	(.)

< 20	0.00	0.915	-0.01	0.736
≥ 20	0.12	0.115	0.12	(<0.001)
Immigration and Acculturation				
Citizenship and Immigration Status				
US-born citizen	0.00	(.)	0.00	(.)
Naturalized Citizen	-0.02	0.896	-0.02	0.428
Non-citizen with Green Card	0.13	0.295	0.06	0.188
Non-citizen without Green Card	-0.03	0.781	-0.02	0.872
Years in the US				
≤ 1	1.65	(<0.001)	0.83	(<0.001)
2-4	-0.46	(<0.001)	-0.11	0.324
5-9	0.04	0.855	0.33	0.002
10-14	-0.03	0.884	0.10	0.067
≥ 15	0.00	(.)	0.00	(.)
Language at home				
English only	0.00	(.)	0.00	(.)
English + other language(s)	0.06	0.328	0.03	0.205
Other language(s) only	0.34	0.011	0.11	0.017

APPENDIX G: Interactions between Perceived Racism and Sociodemographic Characteristics.[a]

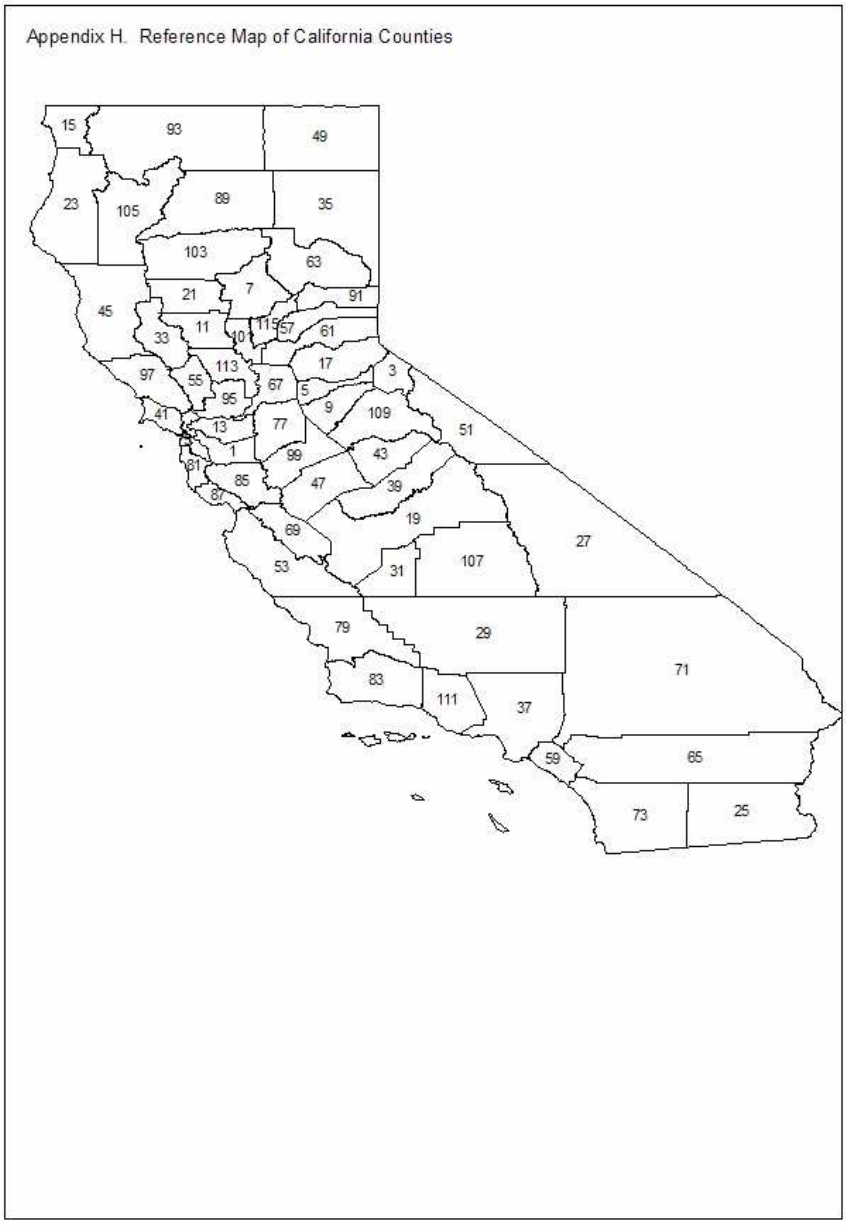
	Primary Risk Profile		Secondary Risk Profile	
Perceived Racism in General * Gender	***Coefficients***	***P-values***	***Coefficients***	***P-values***
Perceived Racism in General (among males)				
Never (reference)	0.00	.	0.00	.
Rarely	-0.02	0.059	-0.01	0.708
Sometimes/Often/All the time	0.03	0.004	0.10	0.012
Gender (among no racism)				
Male (reference)	0.00	.	0.00	.
Female	-0.20	0.000	-0.57	0.000
Perceived Racism in General * Gender				
Females* Rarely	0.03	0.056	-0.02	0.675
Females*Sometimes/Often/All the time	-0.03	0.022	-0.13	0.004
Perceived Racism in General * Race/Ethnicity				
Perceived Racism (among Whites)				
Never (reference)			0.00	.
Rarely			-0.03	0.072
Sometimes/Often/All the time			0.03	0.336
Race/Ethnicity (among never racism)				
White (reference)			0.00	.
Latino			0.05	0.014
API			0.31	0.000
AI/AN			-0.02	0.802
African-American			0.05	0.396
Perceived Racism in General * Race/Ethnicity				
Latino * Rarely			-0.07	0.051
Latino * Sometimes/Often/All the time			-0.05	0.241
API * Rarely			-0.08	0.183
API * Sometimes/Often/All the time			-0.22	0.000
AI/AN * Rarely			0.08	0.633
AI/AN * Sometimes/Often/All the time			0.09	0.504
African-American * Rarely			-0.05	0.529
African-American * Sometimes/Often/All the time			-0.14	0.059
Perceived Racism in Health Care * Race/Ethnicity				
Perceived Racism (among Whites)				
No (reference)	0.00	.	0.00	.
Yes	0.12	0.000	0.18	0.009

Race/Ethnicity (among no racism)				
White (reference)	0.00	.	0.00	.
Latino	-0.03	0.000	0.04	0.014
API	-0.20	0.000	0.22	0.000
AI/AN	0.09	0.004	0.02	0.742
African-American	0.01	0.222	-0.02	0.234
Perceived Racism in Health Care * Race/Ethnicity				
Latino*Yes	-0.11	0.003	-0.27	0.001
API*Yes	-0.13	0.004	-0.07	0.595
AI/AN*Yes	-0.22	0.008	0.06	0.788
African-American*Yes	-0.10	0.017	-0.20	0.015
Perceived Racism in Health Care * Age				
Perceived Racism (among 40-49)				
No (reference)	0.00	.		
Yes	0.11	0.000		
Age (among no racism)				
18-22	-0.14	0.000		
23-39	-0.02	0.009		
40-49 (reference)	0.00	.		
50-64	0.03	0.004		
65-102	-0.06	0.000		
Perceived Racism in Health Care * Age				
18-22*Yes	-0.09	0.066		
23-39*Yes	-0.09	0.006		
50-64*Yes	-0.13	0.001		
65-102*Yes	-0.19	0.000		
Perceived Racism in Health Care * Gender				
Perceived Racism (among males)				
No (reference)	0.00	.	0.00	.
Yes	0.06	0.002	0.34	0.000
Gender (among no racism)				
Males (reference)	0.00	.	0.00	.
Females	-0.19	0.000	-0.59	0.000
Perceived Racism in Health Care * Gender				
Females*Yes	-0.08	0.001	-0.33	0.000
Perceived Racism in Health Care * Poverty Level				
Perceived Racism (among 200-299%)				
No (reference)			0.00	.
Yes			0.07	0.295
Poverty level (among no racism)				

0-99		0.03	0.331
100-199		-0.01	0.740
200-299 (reference)		0.00	.
300-399		-0.13	0.000
≥ 400		-0.14	0.000
Perceived Racism in Health Care * Age			
0-99*Yes		-0.21	0.007
100-199*Yes		-0.12	0.190
300-399*Yes		0.01	0.916
≥ 400*Yes		-0.05	0.579
Perceived Racism in Health Care * Educational Achievement			
Perceived Racism in Health Care (among graduate school)			
No (reference)		0.00	.
Yes		0.13	0.184
Educational Achievement			
< High School		0.17	0.000
High School /GED		0.12	0.000
Some college		0.04	0.014
BA/BS		0.00	0.811
Some graduate school (reference)		0.00	.
Perceived Racism in Health Care * Educational Achievement			
< High School * Yes		-0.31	0.007
High School /GED * Yes		-0.20	0.076
Some college * Yes		0.04	0.752
BA/BS * Yes		-0.06	0.662

a. Each of these moderators were tested with the following regression equations: $Y = \beta_0 + \beta_1(\text{racism}) + \beta_2(\text{moderator}) + \beta_3(\text{racism*moderator}) + \varepsilon$

APPENDIX H: Reference Map of California Counties



County Name and County FIPS ID

County Name	*FIPS ID*	*County Name*	*FIPS ID*
Alameda	1	Siskiyou	93
Alpine	3	Solano	95
Amador	5	Sonoma	97
Butte	7	Stanislaus	99
Calaveras	9	Sutter	101
Colusa	11	Tehama	103
Contra Costa	13	Trinity	105
Del Norte	15	Tulare	107
El Dorado	17	Tuolumne	109
Fresno	19	Ventura	111
Glenn	21	Yolo	113
Humboldt	23	Yuba	115
Imperial	25		
Inyo	27		
Kern	29		
Kings	31		
Lake	33		
Lassen	35		
Los Angeles	37		
Madera	39		
Marin	41		
Mariposa	43		
Mendocino	45		
Merced	47		
Modoc	49		
Mono	51		
Monterey	53		
Napa	55		
Nevada	57		
Orange	59		
Placer	61		
Plumas	63		
Riverside	65		
Sacramento	67		
San Benito	69		
San Bernardino	71		
San Francisco	75		
San Joaquin	77		
San Luis Obispo	79		
San Mateo	81		
Santa Barbara	83		
Santa Clara	85		
Santa Cruz	87		
Shasta	89		
Sierra	91		

Salma Shariff-Marco, MPH

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EDUCATION

JOHNS HOPKINS BLOOMBERG SCHOOL OF PUBLIC HEALTH (JHBSPH), Baltimore, MD
Doctor of Philosophy (Ph.D.), Health, Behavior and Society, August 2006

COLUMBIA UNIVERSITY SCHOOL OF PUBLIC HEALTH, New York, NY
Master of Public Health (M.P.H), Division of Sociomedical Sciences, May 1998
Thesis: Perspectives of South Asian Immigrant Women's Health, New York City

UNIVERSITY OF PENNSYLVANIA, Philadelphia, PA
Bachelor of Arts, Biological Basis of Behavior, May 1996

AWARDS

- Health, Behavior and Society Departmental Dissertation Award, Spring 2006
- The Carol Eliasberg Martin Scholarship in Cancer Prevention, 2005-2006
- The John C. Hume Doctoral Award, 2005-2006
- Cancer Epidemiology, Prevention and Control Fellowship (National Cancer Institute-funded training grant), JHBSPH, September 2002-July 2006
- Community Fellowship, Open Society Institute, July 1998-December 2000

RELEVANT WORK EXPERIENCE

RESEARCH ASSISTANT, JOHNS HOPKINS BLOOMBERG SCHOOL OF PUBLIC HEALTH, Baltimore, MD

MARYLAND CANCER CONTROL PLAN EVIDENCE-BASED EVALUATION; PI: Kathy Helzlsouer, MD, Department of Epidemiology, March 2004-Present

- Establish evidence-based approach for evaluating recommended strategies and to help establish priorities for implementing the Cancer Control Plan with research team
- Conduct literature review on evidence-based research on various cancer control strategies
- Conduct data abstraction of reviews and guidelines/recommendations
- Review and analyze evidence to provide recommendations on the level of support for each strategy
- Write-up qualitative synthesis of evidence
- Content areas include skin cancer, cervical cancer and cancer disparities

A HEALTHY MISTRUST; PI: Ann C. Klassen, PhD, Departments of HBS/HPM, November 2004-October 2005

- Conducted critical review of relevant literature
- Provided editorial assistance

CULTURAL EXPLANATORY MODELS; PI: Ann C. Klassen, PhD, Department of HPM, August 2003-August 2004

- Conducted critical review of relevant literature
- Participated in developing study questions and design
- Coded qualitative data from 500+ semi-structured interviews
- Conducted data entry and analysis

TEACHING ASSISTANT, JOHNS HOPKINS BLOOMBERG SCHOOL OF PUBLIC HEALTH, Baltimore, MD

- RESEARCH DESIGN IN THE SOCIAL AND BEHAVIORAL SCIENCES (3 UNITS); Faculty: Ann C. Klassen, PhD, Department of HPM, class size=50, 4th Quarter Mar-May 2005
- CONCEPTS IN QUALITATIVE RESEARCH FOR SOCIAL AND BEHAVIORAL SCIENCES (3 UNITS); Faculty: Katherine C. Smith, PhD, Department of HPM, class size=25, 2nd Quarter Oct-Dec 2004 & 2005
- SOCIAL AND BEHAVIORAL ASPECTS OF HEALTH (4 UNITS); Faculty: Katherine C. Smith, PhD, Department of HPM, class size=30, Summer Institute Jun 2004

AMERICAN CANCER SOCIETY (ACS), EASTERN DIVISION (NY & NJ), New York, NY
DIRECTOR, COLORECTAL CANCER & NUTRITION/PHYSICAL ACTIVITY, May 2000-August 2002

- Trained and provided technical assistance on the program of work for colorectal cancer and nutrition/physical activity to staff and volunteers
- Conducted peer-counseling pilot intervention to increase awareness and change behaviors on the early detection of colorectal cancer and participated on national pilot evaluation team
- Collaborated with Columbia University and the University of Medicine and Dentistry of New Jersey on colorectal cancer screening research projects on academic detailing for primary care physicians
- Implemented and evaluated Active for Life, a worksite wellness program, for over 500 staff and volunteers
- Chaired the Eastern Division Diversity Workgroup's Cancer Control Committee to develop a work plan outlining appropriate interventions to address cancer disparities in black, Hispanic and Chinese communities
- Expanded partnerships with state and local departments of health, boards of education, academic institutions, and professional associations to build a network of volunteers and partners
- Participated in division-wide and national committees including Strategic Planning Committee for the Elimination of Health Disparities, Development Team for Working Well: A Tool for Worksite Wellness, Program Life Cycle Evaluation Committee, and National Minority Cancer Awareness Week

AMERICAN CANCER SOCIETY, QUEENS, Rego Park, NY
DIRECTOR OF BREAST HEALTH PROGRAMS, October 1999-July 2000

- Managed the Queens Breast Health Partnership—New York State Department of Health and Centers for Disease Control and Prevention funded breast & cervical cancer screening program (with a $1 million budget) comprised of 11 provider partners serving

women in Queens county; facilitated State and provider relationships; ensured program met State's quality assurance requirements and performance measures
- Managed a breast cancer outreach initiative to provide breast health education & screening annually to over 1200 women in the diverse communities of Queens
- Planned and implemented county-level community assessment with a team of over 50 staff and volunteers in order to identify cancer needs and collaborative opportunities
- Implemented Tell-A-Friend, a volunteer-based mammography reminder program, in African American and Latino communities

AMERICAN CANCER SOCIETY, QUEENS Forest Hills, NY
SOUTH ASIAN OUTREACH PROJECT DIRECTOR/OPEN SOCIETY INSTITUTE COMMUNITY FELLOW, August 1998-September 2000
- Initiated and managed outreach efforts to South Asian communities
- Recruited and trained volunteers to conduct outreach linking community members with ACS services and resources
- Managed meetings, projects, and special events to involve the community in cancer control efforts
- Increased project funding via corporate and private contributions as well as grant opportunities

QUEENS BREAST HEALTH PARTNERSHIP (QBHP)—ACS, QUEENS, Forest Hills, NY
QBHP PROJECT COORDINATOR, September 1997-August 1998
- Facilitated communication among QBHP partners to meet its education and screening goals
- Assisted in the development and implementation of outreach strategies to increase screenings
- Organized outreach initiatives and developed relationships with community groups and leaders
- Coordinated the development and allocation of culturally appropriate educational materials and resources to ethnically diverse communities

NEW YORK CITY DEPARTMENT OF HEALTH (NYC DOH)—CROSS CULTURAL AFFAIRS OFFICE, New York, NY
HEALTH RESEARCH TRAINING PROGRAM SCHOLAR, May-September 1997
- Organized research project and theoretical material resulting in Institutional Review Boards' approval from both NYC DOH and Columbia Presbyterian Medical Center
- Designed study questionnaires and procedures and analyzed the data collected through one-on-one interviews and focus group to document health needs of South Asian immigrant women

SPECIAL PROJECTS COORDINATOR, October 1996-September 1997
- Conducted and managed preliminary analysis of an evaluation survey
- Initiated relationships with community groups and recruited them to participate in the Asian Health Issues Advisory Board
- Organized meetings for the Immigrant Health Work Group and Asian Health Issues Advisory Board to identify collaborative opportunities between NYC DOH and community groups

- Set up the Immigrant Health Work Group Newsletter to facilitate communication among members

ABSTRACTS (POSTERS/SCIENTIFIC PRESENTATIONS)

- S. Shariff-Marco. The role of perceived racism and race-based residential segregation on cancer behavioral risk profiles. Academy of Health Annual Research Meeting, Seattle, Washington, June 2006.
- S. Shariff-Marco, M.C. Gibbons, K. Robinson, K. Helzlsouer. *Evidence-based approach to evaluating the Cancer Disparities Strategies of the MD Comprehensive Cancer Control Plan.* 10th Biennial Symposium on Minorities, the Medically Underserved & Cancer, Washington, DC, April 2006.
- S. Shariff-Marco. Role of racism on cancer risk profiles. 10th Biennial Symposium on Minorities, the Medically Underserved & Cancer, Washington, DC, April 2006.
- S. Shariff-Marco, A.C. Klassen. *Cultural Explanatory Models for breast cancer causation and screening practices among urban African American women from low-resource communities*; 9th Biennial Symposium on Minorities, the Medically Underserved & Cancer, Washington, DC, March 24-28, 2004
- S. Shariff-Marco, Z. Surani. *South Asian Americans and Breast Cancer*; American Public Health Association Annual Meeting—Eliminating Health Disparities, Boston, MA, November 2000.

INVITED PRESENTATIONS

- Columbia University, Mailman School of Public Health, Immigrant Health, *Introduction to Cultural Competency*; New York, NY, March 2001
- New York State Department of Health, Annual Meeting, *Multiculturalism and the Importance of Cultural Competency in Health Care*; New York, June 2000
- Communicating Across Boundaries: A Cultural Competency Training on Breast and Cervical Cancer in Asian Pacific Islander American Women, *Cultural Competency, Asian Pacific Islander American Women in NYC*; New York, NY, March 2000
- Asian Americans for Equality--South Asian Community Development Forum, *Outreach*; New York, NY, October 1999
- Harvard Medical School & Harvard School of Dental Medicine, South Asian Health Forum, *Women and Breast Cancer: South Asian Outreach Project*; BOSTON, MA, December 1998
- Asian American and Pacific Islander Health Promotion, Inc., *Cancer Concerns for Asian Americans & Pacific Islanders:* Collaboration Opportunities; New York, NY, June 1998

ADDITIONAL INFORMATION

Certificate Program:
Health Disparities and Health Inequalities, Center for Health Disparities Solutions, JHBSPH
Volunteer Activities:

- Board Member, South Asian Public Health Association; April 2004-Present
- Peer Reviewer, *Journal of Health Care for the Poor and Underserved*, April-May 2005

- Co-founder & coordinator of "Critical Issues in Health Disparities: A Journal Club in Understanding Health Disparities" at JHBSPH, in collaboration with the Morgan-Hopkins Center for Health Disparities Solutions; 2003-2005
- Coordinator of two cancer epidemiology journal clubs, JHBSPH, 2003-2004
- Committee Member, American Cancer Society National Asian American & Pacific Islander Initiative representing Eastern Division (NY & NJ); 2002
- Committee Chair, Communicating Across Boundaries; October1999-March 2000 (a cultural competency training on breast and cervical cancer among Asian American women provided by a group of community and government agencies committed to eliminating disparities in breast cancer screening in New York City).

Grant Awards:

- Body and Soul, New York State Grant, $250,000
- American Cancer Society, Eastern Division Community Grants--$52,000 (Queens Breast Outreach Initiative, year 2), $13,000 (Essence of Beauty) and $11,000 (South Asian Outreach Translations)
- The Greater NYC Affiliate of the Susan G. Komen Breast Cancer Foundation $45,000 & $22,500 extension (Breast Cancer Outreach Initiative)
- Schering Oncology $3,000 (Hepatitis C Radio Awareness Program in Asian American communities)

Skills/Computer Proficiency: Microsoft Office, STATA, SPSS, SAS-Callable SUDAAN, ArcGIS, ProCite