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Racial and Ethnic Disparities in Health Status Among California Adults: The Roles of Socioeconomic Position and Discrimination

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

by

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The dissertation of Laura Hoyt D'Anna is approved.

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DEDICATION

This work is offered as a contribution to the efforts to eradicate racial/ethnic disparities in health. It is dedicated to the memory of my lovely sister Rachel Suzanne Hoyt, who, in her short life, demonstrated compassion for others, strength, unconditional love, and a passion for living. I know that she would say that each life has unique value, and that nothing should be taken for granted. Rachel is the wind beneath my wings.

This work is also dedicated to my bright, amazing, beautiful children; Aidan Joseph D'Anna and Olivia Rachel D'Anna, who are the light and joy in my life. For them, I wish for an equitable world within which they can grow, learn, thrive, explore, love, and be loved. In the absence of such equity, my hope is that they will believe in themselves and persevere to accomplish these milestones, and any others they may choose.

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PRESENTATIONS

Bundy R, Barrus C, Hoyt L, Howard D. Pap Smear Screening for all Eligible Women as a Component of the STD Exam, Long Beach, California. Poster presentation at the Centers for Disease Control and Prevention, Division of STD/HIV Prevention Grantee Meeting, Washington D.C., August 22-26, 1994.

Bundy R, Kau C, Hoyt L. Data Collection in an Urban Sexually Transmitted Disease Clinic, Long Beach, California. Poster presentation at the Centers for Disease Control and Prevention, Division of STD/HIV Prevention Grantee Meeting, Washington D.C., August 22-26, 1994.

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Graziano SL, Hoyt L, Iatesta M, Kent C, Lentz A, Miller K, Kamb ML, Peterman TA, Byers RH, Fishbein M, The Project RESPECT Study Group. Multi-center Randomized Trial of Three HIV Prevention Interventions: Who Chooses to Participate? XI International Conference on AIDS, Vancouver, July 1996.

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ABSTRACT OF THE DISSERTATION

Racial and Ethnic Disparities in Health Status

Among California Adults:

The Roles of Socioeconomic Position and Discrimination

By

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Racial/ethnic minorities fare worse on a number of health indicators, including higher morbidity and mortality rates, and they rate their health status lower when compared to non-Latino Whites. This study investigated the association between race/ethnicity and disparities in self-rated health status and physical and emotional functional limitations. Data were drawn from the 2001 California Health Interview Survey (CHIS 2001); a random digit dial survey of adult California residents (N=55,428) interviewed between November 2000 and October 2001. The specific aims were: 1) To determine if self-rated health status, physical functional limitation, and emotional functional limitation vary as a function of race/ethnicity; 2) To examine the relationships between race/ethnicity, socioeconomic position (SEP), and health status, including physical and emotional functional limitations; 3) To test whether a composite measure for SEP explains a greater proportion of racial/ethnic health inequalities compared to individual SEP indicators; 4) To determine whether the relationship between risk factors and health status varies as a function of race/ethnicity. (The risk factors included sociodemographic factors, psychosocial factors, and medical factors.); and 5) To examine the effect of acculturation on the relationship between race/ethnicity, health status, and physical and emotional functional limitations among a Latino sub-sample of the CHIS, 2001 population. The analytic approach employed multiple linear regression and logistic regression.

Findings show that racial/ethnic minorities had significantly poorer self-rated health status and higher rates of emotional functional limitations when compared to non-Latino Whites. Conversely, racial/ethnic minorities reported fewer physical functional limitations. SEP proved to be a highly significant predictor of health for all racial/ethnic groups, but race/ethnicity also had an independent effect on health. Neither citizenship status nor time spent in the U.S. was significant predictors for Latino self-rated health, however, limited English proficiency was an important predictor of worse health.

Finally, an isolated experience of discrimination in a health care setting had strong negative effects on each of the three health outcomes examined in this study. Findings suggest that unmeasured negative health impacts from chronic experiences of discrimination must be more detrimental to health.

CHAPTER 1: INTRODUCTION

Racial and ethnic disparities in health outcomes are persistent and widely documented (Byrd and Clayton, 1992; Jones et al., 1991; National Center for Health Statistics, 2001; Savitt, 1982). In general, racial/ethnic minorities fare worse on a number of health indicators, including higher morbidity and mortality rates, when compared to non-Hispanic Whites (LaViest, 2002; Williams, 1999). In addition, racial/ethnic minorities rate their health status lower than do non-Hispanic Whites (APHA, 2004).

This study investigated the association between racial/ethnic identification and disparities in self-rated health status and physical and emotional functional limitations among a large and diverse sample of California adults. It was hypothesized that racial/ethnic disparities would be detected among this sample, with poorer health ratings noted among racial/ethnic minorities. A primary focus of the study was to identify the proportion of the racial/ethnic disparities in health status that was attributed to socioeconomic position (SEP). It was expected that SEP would be a major contributor to observed disparities in health status, but that it would not account for all of the observed disparities. Therefore, the analytic approach employed multiple linear regression and logistic regression to analyze the contribution of other potential mediating variables in explaining any remaining disparities in self-rated health status and physical and emotional functional limitations.

Data were drawn from the 2001 California Health Interview Survey (CHIS 2001). The CHIS is the largest health survey ever undertaken in the United States. The data used for this study consist of a random digit dial (RDD) survey of adult California residents (N=55,428) interviewed between November 2000 and October 2001. The large sample and sample design reflected the diversity of the California population and allowed for the provision of health estimates for California's major racial/ethnic groups. The large sample of Latino respondents (n=11,840) allowed for the evaluation of the effects of age at immigration and acculturative processes on racial/ethnic and socioeconomic disparities in health status. Finally, the randomized study design and complex weighting procedures, consistent with the U.S. Census, allowed for the provision of estimates generalizeable to the California population.

The specific aims of this research were: 1) To determine if self-reported overall health status, physical functional limitation, and emotional functional limitation varied as a function of race/ethnicity among participants in CHIS 2001; 2) To examine the relationships between race/ethnicity, SEP, and health status, including physical and emotional functional limitations; 3) To test whether a composite measure for SEP explained a greater proportion of racial/ethnic health inequalities compared to individual SEP indicators; 4) To determine whether the relationship between risk factors and health status varied as a function of race/ethnicity. The risk factors considered included sociodemographic factors (gender, age, and marital status), psychosocial factors (health risk behaviors and perceived discrimination), chronic morbidities, and medical factors (health insurance status, having a usual source for health care, use of alternative health care professionals, and frequency of utilization of health services); and 5) To examine the effect of age at immigration and acculturation on the relationship between race/ethnicity, health status, and physical and emotional functional limitations among a Latino sub-sample of the CHIS, 2001 population.

This research is unique in that it is the first time these issues have been examined within a large, diverse sample representative of the California population. It is hoped that the findings from this study will be used to inform public policy and public health efforts to eradicate racial/ethnic disparities in access to and utilization of health care services, medical treatment, and outcomes related to health care. It is also hoped that relationships between acculturative stressors and self-rated health among a subgroup of Latinos will be used to inform future research within this group of Californians.

Specific Aims

The specific aims of this research were:

1. To determine if self-reported overall health status, physical functional limitation, and emotional functional limitation varied as a function of race/ethnicity among participants in the California Health Interview Survey (CHIS), 2001.

2. To examine the relationships between race/ethnicity, socioeconomic position (SEP), and health status, including physical and emotional functional limitations.

3. To test whether a composite measure for SEP explained a greater proportion of racial and ethnic health inequalities compared to individual SEP indicators.

4. To determine whether the relationship between risk factors and health status varied as a function of race/ethnicity. The risk factors to be considered include sociodemographic factors (e.g. gender, age, and marital status), psychosocial factors (e.g. health risk behaviors, perceived discrimination), chronic morbidity, and medical factors (e.g. health insurance status, having a usual source for health care, use of alternative health care professionals, and frequency of utilization of health services).

5. To examine the effect of age at immigration and acculturation on the relationship between race/ethnicity, health status, and physical and emotional functional limitations among a Latino sub-sample of the CHIS, 2001 population.

CHAPTER 2: BACKGROUND AND SIGNIFICANCE

An Overview of Racial/Ethnic Health Disparities

Racial/ethnic disparities in health outcomes are persistent and widely documented (Byrd and Clayton, 1992, Jones et al., 1991, National Center for Health Statistics, 2001; Savitt, 1982). In general, racial/ethnic minorities fare worse on a number of health indicators, including higher morbidity and mortality rates, when compared to non-Hispanic whites (LaViest, 2002; Williams, 1999), but there is some variation by racial/ethnic group and, in some cases, by subgroup within the larger racial/ethnic category.

African-Americans have the worst health profile with an overall mortality rate that is 1.6 times higher than that of the white population, and higher mortality rates for eight of the ten leading causes of death (Byrd and Clayton, 1992; Jones et al., 1991; National Center for Health Statistics, 2001; Savitt, 1982; Williams, 1999). African-Americans and non-Hispanic whites share the top three, and seven of the ten leading causes of death, however, the risk factors, incidence, morbidity, and mortality rates for these diseases and injuries often are greater among African-Americans than non-Hispanic whites. In addition, three of the 10 leading causes of death for African-Americans are not among the leading causes of death for non-Hispanic whites: homicide (sixth), human immunodeficiency virus (HIV) disease (seventh), and septicemia (ninth) (MMWR, 2005).

Cancer is the second leading cause of death for both African-Americans and non-Hispanic whites. In 2001, however, the age-adjusted incidence per 100,000 population was substantially higher for African-American females than for white females for certain cancers, including colon/rectal (54.0 versus 43.3), pancreatic (13.0 versus 8.9), and stomach (9.0 versus 4.5). Among males, the age-adjusted incidence was higher for African-American males than for white males for certain cancers, including prostate (251.3 versus 167.8), lung/bronchus (108.2 versus 72.8), colon/rectal (68.3 versus 58.9), and stomach (16.3 versus 10.0) (MMWR, 2005). Stroke is the third leading cause of death for both African-Americans and non-Hispanic whites. During 1999--2002, African-American males and females aged 20--74 years had higher age-adjusted rates per 100,000 population of hypertension than their white counterparts (36.8 versus 23.9 for males; 39.4 versus 23.3 for females). In 2002, African-Americans who died from HIV disease had approximately 11 times as many age-adjusted years of potential life lost before age 75 years per 100,000 population as non-Hispanic whites. African-Americans also had substantially more years of potential life lost than non-Hispanic whites for homicide, stroke, perinatal diseases, and diabetes (MMWR, 2005).

Other health indicators measured in the national health objectives for 2010 indicate the persistence of significant racial/ethnic health disparities. In 2002, African-Americans trailed non-Hispanic whites in at least four positive health indicators, including percentages of 1) persons aged <65 years with health insurance

(81% of African-Americans versus 87% of non-Hispanic whites), 2) adults aged ≥65 years vaccinated against influenza (50% versus 69%) and pneumococcal disease (37% versus 60%), 3) women receiving prenatal care in the first trimester (75% versus 89%), and 4) persons aged ≥18 years who participated in regular moderate physical activity (25% versus 35%). In addition, African-Americans had substantially higher proportions of certain negative health indicators than non-Hispanic whites, including 1) new cases of gonorrhea (742 versus 31 per 100,000 population; 2002 data), 2) deaths from homicide (21.6 versus 2.8; 2002 data), 3) persons aged 6--19 years who were overweight or obese (22% versus 12%; 2000 data), and 4) adults who were obese (40% versus 29%; 2000 data) (MMWR, 2005).

Significant health disparities are also noted among other racial/ethnic groups when compared to non-Hispanic whites. American Indians have similar overall mortality rates as whites, lower mortality rates for cardiovascular disease and cancer, but higher mortality rates from injuries, flu, pneumonia, diabetes, suicide, and cirrhosis of the liver. Overall mortality rates for the Latino population are lower than the white population, but Latinos have higher mortality rates for diabetes, cirrhosis of the liver, and HIV/AIDS. (Disparities specific to this group are further discussed in the "Health Effects of Acculturation Stress among Latinos" section.) The Asian-Pacific Islander population has the fewest health problems and is the only racial/ethnic group with lower mortality rates than those of whites for all of the leading causes of death in the U.S (Williams, 1999), although some Asian-American subpopulations experience rates of stomach, liver, and cervical cancers that are well above national averages (Smedley et al., 2002).

A brief review of evidence indicating racial/ethnic disparities in the most common chronic health conditions (arthritis, asthma, diabetes, cancer, heart disease and high blood pressure) is provided to summarize the vast literature on racial/ethnic health disparities.

Arthritis

In 2001, 49 million American adults reported doctor-diagnosed arthritis and another 21 million reported chronic joint symptoms, making arthritis one of the most prevalent health problems and the leading cause of disability in the United States. This number will increase substantially as the U.S. population ages. In fact, the number of people aged 65 or older who have arthritis or chronic joint symptoms is projected to nearly double from 2001 (21.4 million) to 2030 (41.4 million) (CDC, 2005; *MMWR* 2002). Arthritis, however, does not only affect older people. Nearly two-thirds of people with arthritis are younger than 65 years. Further, arthritis affects people of all racial and ethnic groups with the highest prevalence among Caucasians (35.3%) and African-Americans (31.5%), but somewhat lower among Latinos (23.3%). Finally, arthritis tends to be more prevalent among women, individuals who are less educated, have lower activity levels, and a higher body mass index (BMI) than the population in general (MMWR, 2002).

In addition to the debilitating physical effects of arthritis, the medical and societal costs are enormous. For example, medical care for arthritis cost nearly $22 billion in 1995 and during the same year total costs, including medical care and loss of productivity, exceeded $82 billion (Praemer, et al., 1999).

Instances of racial/ethnic disparities in the prevalence and treatment of arthritis are found in the literature. One such example is that of racial and geographic disparities among those undergoing knee arthroplasty (joint replacement surgery), which is often helpful in relieving pain and improving joint function of moderate to severe osteoarthritis (OA). Escalante and others (2000) found that independent of socioeconomic position, Latinos were less likely to undergo hip or knee arthroplasty than non-Hispanic whites in an east Texas cohort. Using a comprehensive, nationwide cohort, Skinner and others (2003) found that significant racial/ethnic differences in the rates of knee arthroplasty among African-Americans, whites, and Latinos, and between men and women, were significantly attenuated when region of the country was factored in the analysis. Despite the adjustments, however, utilization of knee arthroplasty remained significantly lower for black men, in particular.

Another study (Jordan et al., 2003) examined associations between serum levels of cartilage oligomeric matrix protein (COMP), ethnicity (African-American or white) and sex in the Johnston County Osteoarthritis Project, a population-based study of OA in rural North Carolina. The study demonstrated higher levels of COMP in African-Americans compared with whites and men in general. The authors recommended that further research is needed to develop standards for biomarkers that consider gender and ethnic differences.

Asthma

Compared to all other racial/ethnic groups, African-Americans are at greater risk of morbidity and mortality due to asthma (Smedley, et al., 2002). To date, it is not clear whether this greater prevalence is due to biologic or genetic predisposition, socioeconomic factors, or environmental living conditions, although high rates of air pollutants in urban communities has been reported to be a likely contributor (Institute of Medicine, 1999). In addition, racial differences have been observed in patterns of care for both children and adults with asthma. For example, in several studies of Medicaid beneficiaries, African-Americans were more likely to make emergency room visits for care, less likely to make primary care office visits, and equally likely to have a prescription filled, relative to whites (Lozano et al., 1995; Murray et al., 1997). In addition, Ali and Osberg (1997) reported that among Medicaid enrollees, African-American children who had been hospitalized for asthma had significantly fewer primary care visits following hospitalization than did their white counterparts.

Other studies have found that a combination of poor patient understanding of asthma management and inadequate physician monitoring may contribute to disparities in asthma care (Blixen et al., 1997). For example, Zoratti et al. (1998)

reported that asthma management among African-Americans is focused on acute symptom control rather than suppression of chronic airway inflammation in that they are more likely to be prescribed inhaled bronchodilator medications as opposed to inhaled corticosteroids. These patterns were not fully explained by socioeconomic differences between African-Americans and whites.

Contrary to these findings, Krishnan and others (2001) assessed the consistency of asthma care in relation to national guidelines. After controlling for patient age, education, employment, and symptom frequency among a sample of over 5,000 patients, these authors reported no significant differences between African-American and white patients in use of medication regimens and asthma specialty care. This seems to suggest that racial/ethnic differences in asthma care are mixed and may vary as a function of the educational level of patient populations studied (Smedley, et al., 2002). Further, previous studies have not adequately explored sociocultural variables that may influence the use of primary care services and the use of emergency rooms as a primary source of care (Mayberry et al., 2004).

Cancer

Commonly, poorer cancer survival rates observed among racial and ethnic Americans, especially African-Americans, have been attributed (at least in part) to differences in cancer detection and availability of various treatment programs (US DHHS, 1986). These data are generally limited to cancer mortality and incidence rates, with a paucity of data on access to medical care by race and ethnicity, particularly for Asian, Latino and Native Americans (Mayberry et al., 2004). Recent studies have focused on disparities in access to screening, diagnostic and therapeutic interventions for various types of cancer and have produced inconsistent results (Mayberry, et al., 2004). For example, Ackerman and others (1992), and Breen and Kessler (1994), reported dissipation in large racial/ethnic gaps in breast cancer screening. In a 1992 national survey, African-American women received mammography and breast exams at similar rates as white women (Burns, et al., 1996; Frazier et al., 1996; Martin, et al., 1996). Latino women, however, were screened at much lower rates (Arbes and Slade, 1996; Perez-Stable, 1995; Tortolero-Luna et al., 1995). Age also seems to play a role in screening rates in that older African-American women had lower mammography use rates when compared to white women despite the initiation of Medicare reimbursement for mammograms, beginning in 1991 (Hoffman-Goetz et al., 1998; Preston et al., 1997).

In the same 1992 survey, African-American women reported similar rates for cervical cancer screening when compared to their white counterparts (Martin et al., 1996). Breast and cervical cancer screening have been linked to multiple individual and population characteristics including education, income, having a usual source of medical care, health care utilization patterns and preferences, and cultural differences (Harlan, et al., 1991; Kirkmam-Liff and Kronefeld, 1992; Martin et al., 1996;). In fact, having no source of health care has been identified as the strongest predictor for breast and cervical cancer screening (Harlan et al., 1991).

In contrast to cancer screening, most studies have documented extreme racial/ethnic disparities in the stage of cancer at diagnosis, with African-Americans and Latinos far more likely to be diagnosed at advanced stages (Bentley, et al., 1988; Eley et al., 1994; Mayberry et al., 1995; Mettlin et al., 1997; Optenberg et al., 1995; Polednak and Flannery, 1992; Satariano, et al., 1986; Zaloznik, 1995). Findings are mixed, however, with regard to racial/ethnic differences in rates of cancer treatment. For example, early breast cancer studies using data from the Surveillance, Epidemiology, and End Results (SEER) program of the National Cancer Institute reported unadjusted racial differences in surgical treatment of breast cancer, whereas later SEER studies found no racial/ethnic differences in breast cancer treatments (Bain, et al., 1986; Farrow et al., 1992). Conversely, a study of women with ovarian cancer found that African-American women were twice as likely as whites to receive inappropriate treatment and had poorer survival rates, even after controlling for age, residential area, income, and cancer care facility (Parham, et al., 1997). African-American and white differences have also been noted in the treatment of colorectal cancer with African-Americans far less likely to receive appropriate treatment when compared to similar whites (Ball and Elixhauser, 1996). Overall, an exhaustive literature review of racial/ethnic disparities in cancer treatment conducted by Mayberry et al. (2004) indicated that additional information is needed, such as cancer stage at diagnosis, tumor histology, coexisting medical conditions, and cultural factors that may influence diagnosis and treatment for some ethnic groups.

Diabetes

Racial/ethnic disparities in diabetes rates are alarming. For example, African-American and Latino adults are 1.3 to 1.9 times more likely to have diabetes than are White adults (Harris, et al., 1998; Mokdad, et al., 2000; Mokdad et al., 2001). Latinos and African-Americans are also less likely to be in control of their blood sugar levels when compared to whites; they have 2 to 4 times the rate of diabetes complications (e.g. renal disease and blindness), and they have higher diabetes-specific mortality rates (Brunt et al., 1998; Carter and Pugh, 1996; Harris, et al., 1998; Harris et al., 1999; Mokdad, et al., 2000; Mokdad et al., 2001; Weatherspoon et al., 1994).

Published peer-reviewed literature on differences in medical care for diabetes and access to care by race and ethnicity is limited and has not been consistent (Mayberry et al., 2004). The greatest racial/ethnic differences have been identified in methods of diabetes control and patient education (Cowie and Harris, 1997). For example, African-Americans were more likely than whites to be treated with insulin but less likely to receive daily injections or to self-monitor their blood glucose levels.

Heart Disease

Striking African-American/white disparities in coronary heart disease and stroke are well-documented. Although the magnitude of such differences varies as a function of characteristics of the populations studied, findings consistently indicate that African-Americans are less likely to receive pharmacological therapy, diagnostic angiography and catheterization, and invasive surgical treatments relative to white Americans with similar disease characteristics (Mayberry, et al., 2002). A comprehensive study of African-American/white differences in cardiac care, conducted at Duke University Medical Center in North Carolina, found that among patients diagnosed between 1984 and 1992 with obstructive coronary disease (whose status and disease severity was angiographically defined), African-Americans were 32 percent less likely to have had coronary bypass surgery and similarly less likely to have any revascularization procedure. Further, these differences were not explained by other demographic variables such as age and gender, smoking status, comorbidities, disease severity, and insurance status (Peterson et al., 1997). Although this study was limited to one institution, these findings have been duplicated and expanded upon in other studies with varied populations (Allison et al, 1996; Ayanian, et al. 1993; Gatsonis et al., 1995; Goldberg et al., 1992; Hannan et al., 1999; McBean, et al., 1994; Mickelson et al., 1997; Mirvis et al., 1994; Peterson et al., 1994; Sedlis et al., 1997; Udvarhelyi et al., 1992; Weitzman et al., 1997; Whittle et al., 1993). Severe African-American/White differences have also been reported for other cardiovascular conditions including congestive heart failure (Philbin and DiSalvo, 1998) and peripheral artery disease (Brothers et al., 1997). Further, African-Americans are less likely to receive heart transplants even after controlling for prognosis following transplantation, clinical and demographic factors, income, and distance to a transplant center (Ozminkowski, 1993).

The greatest racial/ethnic disparities in cardiac care are found among the uninsured and Medicaid populations (Carlisle et al., 1995; Giles, et al., 1995; Hannan et al., 1999). In one study (after adjusting for comorbidities among uninsured populations) African-Americans were half as likely to undergo angiography and one-third as likely to undergo bypass surgery compared to uninsured whites (Carlisle, et al., 1995). Similar findings (Carlisle et al., 1995; Hannan et al., 1999; Laouri et al., 1997; Leape et al., 1999; Peterson, et al., 1997) indicate that financial factors modify the effect of race/ethnicity on medical care access (Mayberry et al., 1994), but these findings varied somewhat depending on population studied and facility within which care was sought. Therefore, additional research on the relationships between race/ethnicity, SEP and health status is needed (Mayberry et al., 1994).

Racial differences in the treatment of cardiac and stroke patients have been found within the VA health care system, which is required to provide inpatient care to all eligible veterans at no cost (Oddone, et al., 1998; Peterson, et al., 1994; Whittle et al., 1993). In contrast, one study found that there were no racial/ethnic differences in the rate of cardiac catheterization or revascularization after controlling for demographic variables, risk factors and comorbidities, among patients seeking care for myocardial infarction in the Department of Defense health care system (Taylor et al., 1997). These findings seem to suggest that in some settings racial/ethnic differences may be reduced by a universally accessible system (Mayberry et al., 2004), although it was the only study with these findings in the exhaustive literature review of racial/ethnic differences in cardiac care conducted by Mayberry and others (2004).

The Significance of Racial/Ethnic Health Disparities

Persistent racial/ethnic health disparities present ethical, economic, public health, political, practical and social justice issues, and researching the impacts of such disparities is significant for a variety of reasons. First, research on racial/ethnic health disparities has become a priority of the National Institutes of Health and the Department of Health and Human Services, and elimination of such disparities gained "legitimacy" as a scientific focus when identified as a goal of Healthy People 2010 (Cain and Kington, 2003; James, 2003). To date, this goal has not been accomplished and trends suggest that disparities will not be eliminated by the target date of 2010.

Racial and ethnic minorities are expected to comprise a larger minority, and eventually a majority, of the U.S. population during the twenty-first century (LaVeist, 2002). It is projected that minorities will comprise 50% of the U.S. population by the year 2060 and over 50% by the year 2070 (LaVeist, 2002; U.S. Census Bureau). Therefore, the health of U.S. racial/ethnic groups will inevitably reflect the health of the nation as a whole. Further, public health efforts could be seriously threatened if racial/ethnic minorities continue to experience relatively diminished health. For example, infectious diseases, which by nature do not remain contained within socioeconomic boundaries, could have far-reaching destructive effects (Smedley, et al., 2002). All members of a community are affected by the poor health status of its least healthy members.

Second, there are significant economic ramifications when large segments of the population receive inadequate healthcare. Because racial and ethnic minorities have worse health outcomes on a number of indicators, increased numbers of minorities will inevitably result in higher subsequent health care costs related to poorly managed chronic conditions or missed diagnoses (Smedley, et al., 2002). For example, inadequately managed diabetes can result in expensive complications, such as kidney disorder requiring dialysis or transplantation (Smedley, et al., 2002). Further, to the degree that minorities are beneficiaries of publicly funded health programs and receive diminished quality of care, these beneficiaries and the taxpayers supporting the programs will face higher healthcare costs in the future. In addition, individuals who are hampered by poor health are less likely to be productive participants in the workforce. Therefore, racial/ethnic minorities are unduly hindered in their attempts to advance economically and professionally, and further socioeconomic inequities stem from disparate racial/ethnic health.

Third, although health outcomes have been historically worse among racial/ethnic minorities, the gap between the health profiles of some racial and ethnic groups compared to whites has widened in recent years. For example, African-American mortality rates for some diseases such as cancer, diabetes, suicide, cirrhosis of the liver, and homicide, were higher in 1995 than in1950, and the

African-American/white mortality ratios in 1995 were larger than those in 1950 for heart disease, cancer, diabetes, and cirrhosis of the liver (Williams, 1999). These data indicate worsening relative health trends for African-Americans for which clear explanations have not been identified.

Fourth, the problem of racial/ethnic health disparities may likely be underestimated in that it is often difficult to collect good data. For example, death certificate data, which aggregate subgroups within broader racial/ethnic categories, are misleading and obscure heterogeneity within racial categories leading to underestimates of death rates (Williams, 1999). In addition, death certificate data are based on observer bias (i.e., race/ethnicity is assigned based on the examining physician's determination), which has been shown to be inaccurate particularly for racial/ethnic minorities (Williams, 1999). Racial/ethnic identifiers for morbidity data are also problematic. For example, the CDC conducted a study to estimate racial/ethnic disparities in nationally reportable disease conditions. Findings indicated that incidence rates were at least two times greater for African-Americans than whites for eight of forty-two nationally notifiable diseases; however, substantial gaps exist in the reporting of racial/ethnic data for the forty-two reportable diseases, which accounted for approximately 1.3 million of the cases reported by the National Notifiable Disease Surveillance System (NNDSS). Missing data on race ranged from 1% to 63% of cases by state, with an interquartile range of 13%--35%; missing data on Latino ethnicity ranged from zero to 98% of cases, with an interquartile range of

16%--45%. Finally, for nineteen diseases, greater than 30% of cases had missing race information (MMWR, 2005).

Racial and ethnic identity are often characterized as fixed characteristics, however, they may be more fluid for certain individuals and groups. This is evident within the American-Indian population where a tribal designation is frequently an important marker. In addition, individuals may identify as bi- or multi-racial and may have trouble selecting among the groups defined by government categories. Historically, certain groups have been undercounted through the census, with larger undercounting for African-Americans than whites; an upward trend from 1980-1990 (Williams, 1999). This is extremely important in that census data are used to calculate denominators for mortality rates, construct sampling frames, and adjust for non-response in population-based epidemiology studies. The lack of adequate data for specific subgroups, especially smaller minority groups, results in the persistence of the incorrect belief that there are underlying differences in biology between racial/ethnic groups (Williams, 1999). Finally, controversy surrounding the issue of collecting data with racial/ethnic identifiers has made it extremely difficult to collect these data in certain settings and has led to calls for the elimination of such data.

Fifth, the causal pathways between racial/ethnic identity and health status are complicated and not clearly understood. Many theories have been developed to explain racial/ethnic disparities in health outcomes. For example, the biologic theory indicates that there are biological differences between whites and racial and ethnic groups that make racial/ethnic minorities more susceptible to disease. This theory has been largely refuted (Wade, 1997) leading to other theories that focus on experiences unique to certain groups such as migration, segregation, racial attitudes and discrimination. These experiences have both psychological and physiological impacts that have been shown to worsen health status (Eisenberger et al., 2003). Other theories purport that access to, and equality of, medical care is an important determinant. In these models, cultural beliefs, practices, linguistic barriers, and a lack of inclusion of cultural values and norms in Western medical models, influence individual health and care-seeking behaviors, which in turn have direct influences on health.

By far, the role of SEP as a determinant of racial/ethnic inequalities in health has garnered the greatest attention when compared to other determinants. Nevertheless, there is no consensus on the role that SEP plays in determining these inequities (Nazroo, 2003). This debate is particularly controversial when considering ethnic inequalities in health. For example, some argue that socioeconomic inequalities make a minimal or no contribution to ethnic inequalities in health (Wild and McKeigue, 1997), while others argue that along with SEP, the cultural and genetic elements of ethnicity must also play a role (Smaje, 1996), while still others argue that ethnic inequalities in health are primarily determined by socioeconomic inequalities (Navarro, 1990; Sheldon and Parker, 1992). Further, there is evidence to indicate that just as SEP is related to health within ethnic groups it may also be related to health between ethnic groups. Historically, most studies have focused on African-American/white differences ignoring differences that may exist between other ethnic groups and subgroups within ethnic groups.

Other controversies related to SEP noted in the literature include the debate on whether it is "social class" or race that explains racial/ethnic disparities in health and the causal ordering of the two (Byrd and Clayton, 2000; Clark et al., 1999; Davey-Smith, 2000; Jones, 2001; Kaufman et al., 1997; Kaufman and Cooper, 1999; Kaufman and Cooper, 2001; Krieger, 2000; Krieger et al., 1993; Krieger, 1987; Krieger and Smith; 2000; LaVeist, 2000; Lillie-Blanton et al., 1996; Muntaner et al., 1996; Muntaner, 1999; Navarro, 1990; Stolley, 1999; Williams, 1999). Many of these studies offer limited perspectives in that they adopt an "either/or logic" that focuses either on the role of racism or the role of SEP (Mayberry, 2002). As will be discussed later, there are benefits to considering both simultaneously in that SEP and race are intertwined.

Empirical evidence suggests that SEP is not the only determinant of racial/ethnic health inequalities. In fact, in many studies racial/ethnic disparities persisted after controlling for confounders such as SEP, access to care, and comorbidities (Smedley, et al., 2003). In addition, it is clear from a wide body of literature that disparities in access to health care are not adequately explained by insurance, income (or other measures of SEP), comorbidities, severity of disease at diagnosis, availability of services, or patient preferences (Mayberry et al., 2004). These findings are mixed, however. For example, evidence indicates that racial/ethnic disparities exist in some areas, such as cardiac care, cancer surgical treatment, and HIV/AIDS therapy, but not in other areas such as diabetes care and cancer screening, which suggests that the cost of the care may be an important consideration in clinical decisions affecting racial/ethnic minority groups (Mayberry, et al., 2004). Further, disparities are reduced among privately insured patients and those participating in a universally accessible DOD health care system (Mayberry, et al., 2004). On the contrary, racial and ethnic disparities are observed within other equally accessible systems of health care such as patients in the VA system and Medicare and Medicaid beneficiaries, which suggests that equal access to care does not eliminate disparities (Mayberry, et al., 2004).

Taken together, the data are suggestive of determinants of racial/ethnic health inequities that are not accounted for by SEP, health risk behaviors, or health care access factors. Instead, the unexplained portion of these inequities is likely the result of racial/ethnic discrimination, which has been shown to undermine the health of individuals and whole populations (James, 2003). Experiences of racism, and more specifically, individual perceptions of these experiences, has been shown to result in personal negative emotional and stress responses, which in turn have been shown to be related to hypertension, cardiovascular disease, mental health, and other negative states of health (Finch et al., 2001; Karlsen and Nazroo, 2002; Williams, and Williams-Morris; 2000;). Additional health impacts of racism are limited access to health care, economic deprivation, and inequitable exposures to occupational and environmental hazards (Cain and Kington, 2003). Although the majority of research on discrimination has been conducted among African Americans (Cain and Kington, 2003), there is evidence suggesting that bias has differentially impacted the social position of each racial/ethnic group in the United States. Therefore, there is reason to suspect that bias may also differentially affect the health status of racial/ethnic minority groups in addition to African-Americans. Efforts to understand the role of discrimination in determining racial/ethnic disparities in health are important steps in moving toward equity and social justice in the American healthcare system; a system that currently reflects the American legacy of racial discrimination.

Challenges in Studying Race, Ethnicity and Health

Research on race, ethnicity and health is influenced by the historical role that race has played in U.S. history and contemporary culture (Krieger, 2002; LaViest, 2002; See and Wilson, 1988). Examining differences in health by race and ethnicity raises important issues such as racism, accountability, agency and human rights (Gruskin and Tarantola, 2001; Kreiger, 2000; United Nations, 1948; United Nations, 2002; United Nations, 2001). Historically, disparities in health outcomes were thought to be the result of biological and genetic differences unique to specific racial/ethnic groups. Prior to 1800, race was used to describe lineage. During the 18th century, the concept of race became intertwined with ideas of morality through the use of biblical frameworks (Wade, 1997). Race as a permanent, separable type with innate qualities became popular during the 19th century, the age of "scientific racism," when comparative anatomy was developed (Banton, 1979). Racial types became hierarchically ordered when Blumenbach shifted the basis of racial classification from geography to perceived beauty, with Caucasian as the ideal (Boas, 1936). In the 20th century, Darwin refuted the notion of permanent racial types, resulting in sub-species or geographical types. The conceptualization of population genetics and the emergence of eugenics as a "convergence of science and social policy" followed (Banton, 1979). Theoretically, scientific racism was "dismantled by the atrocities of the Nazi regime, World War II, and the black civil rights movement" (Wade, 1997), and this rejection is generally accepted among sociologists, anthropologists, and historians reducing differences between current racial groups to phenotypical signifiers (Wade, 1997). Distinctions between racial and ethnic identities are blurred throughout the sociological and anthropological literature (Jenkins, 1997). Although it is generally accepted that race and ethnicity are social constructs that are reproduced in social interaction (Barth, 1969; Jenkins, 1997), there is disagreement about how they are reproduced and the relative impacts of this reproduction. Banton (1983) argued that "…ethnicity is more concerned with identification of 'us', while racism is oriented to the categorization of 'them'. Using Banton's framework, ethnicity has positive connotations whereas race has negative connotations of disparate power, authority and ability to assign positions in society. Indeed, for some cultural enclaves, it appears that within group social cohesion and some level of isolation from other groups may be protective for health (Gee, 2002).

In recent years, some have called for an end to research on race and health (Fullilove, 1998; Leslie, 1990; Osborne, 1992; Stolley, 1999). In addition, many disciplines have debated the viability of the concept of race (Betancourt and Lopez, 1993; LaVeist, 2002; Scarr, 1988) arguing that race is not a valid biological concept and therefore is not a valid scientific concept in that documenting racial differences aids racist arguments about the genetic inferiority of certain groups (LaVeist, 2002). For example, medical journal editors have discouraged the use of the term race in submitted manuscripts (LaVeist, 2002), and physical anthropologists no longer recognize race as a valid concept (Brace, 1964; Livingston, 1962). Although the efforts to abandon the historic focus on race as a dividing concept in the United States may be well-intentioned, in practice, these efforts may actually have deleterious effects on public health. First, these arguments seem to inherently legitimize the biological notion of race while failing to recognize the important effects that may result from social variables (e.g., inequitable treatment based on phenotypical signifiers), which may be the variables of importance in explaining differential racial/ethnic health outcomes (Krieger, 2003). Further, the race/ethnicity of persons reporting discrimination is germane to the issue and it would be impossible to differentiate health effects of racial discrimination between people of color and whites without knowing the respondent's racial/ethnic identification. In other words, there is no reason to think that the problem of inequitable health among racial/ethnic minorities would be rectified without untiring efforts to identify and document the problem. Most probably, the inequities would persist in this country; but would be undetectable (Krieger, 2003; Smedley, et al., 2002; van Ryn, 2002).

Finally, targeting the elimination of racial/ethnic health disparities without addressing the ongoing health impact of racism in the United States ignores an important and seemingly powerful variable. Further, ignoring race in the study of the health impact of racism means that explanations for and interventions to improve population health would be incomplete, misleading and even harmful (Krieger, 1999; Schwartz and Carpenter, 1999).

CHAPTER 3: EXAMINING RELATIONSHIPS AND POTENTIAL CAUSAL PATHWAYS

Identifying causal pathways for poorer racial/ethnic health outcomes has proven to be a challenging task. Ethnic/racial minorities are disadvantaged in a variety of ways relevant to health including: (1) general health status, characterized by higher rates of chronic/disabling illness; (2) lower likelihood of having health insurance; (3) linguistic barriers between the provider and patient; (3) racial attitudes and discrimination; (4) historical experiences, such as migration and segregation; and (5) the settings where minorities receive health care are less likely to provide a "usual" provider or source of care (Smedley et al., 2003). Further, the relative impact of each factor and how these factors may interact to result in racial/ethnic disparities are poorly understood (Mayberry et al., 2004).

Previous studies have focused on socioeconomic position (SEP) and access to care as predictors of racial/ethnic health disparities (Mayberry et al., 2004; Smedley et al., 2003). In a synthesis of such studies, the Institute of Medicine (IOM) (2003) reported that racial/ethnic minorities (with the greatest focus on African-Americans) were: 1) less likely to receive testing for cerebrovascular diseases; 2) less likely to be put on a transplantation list or to receive dialysis when experiencing renal disease; 3) less likely to receive antiretroviral medications, pneumonia prophylaxis, or protease inhibitors for HIV/AIDS; 4) more likely to use the emergency room (ER), and more likely to receive medication to control acute but not chronic asthma symptoms; 5) less likely to undergo testing for diabetes (even with higher rates of diabetes morbidity and mortality), more likely to have poor glycemic control, and more likely to be treated with insulin versus other pharmacological agents; 6) more likely to experience a C-section (especially if African-American or Latino), and less likely to receive prenatal care and education; 7) much more likely to be given more and higher doses of antipsychotic medications (whereas whites receive more anti-depressant medications, although no differences were noted among privately insured federal employees); 8) less likely to be resuscitated and more likely to undergo amputation; 9) more likely to under use analgesic medications, which may be related to cultural factors. Finally, differences in rates of treatment varied depending on physicians' and patients' gender and race (Smedley, et al., 2003). A literature review of provider biases is beyond the scope of this dissertation since characteristics of the provider have not been assessed in CHIS.

Previous work has outlined potential causal mechanisms for the relationship between race/ethnicity and health status. One potential pathway is that of race/ethnicity as a determinant of SEP, which in turn affects health status. This pathway is convoluted and elusive, however, in that other outside factors influence SEP and health status, such as health risk behaviors, psychosocial stressors, and medical care factors. Further, some of these factors interact with each other making it difficult to separate their relative impact.

Race/Ethnicity is a Determinant of SEP

Racial/ethnic identity is a major determinant of every indicator of socioeconomic position (SEP). SEP refers to one's placement in a system of social stratification that allocates resources, which allow people to attain good health or other desired goals. SEP indicators have been defined as "markers of social relationships and command over resources and skills that vary over time" (Duncan et al., 2002; Link & Phelan, 1995; Macintyre & Hunt, 1997). Most commonly, these resources are defined as education, occupation, income and assets or wealth (House and Williams, 2000). There are extreme racial differences in education availability, income returns at a given level of education or occupation, income purchasing power, stability of employment, and occupational health risks (Kaufman et al., 1997; Williams and Collins, 1995). In addition, marked racial differences in wealth are evident at every income level. The greatest differences are noted in the lowest quintile of income in the U.S., within which the net worth of whites is 10,000 times higher than that of African-Americans ($10,257 versus $1) (Eller, 1994; House and Williams, 2000).

One theory attributes the strong relationship between race/ethnicity and SEP to the impact of racism as an organizing principle within American society. Racism "incorporates ideals of superiority, negative attitudes and beliefs toward racial and ethnic "outgroups," and differential treatment of members of these groups by both individuals and societal institutions" (Williams and Collins, 1995). Racism has resulted in the construction of social institutions and policies that have differentially affected racial/ethnic minorities' opportunities for socioeconomic attainment (Omi and Winant, 1986; Quadagno, 1994). Although racial attitudes of whites toward African-Americans may have improved at the individual level, the institutionalized entrenchment of such attitudes is difficult to change, and are still experienced at the individual level.

One example of institutionalized racism is housing segregation. Segregation is associated with concentration of poverty, poor education, and restricted employment opportunities. First, because housing equity is a major source of wealth, the significant differences in black-white wealth can be attributed to segregation (Williams, 2001). Low skilled, high-paying jobs have moved from urban areas where there are high concentrations of African-Americans, to suburbs where there are very few African-Americans. Because African-Americans, and to a lesser degree other darker skinned minorities, have been disproportionately affected by segregation, they are more likely to be isolated from positive role models, to live in dilapidated environments void of important health and social resources, and to develop "cultural responses that weaken commitment to norms and values critical to mobility" (Williams and Collins, 2001). Segregation also has direct effects on health such as pathogenic housing/living conditions and increased levels of violent crime. In fact, of the fifteen leading causes of death in the U.S., the African-American/White gap is largest for homicide, which is positively associated with segregation for African-Americans (Williams, 1999). Therefore, environmental factors have important effects on life chances for racial/ethnic minorities in that they determine educational and employment opportunities, which in turn affect income and wealth potential.

Segregation is an important variable in explaining differential SEP by race and ethnicity, but it was not explicitly measured in CHIS and it is mentioned here only briefly to provide contextual background for this research, which is limited to three indicators of SEP; education, income, and employment status.

SEP is a Determinant of Health Status

One of the strongest and most consistent predictors of health noted in the literature is SEP (Duncan et al., 2002; Everson et al., 1997; Link & Phelan, 1995; Macintyre & Hunt, 1997; Williams, 1997). In the United States, individuals with higher SEP have better outcomes on a number of health indicators including mortality, and morbidity from almost every disease and condition (Siegel, 2005). In fact, controlling for other demographic factors, Williams (1997) reported that persons with incomes less than $10,000 had a 3.22 times greater risk of dying than for those with incomes over $30,000.

In general, individuals of higher SEP have better access to health care, more education, superior diets, increased levels of exercise, reduced levels of depression and less negative health behaviors such as smoking and alcohol consumption (Everson et al., 1997). Conversely, individuals with lower SEP are more prone to excessive alcohol use, stressful life events and environments, limited access to social support, less supportive marriages, and single mother households. Risky health behaviors are often cited as the cause of the SEP differential in health, however, studies have shown that when the impact of smoking, drinking, obesity and physical inactivity are considered, the risk of dying for the lowest income group was still 2.77 times as great (Williams, 1997).

House and others (2000) explained that SEP "...shapes people's experience of and exposure to virtually all psychosocial and environmental risk factors and that these operate through a range of physiological mechanisms." For example, there are long-term impacts of intra-uterine and early childhood environmental factors (Smith, 1999). Bearer (1995) reported that children are more sensitive to toxic exposures than adults for various reasons such as: different absorption pathways, tissue distribution, ability to transform and eliminate chemicals, and body response to environmental chemicals and radiation. The level of sensitivity varies depending on the developmental stage, and environmental contaminants interact with genetic predisposition to either create or ameliorate chronic and life-threatening diseases, such as cancer, coronary heart disease and schizophrenia (Halfon, 1999). Individuals in lower socioeconomic groups are disadvantaged through a variety of biomedical, environmental, psychological and behavioral factors. In addition, the damaging effects of poverty are not easily reversed. One study noted that one period of economic hardship in 1965 was a significant predictor of reduced physical, psychological, and cognitive functioning in 1994 (Lynch et al., 1997). Further, Marmot et al. (1984) reported that height is inversely related to mortality, and that height varied by employment grade indicating that environment in early life predicts disease in later life.

The Whitehall studies provided evidence that job status or employment grade has an important impact on health status. Marmot et al. (1991) reported that social circumstances differed between employment categories. As one example, those lowest on the grade hierarchy were more likely to report problems with finances and housing and they were more likely to be renting their living quarters. This is important, in that housing tenure predicts mortality independent of social status or class as defined by job status (Marmot, et al., 1991). Further, lower status jobs are characterized by low control and low opportunity to learn and develop skills, which results in high psychological work load associated with increased risk for cardiovascular disease (Karasek, 1981; Alfredsson, et al., 1985; Marmot et al., 1991).

There is also evidence indicating that in addition to absolute SEP, relative SEP is an important health indicator. Previous studies have found that the social gradient of health results in progressively worse health status the lower one is in the socioeconomic strata (Kaplan et al., 1996; Kawachi and Kennedy, 1997 and 1999; Marmot, 1994;). Vast disparities in health conditions exist between high and low income earners, and these disparities have increased in recent history due to increases in differential wage rates for more and less skilled workers, devolution of publicly funded social services, tax policies favoring the rich, the decline of labor unions, and an increase in the proportion of female-headed households (Moss, 2002).

Therefore, it has been proposed that the psychological impact of relative deprivation is linked to poorer health outcomes throughout one's life (Smith, 1999).

Recent studies have challenged the importance of relative socioeconomic deprivation as a determinant of health, suggesting that it is absolute, not relative income that matters. For example, Sturm and Gresenz (2002) found no evidence for the hypothesis that income inequality is a major factor for common disorders of physical or mental health. Although differences were noted at the population level, they disappeared when individual characteristics were controlled. Instead, they found that the highest prevalence for every disorder was found in the two poorest fifths of the population as stratified by family income.

The "selection" or "drift" hypothesis has been offered as one explanation for poorer health status among individuals in lower socioeconomic groups. This hypothesis purports that one's health condition determines SEP in that those who are unhealthy are less able to participate in the workforce and therefore experience reduced income and lack of access to health insurance. Recent studies have found that although health-related downward mobility does occur, it is not "sufficiently widespread to have a major effect on the socioeconomic status gradient in mortality" (Fox et al., 1985; Wilkinson, 1986).

Socioeconomic theories for racial/ethnic health disparities explain that ethnic/racial minorities, especially the darkest skinned minorities, are more likely to be of lower SEP when compared to whites or certain Asian groups (House and

Williams, 2000) and that this is the reason (or one of the main reasons) that they experience poorer health outcomes. A large portion of racial/ethnic disparities in health has been explained by the socioeconomic disadvantage of these groups (Williams and Collins, 1995). For example, as noted previously, African-Americans are less likely to receive simple medical procedures and treatment and more likely to receive extreme medical procedures reflective of the lack of preventive and routine care.

Measuring Socioeconomic Position

Although SEP has been well-documented as a significant predictor of health, the role it plays in the pathway between racial/ethnic status and overall health is still not clear. Measuring SEP is often impossible due to methodological or confidentiality issues. In an exhaustive review of 400 original studies with findings relative to racial/ethnic disparities in health care, Mayberry and others (2004) found that SEP indicators were usually not available to the researchers and therefore excluded in these studies. For example, with respect to cardiovascular disease, these researchers identified only one study regarding racial and ethnic differences in access to cardiac care which addressed the issue of SEP (Daumit et al., 1999). In addition, Mayberry and others (2004) noted that this study is also an exception in that it includes multiple SEP indicators including level of education, marital status, employment status and type of employment, and a "surrogate of SEP," which is insurance status (Daumit et al., 1999). This study found that among end-stage renal disease (ESRD) patients at high risk for cardiovascular disease who were eligible for Medicare insurance, African-Americans were 29% less likely to have had catheterization, 52% less likely to have had coronary angioplasty, and 44% less likely to have had bypass surgery during follow-up, even accounting for SEP and insurance (Daumit et al., 1999). Further, among the subgroup of patients who were Medicare insured before the onset of ESRD there was no racial difference for cardiac procedure rates (Daumit et al., 1999). This study suggests that insurance status, rather than typical measures for SEP, is an important determinant for equitable cardiac care. In other studies, however, the predictive value of insurance status for treatment of cardiovascular disease has varied (Carlisle et al., 1995; Hannan et al., 1999; Laouri et al., 1997; Leape et al., 1999; Peterson, et al., 1997).

Various measures of SEP have been used when examining the relationships between race/ethnicity, SEP and health. The variables most commonly used in U.S. studies are education, employment status, and some measure of income. Consequently, the justification for including these three SEP indicators in this study is briefly reviewed here.

Education data are desirable in that they are relatively easy and reliable to collect, and they are a marker of early life circumstances, which facilitate use as an independent predictor (Davey-Smith et al., 1998). Education is an important determinant of one's work and economic situations, which have influences on health through specific work environments and levels of consumption (Psacharoupoulos, 1985). Health behaviors are also affected by education level with a greater likelihood of engaging in health-enhancing behaviors occurring at higher levels of education (Lynch et al., 1997; Ross & Wu, 1995). Education data are not perfect, however. For example, education level does not account for other career training or investments that individuals may make later in life, nor does it account for the adverse impacts that volatility in economic status during adulthood may have on health (Duncan et al., 2002; McDonough, et al., 1997).

Turning to occupation, "Usual" or "most recent" occupation reflects exposure to the psychosocial and physical dimensions of work arrangements, expected earnings, and social capital (Duncan et al., 2002; Johnson, et al., 1996; Karasek & Theorell, 1990). Although it has been "found to be robust in predicting variations in health status" (Krieger et al., 1997), usual or most recent occupation is a problematic measurement for certain groups such as teenage mothers or others who do not participate in the labor market. In addition, occupation status may reflect later-life circumstances, making it difficult to differentiate between causation (low occupation level contributing to poor health outcomes), or selection (poor health outcomes resulting in low occupation level) (Duncan et al., 2002).

U.S. studies have used the construct of household income as an indicator of SEP status more often than other countries. Household income is useful in that it is indicative of a household standard of living experienced by all members of the household who theoretically share goods and services (Duncan et al., 2002). In reality, however, household members do not always have equal access to income, goods or services. Specifically, females are typically the disadvantaged members of the household (Pahl, 1990; Volger & Pahl, 1994). In addition, income understates racial differences in household economic resources in that it does not account for the vast racial differences in wealth (Williams, 1996). Further, household income may not be an accurate representation of standard of living for certain groups such as retired individuals or those who have other sources of family wealth. Finally, a one-time measure such as household income does not capture information relative to the cumulative effects of a lifetime of deprivation or privilege (House, 1996).

Recent research highlights the importance of focusing on economic indicators of SEP (Duncan, et al., 2002). Specifically, assets may be more descriptive of one's economic condition, compared to income, which is prone to fluctuation and does not reflect other economic burdens or outflows (Krieger, et al. 1997). In fact, indicators of wealth are related to health independent of traditional indicators of SEP (Filakti & Fox, 1995; House, 1996). Further, although also subject to some "reverse-causation" problems, wealth is more stable than income in that it usually reflects a condition developed over a lifetime, whereas income is subject to fluctuation (Duncan et al., 2002). Therefore, when wealth is measured as an indicator of SEP, the racial gaps in SEP widen. In fact, at every level of income, African-Americans have considerably less wealth than whites (Filakti & Fox, 1995; Williams and Collins, 2001).

Psychosocial Factors

The Paradigm for Research on Socioeconomic Status and Health (Williams, 1990) posits that psychosocial factors account for much of the socioeconomic disparities in health. In this model, lifestyle characteristics and living conditions are not viewed as individual characteristics or behavioral choices, but as patterned responses of social groups to the realities and constraints of the external environment, specifically the structural elements of inequality in society (Mirowsky and Ross, 1986). These responses are presented as pathways through which effects of social stratification are mediated to individuals and which in turn have impacts on health (Williams, 1990).

Blane and others (1996) offered a theory of SEP stratification that further explains this relationship. According to this theory, social stratification itself is a social force that has negative health effects for those in the lowest strata, and advantages and disadvantages tend to cluster cross-sectionally and accumulate longitudinally. This means that advantages and disadvantages breed other advantages and disadvantages simultaneously and over time. For example, individuals born into lower SEP have decreased opportunities for good nutrition, health care and education, which, over time, lead to decreased opportunities for employment and income and overall poorer health. Further, people in the lowest SEP strata have increased exposure to psychosocial variables predictive of morbidity and mortality including: 1) lack of social relationships and social supports (Health benefits, including lower rates of CHD, have been reported among individuals who had strong social networks most commonly defined by being married, having close friends, involvement in church or other organizational meetings. Individuals in the lowest SEP are the least likely to have these supports as being impoverished results in an exclusion from opportunities, activities and amenities that encourage social networking (Whelan, 1993).); 2) personality dispositions, such as a lost sense of mastery, optimism, sense of control, and self-esteem or heightened levels of anger and hostility; and 3) chronic and acute stress in life and work, including the stress of racism, classism, and other phenomena related to the social distribution of power and resources (Blane et al., 1996). This theory has been supported by empirical findings (House et al., 1994; House and Williams, 1995; Kessler and Neighbors, 1986; Kaplan et al., 1996; Rodin, 1986; Williams, 1990; Williams and Collins, 1995).

The Role of Health Risk Behaviors

Previous studies have shown that health-risk behaviors such as tobacco use (Marmot et al., 1991), alcohol consumption, having a sedentary lifestyle, and obesity are associated with morbidity and mortality (Fraser et al., 1997; Healthy People 2000, 1990; McGinnis & Foege, 1993). These health-risk behaviors tend to cluster (Sherwood and Jeffery, 2000), with higher prevalence of health-risk behaviors being associated with lower education and income (Liu et al., 1982; Lynch et al., 1997; National Center for Health Statistics, 1998; Winkleby et al., 1990). Further, Marmot et al. (1991) reported that individuals in lower status jobs had different attitudes toward health compared with individuals in higher status jobs, including a reduced likelihood in the belief that they could take action to prevent a heart attack. Therefore, the leading hypothesis explaining the socioeconomic disparities in health ascribes the increased risk for negative health outcomes among lower SEP groups to health risk behaviors (Williams, 1990).

There are findings contrary to this hypothesis. For example, previous longitudinal research with nationally representative samples indicates that selected health-risk behaviors account for only a small proportion (about 10-20%) of socioeconomic differences in mortality (Davey-Smith et al., 1990; Hirdes & Forbes, 1992; Lantz et al., 1998; Lynch et al., 1996; Marmot et al., 1997). Therefore, it appears that socioeconomic differences in mortality would persist even if improved health behaviors were realized among the disadvantaged (Lantz et al., 1998). In addition, the outcomes of interventions to reduce behavioral or psychosocial risk factors vary by group. Interventions among socioeconomically advantaged groups have been more successful when compared to groups who are socioeconomically disadvantaged. For example, the differences in smoking rates have increased between SEP groups subsequent to the recent massive public health and public policy efforts (House and Williams, 2002).

Notwithstanding these findings, in summary, certain risk behaviors are strongly associated with specific diseases and the outcomes from a number of these behaviors are briefly reviewed here.

<u>Cigarette Smoking.</u> Cigarette smoking is responsible for 440,000 U.S. deaths each year (APHA, 2004) and more than 12 million Americans have died from smoking since the first surgeon general's report on smoking was released in 1964. The well-known effects of smoking include lung, mouth and esophageal cancers.

Recent research indicates that smoking is also linked to leukemia, cataracts, pneumonia, cancers of the pancreas, cervix and kidneys, diabetes complications, hip fractures and reproductive complications (U.S. Surgeon General, 2004). In spite of the damaging effects of tobacco use, quitting smoking has immediate and long-term benefits, such as improved circulation and a drop in heart rate (US Surgeon General, 2004).

Approximately 1 in 4 U.S. adults (23.1%) are current cigarette smokers (NHIS, 1999-2001). Men are slightly more likely than women to be smokers (25.1% v. 21.2%), and a greater portion of younger adults when compared to older adults are smokers. There are significant differences in smoking rates by race/ethnicity with Asian adults having the lowest prevalence of current smoking and Latino adults having the next lowest rate (17.0%). Rates of smoking vary by gender. For example, African-American men smoke at higher rates than white men (27.1% v. 25.2%) whereas smoking rates among African-American women (19.5%) are lower than white women (22.2%). Rates of smoking among Latino women were extremely low (12.0%) compared to non-Hispanic black and white women. Adults with higher levels of education are less likely to be smokers when compared to those with fewer years of education, and the prevalence of cigarette smoking declines steadily with increasing income for both men and women. Finally, married adults have a lower prevalence of current cigarette smoking compared to all other marital status groups (NHIS, 1999-2001).

Alcohol Use. There are health benefits for light or moderate alcohol use. Nonetheless, one indicator of unhealthy alcohol use frequently noted in the literature is that of consuming five or more drinks in a single day at least once in the past year. Accordingly, the National Health Interview Survey (1999-2001) revealed that about 1 in 5 U.S. adults (19.8%) had five or more drinks in a single day at least once in the past year. Men were more than twice as likely as women (28.7% v. 11.5%) to have consumed five or more drinks in a single day, and younger adults were significantly more likely than older adults to engage in this behavior. Alcohol use varied considerably by race/ethnicity with Asian adults having a significantly lower prevalence of alcohol use compared to all other race groups. White adults (21.5%) were more likely than African-American adults (11.0%) and Latino adults (17%) to have had five or more drinks in one day, at least once in the past year. Latina women (7%) had much lower rates of having had five or more drinks at least once in the past year than non-Hispanic white women (13.8%).

The association between education and alcohol use is complex when compared to other unhealthy behaviors. Generally, adults with higher levels of education are less likely than those with fewer years of education to engage in unhealthy behaviors. With regard to alcohol use, the prevalence of having five or more drinks in one day at least once in the past year was lowest among adults who had not graduated from high school (16.7%) and those who had a master's degree or higher (16.4%), however, it was higher among those with levels of education in between. Further, individuals with a GED diploma (23.9%) were more likely than both non-high school graduates (16.7%) and high school graduates (19.1%) to have engaged in this behavior suggesting there may be something unique about this group of individuals with respect to education and alcohol use. Finally, the prevalence of having had five or more drinks in one day at least once in the past year increased modestly by income level and most notably so among adults at the highest income level.

Diet. There is increasing recognition of the contribution of diet to long-term health (National Research Council, 1989; US Dept of Health and Human Services, 2000). High fat diets contribute to the development of obesity, diabetes, cardiovascular disease and some cancers (Kesteloot and Joossens, 1992; National Research Council, 1989; World Cancer Research Fund, 1997.) In addition, obesity is significantly associated with many chronic diseases and debilitating conditions (Anonymous, 1998; Bender et al., 1998). During the past two decades, the prevalence of obesity has doubled in adults and children and tripled in adolescents (Bassett and Perl, 2004). Two-thirds of the American population is overweight or obese, with the highest rates of increased morbidity and mortality from cardiovascular disease (likely caused by risk behaviors early in life) among certain minority female populations (Strong, 1995). Two-thirds of US youths exceed dietary fat recommendations (McDowell, et al., 1994), and only 20% meet guidelines for vegetable intake and 14% for fruit intake (Krebs-Smith, et al., 1996). Approximately 400,000 deaths and $117 billion in health-care and related costs each year are attributable to obesity (Bassett and Perl, 2004).

Poor diet represents a significant health issue in that obesity results in short-term medical consequences such as adverse effects on growth, blood pressure, blood lipids, and glucose metabolism (Gidding et al., 1995; Shinha et al., 2002). By 5 to 10 years of age, it is estimated that 60% of overweight children have at least one associated biochemical or clinical cardiovascular risk factor and 25% have two or more (Freedman, et al., 1999). Comorbidities of high body weight during childhood include hypertension, dyslipidemia, insulin resistance, sleep apnea and psychosocial consequences (Davison and Birch, 2001; Strauss, 2002; Styne, 2001). Further, dietary behaviors track from early childhood into adulthood (Boulton, et al., 1995; Nicklas et al., 1991; Stein et al., 1991; Zive et al., 2002). Therefore, overweight developed in early childhood persists through adolescence and adulthood (Serdula et al., 1993; Whitaker et al., 1997).

There is an inverted u-shaped association between obesity and age, with the youngest (13.6%) and the oldest (14.2%) least likely to be obese and adults aged 45-64 years (26.6%) having the highest prevalence of obesity (NHIS, 1999-2001). Even so, the prevalence of childhood overweight is increasing among boys and girls of all ages, races and ethnic groups, and the increases among low-income preschool children are particularly strong (Crawford, et al., 2004). The prevalence of early childhood overweight among low-income preschool children is highest among Latino children at 12%, compared with 9.6% in Asian/Pacific Islanders, 7.8% in African Americans, and 7.1% in Whites (CDC, 1998). Findings from the most recent National Health and Nutrition Examination Survey (NHANES) indicate that in 1999-

2000 increases in childhood obesity were particularly marked in Mexican American and African-American children (10 percentage point increase versus 5 points in White children) (Thorpe et al., 2004).

SEP is a strong predictor of dietary risk factors in the US and other countries. Although the prevalence of overweight/obesity is increasing overall, the picture becomes more complicated when SEP and environment are considered (Valeria da Veiga, et al., 2004). In the U.S., diabetes disproportionately affects residents of communities of color, such as East Harlem in New York City, which is 50% Latino and 40% African American. In this community, approximately one-third of adults and one-half of children live in poverty and residents have the highest prevalence of obesity, diabetes and all-cause death rates in New York City. Diet is integral to the treatment of diabetes and the maintenance of glycemic control. The availability of recommended foods that are low in fat and high in fiber in neighborhood stores may affect the food choices of African American and Latino adults with diabetes (Hunt and Pugh, 1998) and one study found, for example, that in East Harlem residents have many more undesirable stores (those that do not carry a variety of diabetes-healthy foods) when compared to affluent residents on the Upper East Side (Horowitz, et al., 2004). Fats and sweets provide dietary energy at a very low cost compared to the energy cost of lean meats, fish, vegetables, and fruits therefore the cost of heart-healthy and diabetes-healthy foods can be prohibitive (Drewnowski et al., 2004).

Physical Activity. Regular physical activity has numerous benefits for health and well-being (Bertrais, et al., 2004). Even moderate amounts of physical activity seem to confer substantial health benefits to inactive or irregularly active individuals, which led the Centers for Disease Control to issue a recommendation that all adults should engage in moderate physical activity 30 minutes or more on most days of the week (Pate et al., 1995). Conversely, a low level of physical activity is a major risk factor for the development of chronic disease including coronary heart disease, hypertension, obesity, type 2 diabetes, osteoporosis, certain types of cancer, and some mental health problems (Pate et al., 1995; US Dept of Health and Human Services, 1996). Recent research indicates that although maintaining ideal body weight is important in preventing decline in overall health and physical functioning, light regular exercise can actually reduce the risk of health decline even among individuals who cannot achieve the ideal body weight (Xiaoxing and Baker, 2004).

The associations between physical inactivity and sociodemographic variables such as age, gender, and income levels have been well-documented (Sherwood and Jeffery, 2000; Trost et al., 2002; US Dept of Health and Human Services, 1996). According to NHIS (1999-2001) about 4 in 10 U.S. adults (38.6%) were physically inactive in their leisure time, and men had lower rates of leisure-time physical inactivity than women (35.8% v. 41.0%). Further, younger adults were significantly less likely to be inactive in their leisure time than older adults. Levels of physical inactivity vary by racial/ethnic group with Latino adults (55.0%) showing the highest prevalence of inactivity when compared to African-Americans (50.7%), whites

(36.5%), and Asians (38.1%) (NHIS, 1999-2001). Finally, there seems to be a relationship between physical inactivity and marital status for men in that cohabitating men (41.5%) were more likely than their married counterparts (35.9%) to be physically inactive, whereas never married men were the least likely to be physically inactive and obese (Shoenborn, 2004). Finally, lack of physical activity declined with increasing income (NHIS, 1999-2001).

The relationship between education and physical activity appears to be less clear with both positive (Bauman and Armstrong, 2001; Jones, 1998; Macera and Pratt, 2000) and negative (Martin et al., 2000) relationships occurring in large samples from varying populations. Results from the NHIS 1999-2001 showed that individuals with higher levels of education were less likely to be physically inactive during their leisure time, whereas non high school graduates were the most likely to be physically inactive when compared to GED holders and those with higher levels of education.

The relationships between body mass index (BMI), physical activity, and decline in overall health and physical functioning have not been well-studied (Hubert, et al., 2002; Vita, et al., 1998). For example, some studies have examined smoking, high BMI and low activity level as a single risk index in multivariate analyses, which does not identify the independent effects of each. In addition, reliance on self-reported weight, height and activity level are common, and previous research suggests that participants tend to underestimate their weight and overestimate their height and physical activity (Bostrom and Diderichsen, 1997; Norman et al., 2001; Palta et al., 1982; Sallis and Saelens, 2000).

Perceived Discrimination

Perceived discrimination is one type of psychosocial stressor that plays a role in explaining racial disparities in self-reported physical and mental health (Williams, 1997). The subjective experience of racism alone appears to be an important health stressor (Williams, 1996). Previous research indicates that experiencing racial/ethnic discrimination produces physiological responses, which have been linked to both physical and mental health outcomes (Eisenberger et al., 2003). For example, a pattern of physiological activations, very similar to those found in studies of physical pain, emerged during a study of the effects of social exclusion (Eisenberger et al., 2003). Neural correlates of distress were observed in experiments utilizing both implicit and explicit social exclusion. Further, the experience and regulation of social and physical pain demonstrate a common neuroanatomical basis (Eisenberger et al., 2003). In spite of this, participants engaged in some type of regulation, or management, of the distress only in response to explicit social exclusion. Therefore, individuals appear to require explicit awareness of social exclusion before a regulation response occurs and physiological changes result.

This association was also demonstrated through the CARDIA study, which measured the effects of racial discrimination on blood pressure among young black and white adults (Krieger and Sidney, 1996). African-American/white differences in blood pressure were substantially reduced when experiences of racial discrimination and responses to unfair treatment were taken into account. Therefore, racial discrimination and not race itself seems to shape patterns of blood pressure observed among the US African-American population when compared to whites. Interestingly, many African-American participants reported that they typically accept unfair treatment and had not experienced racial discrimination. Blood pressure was higher among this group when compared to African-Americans who reported they had experienced racial discrimination and challenged unfair treatment in one or two of seven situations. These findings varied somewhat depending on social and economic position, and gender, with working class African-American women, who accepted unfair treatment and "kept it to themselves," experiencing the highest blood pressure levels.

Several explanations are offered for why some African-American participants reported they had not experienced discrimination. First, it is possible, but not probable that they actually had not experienced discrimination. Alternatively, some individuals experiencing discrimination may not acknowledge or report it as such. In fact, research indicates that individuals belonging to groups that are discriminated against are more likely to state that members of their group, rather than themselves, experience discrimination (Krieger and Sidney, 1996). This has been labeled as "internalized oppression" in the literature whereby unfair treatment is perceived by members of stigmatized groups as "deserved" and nondiscriminatory (Krieger and Sidney, 1996). Further, those who refuse to accept stigmatized status may be more able and willing to report discriminatory treatment. Conversely, individuals who have experienced but feel unable to challenge discrimination may find it painful to admit that they have experienced discrimination either to themselves or another person, which has been demonstrated in research where additional probes were used (Krieger and Sidney, 1996). Finally, some may feel compelled not to display anger and hurt to shield vulnerability and protect against recrimination and playing into derogatory stereotypes about African-Americans being 'too emotional" (Krieger and Sidney, 1996). Therefore, it is theorized that discrimination must be recognized in order to develop a response, and that the response, or act of challenging the discrimination, offers some protective health value.

Health effects may vary depending on the type of discrimination experienced. For example, findings suggest different health effects of segregation for Chinese-Americans when compared to African-Americans. Discriminatory housing practices such as redlining and segregation predicted better health status for Chinese-Americans, who seemed to benefit from living in isolated cultural enclaves, when compared to African-Americans (Gee, 2002). In this study, discrimination at the individual level predicted lower levels of mental health, but not of general physical health status for Chinese-Americans (Gee, 2002). Finally, the source of perceived racism, i.e. whether it is acute or chronic, is relevant in that each has been shown to differentially predict health status (Williams et al., 1997). Further, African-Americans appear to be particularly vulnerable to physiological and psychological impacts from the combined effects of acute and chronic perceptions of racism (Cooper, RS, 1993; Feagin, 1991; Sigelman and Welch, 1991).

African-Americans have endured extreme forms of discrimination which create challenges to efforts to improve their health. For example, fears of medical professionals among African-Americans date back to the antebellum period and the use of slaves and free black people as subjects for medical experimentation (Gamble, 2002; Humphrey, 1973; Savitt, 1982). More recently, the Tuskegee Syphilis Study, which did not educate patients or treat them adequately, resulted in charges that the study was part of a governmental plot to exterminate black people (Taylor, 1991; Welsing, 1991). Hence, a pervasive distrust of medical and public health authorities, and extremely low African-American participation in clinical trials and other health-related programs, resulted (Gamble, 2002). Further, various forms of unequal treatment within contemporary medical settings reinforce the powerful legacy of the Tuskegee Study. Outside of the medical setting, African-Americans, but not white ethnics, have encountered severe structural discrimination (Saks, 1994). For example, African-Americans were prevented from attaining higher education in white institutions, disproportionately segregated to lower paying jobs, unable to obtain home loans, and even unable to obtain loans to improve the homes in which they lived (Saks, 1994).

The Association between SEP and Perceptions of Discrimination

SEP is associated with perceptions of racism (Forman et al., 1997); however, this relationship is complex (Forman et al., 1997). For example, some previous research has reported a positive relationship between SEP and discrimination, whereas other studies have reported that SEP is inversely related to experiences of discrimination among African Americans (Sigelman & Welch, 1991). It is probable, therefore, that the association between SEP and racism among African Americans varies depending on what dimension of racism is assessed. For example, African-Americans of higher SEP have reported perceiving their environments as more discriminatory because they are more likely to be negotiating environments within which racism is less overt. On the other hand, African-Americans of lower SEP report experiencing more overt expressions of racism, including racism within institutionalized settings (i.e. access to employment) (Clark, et al., 2002). Further, lower SEP African-Americans appear to be more susceptible to some negative health outcomes as a result of discrimination when compared to higher SEP African-Americans and those of other ethnic groups. African-Americans of lower SEP encounter dual stressors; economic hardship and racial discrimination (Clark, et al., 2002). These individuals are therefore exposed to chronic stressors, but also have fewer resources to cope with these stressors, which results in more deleterious health outcomes (Feagin JR, 1991). In addition, as noted previously, when compared to non-Hispanic whites, African-Americans of equal educational levels have a higher prevalence of hypertension and all-cause mortality (Pappas, et al., 1993).

Physicians' Perceptions Leading to Discriminatory Treatment

There is considerable evidence that patient race and SEP affect physicians' perceptions of patients during medical encounters (Armitage et al., 1979; Bertakis et al., 1993; Ventres and Gordon, 1990; Wallen et al., 1979), and the diagnoses and treatments that follow from these perceptions (Ayanian and Epstein, 1991; Hannan et al., 1991; Hannan et al., 1998; Majeroni, et al., 1993; McKinlay, 1996; Martin, et al., 1998; Perkoff and Anderson, 1970; Redman et al., 1991; Steingart, 1991; Tobin et al., 1987; Todd et al., 1993). Findings from one study indicate that physicians perceived African-American cardiac patients to be more likely to be at risk for noncompliance with cardiac rehabilitation, substance abuse, and having inadequate social support. In addition, physicians rated African-American patients as less intelligent than white patients even when controlling for patient sex, age, income, and education (van Ryn and Burke, 2004). SEP was also an important predictor of physicians' perceptions in this study, with lower SEP patients receiving more negative physician ratings on personality characteristics (lack of self-control, irrationality) and level of intelligence (van Ryn and Burke, 2004).

Patients of lower SEP were also rated as being less likely to be compliant with cardiac rehabilitation, less likely to desire a physically active lifestyle, less likely to have significant career demands, less likely to have responsibility for the care of a family member, and more likely to be judged to be at risk for inadequate social support (van Ryn and Burke, 2004). These authors conclude that differential perceptions based on race and SEP may account for differences in treatment observed in other studies in that physician attitudes, perceptions and beliefs about patients have been shown to influence physician behavior in medical care encounters (Hall et al., 1993; Hall et al., 1988; Kaplan et al., 1995; Roter et al., 1988; Sheehan et al., 1985). Further, evidence has shown that higher SEP patients are more willing to volunteer information during medical encounters, more satisfied with their treatment and more likely to comply (Hall et al., 1993; Ben-Sira, 1976; DiMatteo and Friedman, 1980; Hall and Dornan, 1988; Ross and Duff, 1982; Buller and Buller, 1987; Roter et al., 1987). Findings suggest that the delivery of less information to African-American and low SEP patients when compared to others is a result of the physician's perception that these individuals are less intelligent and therefore could not comprehend or utilize additional information (Epstein, et al., 1985; Hooper, et al., 1982; Roter, et al., 1988; Waitzkin, 1985). Further, differences in feelings of affiliation toward patients may explain the differences in treatment reported in other studies (van Ryn and Burke, 2002).

Finally, it has been shown that race and SEP have independent effects on physicians' perceptions. Therefore, considering them separately may underestimate the combined effect that these sociodemographic factors have on physician quality of care. For example, because on average African-Americans have lower SEP when compared to whites, African-Americans of lower SEP may be particularly disadvantaged in the clinical setting (van Ryn and Burke, 2004).

Measuring Discrimination

Discrimination is difficult to measure in that experiences of discrimination, and the awareness of the experiences of discrimination, vary between and within social groups defined by gender, socioeconomic position, race/ethnicity, and historical cohorts (Karlsen & Nazroo, 2002). Because people are more apt to recognize discrimination against groups as a whole than to recognize discrimination against themselves as individuals (Karlsen and Nazroo, 2002), discrimination is typically measured by asking what people think their own (or another) group experiences (Krieger and Sidney, 1996). Individuals who report that they have experienced discrimination tend to report discrimination in one or two, but not all areas, of their life, such as quality education, decent housing, getting a job and receiving equal wages. This may reflect difficulty in distilling multiple experiences, or recognizing experiences as discrimination because they are common, or too difficult to discuss. Also, the experience of multiple forms of discrimination may not be "simply reduced to the 'sum' of each type" and it may be difficult to label or classify experiences as discrete entities (Karlsen and Nazroo, 2002). In addition, some people, who have not actually experienced an event, may live in fear of racism and may have health effects as a result of this fear alone (Karlsen and Nazroo, 2002).

Interpretations of discrimination may vary across groups because racism is expressed differently today than in the past; today it is more institutionalized and covert (Karlsen & Nazroo, 2002). Collectively, these factors have led to a decline in self-reported experiences of discrimination. In addition, discrimination is a complex, multi-level phenomenon that may not be adequately measured by self-reported experiences. Krieger (2001) identified six "discrete – yet entangled – multi-level pathways linking expressions of racial discrimination and their biological embodiment across the life course:" economic and social deprivation; toxic substances and hazardous conditions; socially inflicted trauma; targeted marketing of commodities; inadequate health care; and resistance to racial oppression.

Finally, it is difficult to measure the effects of discrimination in that the pathway(s) between socially inflicted trauma and health is not well understood. It is hypothesized that long-term exposure to inferior treatment and devalued status is damaging to self-esteem, invalidates self-worth, and may block aspirations, which may lead to psychological responses that in turn lead to physiological changes. Alternatively, as mentioned above, there may be immediate physiological responses that lead to deterioration in health over time (Eisenberger et al., 2003; Karlsen and Nazroo, 2002). Further, different manifestations of discrimination "…all have independent detrimental effects on health, regardless of the health indicator used" (Karlsen and Nazroo, 2002).

In spite of these measurement difficulties, at least two studies have reported that perceptions of discrimination provide some additional explanation for racial differences in self-rated health after SEP is accounted for (Williams et al., 1997; Ren et al., 1999 in Williams & Collins 2001). One such study (Williams et al., 1997) documented markedly higher levels of discrimination based on race or ethnicity. Although SEP accounted for most of the racial differences in physical health, the recognition of experiences of discrimination explained a portion of the racial differences in self-reported measures of physical health.

The Impact of Medical Care

Racial/ethnic differences in access to health care most likely contribute to the observed disparities, although to what degree is unclear. Latinos, Asian Americans, American Indians and Alaska Natives, and African-Americans are less likely than whites to have health insurance, they have more difficulty obtaining healthcare, and have fewer choices in where to receive care (Smedley et al., 2002). According to Collins et al. (1999), Latino and African-American patients are more likely to receive care in emergency rooms, and are less likely than whites to have a regular primary care provider. Of greatest importance, however, is the fact that at equivalent levels of access to care, racial and ethnic minorities experience a lower quality of health services and are less likely to receive routine medical procedures when compared to white Americans (Smedley, et al., 2002).

Some theories hypothesize that increased access to health care afforded through health insurance will result in better ratings in overall health status. Although uninsured populations generally have worse health outcomes than insured populations (Berk et al., 1995; Donelan et al., 1996; Franks et al., 1993; Hadley et al., 1991), health insurance only accounts for a relatively small portion of overall health status (Smedley, 2003; Zuvekas and Taliaferro, 2003). In addition, medical care in general accounts for only a small percentage of population health (Bunker et al., 1995); indicating that even if health insurance is provided for socioeconomically disadvantaged groups, their health status will not equal that of individuals in higher socioeconomic strata.

The mediating role of medical care seems to vary by racial/ethnic group. For example, although California Latinos have less access to care, and fewer hospital inpatient days, they exhibit better health outcomes for certain chronic diseases (Hayes-Bautista, 1997). It is unclear whether these trends will hold as the length of acculturation among this population increases and the data begin to capture rates relative to second and third generation immigrants. Recent history demonstrates that simply providing access to health care for California Latinos as was done through the Healthy Families (HFP) and Medi-Cal Programs, does not necessarily translate into utilization, as evidenced by low enrollment rates in these two programs. In addition, universal health care systems adopted in other countries have demonstrated that access to medical care is not enough to ensure utilization (Pincus et al., 1998).

In summary, cost may not be the only deterrent to utilization of health services. People of lower SEP may be less likely to access medical care due to attitudes towards health and health care (Suchman, 1965), and characteristics of the health care system that do not encourage consumption. One such characteristic is the promotion of a Western medical model (a didactic model of information dissemination generated by an authoritarian physician and received by the patient), that may not accommodate variations in cultural health beliefs, provider-patient interactions, or environmental stressors that may make it difficult to comply with health advice.

Gender Adds to the Complexity of the Relationships

The complexity of the relationships between race/ethnicity, SEP and health deepens when gender is considered, in part because there are layers of subjugation that are unique to women. Economic structures and gender equity are closely linked. Across cultures, gender equity is positively associated with lower fertility and better health for women and children as well as with economic development (Moss and Barrett, 1995; Razavi, 1997; World Bank 1998). Women typically have less control over household financial resources that affect nutrition, reproductive decision-making and health (Dollar & Gatti, 1999). In the U.S., women have higher rates of multiple indicators of morbidity, but lower rates of mortality when compared to men (Williams, 2002). The minority-white mortality ratio for women is similar to that of men (Williams, 2002). Some examples of racial/ethnic disparities in certain health conditions affecting women include: breast cancer: white women have a higher morbidity rate, but a lower mortality rate when compared to other groups such as African-Americans who are more likely to have advanced disease when diagnosed, and to have worse outcomes at each comparable stage. Minority women have lower death rates for heart disease and most cancers, but higher death rates for HIV/AIDS and homicide (Williams, 2002). White women have higher rates of chronic obstructive pulmonary disease and suicide (Williams, 2002).

More than half of single-parent households with children have incomes below the poverty level; and the majority of these single parents are women (Moss, 2002; UNDP, 1999). Recent gains in female earnings resulting from new legal frameworks and public policies protecting women's rights are concentrated in higher-income households (Moss, 2002). Further, minorities (African-Americans in particular) experience greater numbers of female-headed households. Because these conditions are worse for women than men, racial differences in individual earnings at the same education level understate racial differences in household income (Williams and Collins, 2001). In other words, minority families with female-headed households will have less overall household income when compared to those with male-headed households and merely looking at individual measures of income will not capture this important information. In addition, there are contrary findings for women relative to health risk and low SEP. In at least one study, women had high mortality risk when they had experienced low family incomes prior to pre-retirement years. These data suggest the inadequacy of using education and occupation/income as SEP indicators for women (Duncan, et al., 2002).

Although gender domination may provide some similar experiences among women, there are layers of subjugation experienced by African-American women in particular that make them very unique from white women.

Health Effects of Acculturation Stress among Latinos

People classified as Latino (or Hispanic) are heterogeneous in terms of culture and country of origin, however, the terms Latino and Hispanic are often used interchangeably. For purposes of this study, Latino is the preferred term, but this section reflects the classification used in specific bodies of work cited.

Latinos residing in the U.S., and Mexicans in particular, hold the lowest, or among the lowest, position in monthly earnings, rates of college graduation, professional and managerial positions, U.S. citizenship, and English language ability when compared to other immigrant groups including, Haitians, Jamaicans, other West Indians, Philippinos, Vietnamese, Laotians, Cambodians, Chinese and all others (Portes and Rumbaut, 2001). Latinos' annual per capita median wage is nearly one half that of whites and Latinos is the only group below the state annual median per capita wage (Beccera, 2002). In addition, they are more likely to experience poverty, overcrowded housing and inadequate health care (Becerra, 2002). Finally, Latinos are more likely than any other racial/ethnic group to be without health insurance (Franzini, 2004). In fact, California Latinos have the highest rate of uninsurance among all ethnic groups (28% v. 9% of whites) (Aguayo, et al., 2003). Further, over 1.6 million Latinos in California (18.5%) do not have a usual source of health care—a "widely used measure that indicates a person's potential access to needed care" (Aguayo, et. al., 2003).

Despite low rates of insurance, Hispanics have lower age-adjusted death rates (per 100,000 population) for seven of the top ten leading causes of death in the U.S., with Hispanic/white ratios as follows: heart disease (.68), cancer (.62), stroke (.80), pulmonary disease (.41), unintentional injuries (.97), flu and pneumonia (.80), and suicide (.58) (Williams, 1999). Further, the Hispanic advantage in mortality is mainly among the middle and older age groups (Franzini, 2004). Using the National Longitudinal Mortality Study matched to the National Death Index, Sorlie et al. (1993) also reported lower all-cause mortality rates for Hispanics compared to non-Hispanic whites, and, when adjusted for income, Hispanic men and women in each age group had significantly lower mortality rates compared to the rates for Non-Hispanic Whites. This is counterintuitive in that low socioeconomic status, poor assimilation, and experiences of discrimination and subjugation, should predict worse health outcomes among this group. The contradictory phenomenon of relatively better health status among this group has been termed an "epidemiological contradiction" or "epidemiological paradox."

Explaining the Latino Health Paradox.

Multiple theories have been developed to explain the Latino epidemiological health paradox. The Salmon Bias Hypothesis suggests that Hispanics return to their birth country after they retire or become seriously ill. Therefore, if they die in their birth country their vital statistics are not recorded in this country, which creates an artificially low number of deaths for the population (Franzini, 2004). This phenomenon has been termed "statistically immortal" (Pablos-Mendez, 1994). The relevance of this hypothesis has been questioned for Latinos who are U.S. born and would, according to this theory, stay in the U.S. to die; Cubans, who cannot return to Cuba for political reasons; and Puerto Ricans, for whom vital statistics are recorded in the U.S. (Franzini, 2004).

The Healthy Migrant Hypothesis implies that the healthiest and strongest members of a population migrate. This notion is supported empirically in that in the U.S., foreign-born persons have lower mortality rates than U.S.-born citizens, and recent immigrants have better health than those who have resided in the U.S for longer periods of time (Stephen, et al., 1994). According to this theory, migrants from other regions of the world should demonstrate a healthy migrant effect similar to that of Latinos. In reality, the healthy migrant hypothesis has been refuted in that European migrants do not demonstrate the same healthy migrant effect relative to U.S.-born whites (Abraido-Lanza, et al., 1999; Franzini, 2004).

Culture appears to have some beneficial effects that mediate the impact of socioeconomic disadvantage for Latinos (House and Williams 2002). One theory states that social connection and support is protective for health and may attenuate the effects of other health risks. In social epidemiological research, a consistent theme of positive health benefits emerges from the notion of being connected to something or someone. For example, some level of connectedness to other human beings is protective against coronary heart disease (CHD) and mortality. Lower rates of CHD among individuals who have strong social networks defined by being married, having close friends, involvement in church or other organizational meetings have been reported. Indeed, it is difficult to ignore cultural effects when examining the health status of Latinos. The family is at the center of Latino culture. Latino households are more likely to have two parents and children when compared to state averages (41.1% v. 26%), and immigrant Latino households are more likely to be composed of a couple with children than US-born Latino households (49% compared to 31%) (US Census, 1990).

Culture and the process of acculturation can influence individual risk behaviors, which may play some role in health status. Health behavior and acculturation hypotheses have been proposed to explain the paradox such that: 1) Latinos have more favorable health behaviors and risk factor profiles than non-Latino whites, and 2) Health behaviors and risk factors become more unfavorable with greater acculturation. Collectively, Hispanics demonstrate a mixed behavioral risk profile. As a group, Latinos smoke less (Rogers and Crank, 1988; Abraido-Lanza et al., 2005), drink less (Scribner, 1996; Abraido-Lanza et al., 2005), eat a diet higher in fiber than non-Hispanic whites (Elder et al., 1991; Jones, et al., 1997; Schaffer, et al., 1998); have nearly equivalent mean serum levels of cholesterol; and have higher proportion of mothers receiving prenatal care (Franzini et al., 2004; National Center for Health Statistics, 2000). Conversely, in general, Hispanics have lower rates of childhood immunizations; a higher prevalence of hypertension; significantly higher rates of diabetes; higher BMIs (Abraido-Lanza, 2005), diets that are lower in fruits and vegetables (Thompson, et al., 1999); less likely to engage in any exercise activity (Abraido-Lanza, 2005); are less likely to live in areas with high air quality (Center for Health Statistics, 2000; Franzini et al., 2004); and are likely to experience an unplanned pregnancy (Poston and Dan, 1996). It is possible that the lower overall and cause-specific mortality rates are a function of a relatively new immigrant population that has not yet succumbed to their high-risk environments, and that the epidemiological paradox is purely artifactual. Indeed, for many of the top ten leading causes of death in the U.S., Hispanics exhibit higher age-adjusted death rates; diabetes (1.57 Hispanic/white ratio), liver cirrhosis (1.73), and HIV/AIDS (2.26) (Williams, 1999), and tuberculosis, septicemia, and homicide (House and Williams, 2000). Hispanics are also at increased risk for unintended pregnancy and other sexually transmitted diseases in addition to HIV/AIDS. Therefore, unadjusted mortality and morbidity rates may create an exaggerated "epidemiological paradox" of superior health.

The Significance of Acculturative Stressors.

In general, assimilation and acculturation are thought of as two different concepts. Assimilation usually refers to integration within structural processes, whereas acculturation encompasses the adaptation of individual and cultural beliefs and practices. (Aneshensel, 2004). The following discussion focuses on acculturative processes involved in Latino immigrants' adaptation to a "host society" that might impact various health outcomes. Assimilation is only reviewed briefly here as a historical introduction to modern theories describing acculturative processes.

Park and Burgess (1921), founders of the classical assimilation model, described assimilation as, "…a process of interpretation and fusion in which persons and groups acquire the memories, sentiments, and attitudes of other persons or groups, and, by sharing their experience and history, are incorporated with them in a common cultural life." One of the most important expansions to the model was Gordon's (1964) typology of subprocesses which included: 1) change of cultural patterns to those of host society; 2) large-scale entrance into social institutions of host society, on primary group level; 3) large-scale intermarriage; 4) development of sense of people-hood based exclusively on host society; 4) absence of prejudice; 5) absence of discrimination; 5) absence of value and power conflict. These sub-processes were qualified as types or stages of assimilation that may occur in varying degrees, with cultural assimilation always occurring first, but not necessarily followed by other types. Gordon believed that when structural assimilation to societal rules and norms occurred, all other types of assimilation followed. The key point to this theory, and the one that is perhaps most problematic, is the assumption that the assimilation process moves "inevitably and irreversibly toward assimilation," and that "...most ethnic groups will eventually lose all their distinctive characteristics and cease to exist as ethnic groups…" (Zhou, 1997). In fact, recent evidence indicates that some groups retain some of their distinctive ethnic characteristics, and that different groups seem to assimilate at varying rates and degrees.

Present day processes of immigrant acculturation or assimilation are typically measured by school performance, language knowledge and use, ethnic identities, level of parent-child generational conflict, and the extent to which peer relations extend beyond one's ethnic circle (Portes and Rumbaut, 2001). Portes and Rumbaut (2001) offered a theory of "segmented assimilation," which explains that today's immigrants are different from past immigrants in three key aspects: "1) their individual features, including their age, education, occupational skills, wealth and knowledge of English; 2) the social environment that receives them, including the policies of the host government, attitudes of the native population, the presence and size of a co-ethnic community; and 3) their family structure."

Evidence indicates that increased acculturation results in poorer health among Latinos. For example, infant mortality, low birth weight, cancer, high blood pressure, adolescent pregnancy, and psychiatric disorders increase with length of stay in the United States for Hispanics, with foreign-born Hispanics having a better health profile than their U.S.-born counterparts. In addition, physical health is negatively associated with acculturation stressors such as discrimination, legal status, and language conflict (Finch & Vega, 2003). In one California study, perceived discrimination had an independent effect on depression outcomes among adults of Mexican origin (Finch, et al., 2000). This study found that highly acculturated immigrant Latinos are more likely to experience discrimination when compared to immigrants who were not highly acculturated (Finch et al., 2000). This is intuitive in that immigrants, who attempt to assimilate into their host country, in this case the U.S., are more likely to meet resistance when compared to those who remain more isolated in cultural enclaves. Further highlighting the effects of immigration, US born Latinos who were highly acculturated were actually less likely to experience discrimination. This seems to suggest that immigrant status has an independent effect on the experience of discrimination and resultant health outcomes.

Social support seems to mitigate the effects of discrimination for some groups (Finch and Vega, 2003). In one study, physical health was positively associated with social support, and discrimination was associated with poorer physical health only among those who did not have social support (Finch and Vega, 2003). Therefore, the close social ties evident among newly immigrated Latinos may be protective for certain health conditions. This relative advantage appears to diminish, however, as migrants become assimilated into mainstream US culture. Therefore, once Latino immigrants are fully acculturated to high-risk community environments, health outcomes will theoretically resemble those of other socioeconomically disadvantaged groups living in similar environments (Scribner 1996).

Over time, it appears that immigrants often adopt the behavior patterns of the new culture (House and Williams, 2000). Specifically, decreased breast feeding, increased use of cigarettes and alcohol (especially in young women), driving under the influence of alcohol, and the use of illicit drugs are evident with acculturation (Vega and Amaro, 1994). Dietary patterns also deteriorate over time evidenced by the facts that: U.S. Latino adults experienced an 80% increase in obesity in the last decade (Hubert, et al., 2005); Latinos have the highest prevalence of early childhood overweight among low-income children (CDC, 1998); and Latino women are far more likely than white women to be obese (Thompson, et al., 1999). In a recent study, higher acculturation (measured by generational status and years lived in the U.S.) was the strongest correlate of obesity (measured by BMI), followed by less exercise and poorer diet, among a community and labor camp sample of adult California Latinos (Hubert, et al., 2005).

Length of stay in the U.S. is also associated with increased exposure to relative deprivation and appears to have an additive effect on immigrant health status. Other environmental factors such as increased stressors related to work and sociopolitical environments experienced by racial minorities in the U.S. have also been reported within the Latino population (Rogler, 1999), and may have a role in negative acculturative health effects. For example, Williams (1996) found that darker-skinned Mexican-Americans who were Indian in appearance were lower on multiple indicators of SEP and they reported higher levels of discrimination when compared to their light complexioned, European-looking peers. Conversely, recognizing and developing positive responses to discrimination may be protective for health within certain segments of this ethnic group. Portes and Rumbaut (2001) note the importance of the process of "...forging a reactive ethnicity in the face of perceived threats, persecution, and exclusion." One example of forging a reactive ethnicity is found among Mexican-Americans, whose higher levels of bilingualism may be attributed to their exposure to prejudice in working class environments, resulting in the need to resist mainstream ideals and to hold more tightly to their native language.

Historically, then, studies have reported that as acculturation level increases, distress also significantly increases, independent of the effects of income and education, particularly for young adults (Kaplan & Marks, 1990). Specific to Mexican Americans, researchers have proposed that a longitudinal process may occur where acculturated younger Mexican Americans attempt to advance economically and socially in the host society and therefore "strip" themselves of traditional, ethnic resources and support. This stripping of social support may leave them more vulnerable to stressors resulting from discrimination and relative deprivation in that their attempts to assimilate and acculturate to the host society are met with resistance causing dissonance resulting in mental and physical health stressors. This theory is empirically supported in that worse health has been associated with higher levels of SEP and acculturation, particularly among Mexicans (Finch, et al., 2000). There is evidence to suggest, however, that as these individuals become older, they seek to re-establish connection with their native culture, which serves to decrease the effects of relative deprivation and discrimination and to thereby create more positive mental health. This would explain why findings are varied among Mexican Americans dependent on age groupings.

Taken together, the health behaviors and acculturation hypotheses appear to explain some of the Latino mortality paradox, but findings do not have consistent directionality (Abraido-Lanza et al., 2005). For example, at least two indicators of good health, health care use and self-perceptions of health, have been positively associated with increased acculturation (Lara, et al., 2005). The relationships and pathways between acculturation and risky behaviors have not been identified and therefore merit additional investigation (Abraido-Lanza et al., 2005).

Studying Latinos' Health

Assessing the health of the Latino population is affected by the extreme and complex variation in sociocultural, demographic and historical experiences within and between Latino subgroups from Mexico, Puerto Rico, Cuba, El Salvador, Guatemala, Nicaragua and other countries (Vega and Amaro, 1994). There are significant limitations in the data resulting from the common practice of aggregating individuals of all Latin descent, constant and changing patterns of immigrant influx, and the lack of systematic research within this population. Specifically, mortality rates obscure heterogeneity within racial categories and may not provide accurate pictures of rates for subgroups of Hispanics. In fact, there is variation in mortality rates among Hispanic subgroups. Age-adjusted mortality rates for 1998 from the National Center for Health Statistics indicate that Puerto Ricans had the highest mortality rates per 100,000 (419.7), Cubans the lowest (302.6), and Mexican-Americans and other Hispanics were in the middle of the range (365.2 and 320.8, respectively) (Hoyert, et al., 1999). In addition, the pathways leading to these health outcomes are not clear and appear to vary by Latino subgroup. For example, higher levels of SEP and acculturation are associated with worse health among Mexicans, but with better health among Latinos from the Caribbean Islands.

Further complicating the situation, death certificate data are often subject to observer bias and have been found to have high rates of inaccuracies for certain ethnic groups including Hispanics. In one study, 80 percent of persons who self-identified with an "other" category (70 percent of whom were Hispanic) were classified by the interviewer as white (Williams, 1996). It is unlikely that studies using death certificate data are able to control for the length and experience of acculturation. The quality of mortality data is also problematic because certain minority groups are historically undercounted in census data, which are used to calculate denominators for mortality rates (Williams, 1996).

Based on this review of theoretical and empirical work, it is hypothesized that poorer health status will be found among racial/ethnic minorities when compared to non-Hispanic whites in this sample of California adults. Therefore, a primary focus of the proposed study is to determine the proportion of these disparities that is attributed to socioeconomic position (SEP), and whether this relationship is conditional on racial/ethnic classification. Although it is expected that SEP is a major contributor to disparities in health status, it is hypothesized that it will not account for all of the observed health disparities. Therefore, additional psychosocial factors and medical care factors will be examined to assess whether they help explain any portion of the remaining health disparities. These factors include health-risk behaviors, access to and utilization of medical care, perceived discrimination in a health care setting, and other covariates such as: marital status, sex, age and chronic morbidity. A related primary goal of this research is to examine the impact of acculturation on self-reported health status among Latinos. In addition, this study will attempt to differentiate the relative impacts of different levels of acculturation by distinguishing adult Latino immigrants from child immigrants and U.S.-born counterparts.

CHAPTER 4: CONCEPTUAL FRAMEWORK

The theoretical context for the proposed study is formulated from two paradigms. The first, the social structure and personality perspective, is taken from sociological social psychology and examines the relationship of macro social structures to individual characteristics and behavior (House, 1981; Inkeles, 1959). The social structure and personality perspective posits that social structures shape individual values and behavior, and that an individual's structural position partially accounts for SEP differentials in morbidity and mortality. Previous research suggests that health behaviors, stress, social ties and attitudinal orientations are important links between social structure and health status (Williams, 1990). Further, these psychosocial factors have been linked more strongly to health status when compared to medical care, and they are also systematically related to SEP (Williams, 1990). Therefore, the social distributions of these factors represent the patterned response of social groups to the conditions imposed on them by social structure (Williams, 1990). In other words, this framework posits psychosocial factors are the pathways through which the effects of social stratification are mediated to individuals.

Derived from the social structure and personality perspective, the Paradigm for Research on Socioeconomic Status and Health (Williams, 1990) is useful to illustrate the complex causal pathway between race/ethnicity and health status. This model posits SEP as an important determinant of health status, with psychosocial factors and medical factors as mediators of the association between SEP and health outcomes.

As noted previously, SEP is an important determinant of health that is often cited as one of the main reasons for racial/ethnic disparities in health (Duncan et al., 2002; Everson et al., 1997; Link & Phelan, 1995; Macintyre & Hunt, 1997; Williams, 1997). In general, individuals with higher SEP have better outcomes on a number of health indicators. For example, individuals of higher SEP have better access to health care, more education, superior diets, increased levels of exercise, reduced levels of depression and fewer harmful health behaviors such as smoking and alcohol consumption (Everson et al., 1997). Individuals of lower SEP are more prone to excessive alcohol use, more stressful life events and environments, limited access to social support, less supportive marriages, and single mother households (Everson et al., 1997).

One popular theoretical explanation for these relationships is that individuals of higher SEP experience less environmental stressors in their daily life and are therefore less likely to use unhealthy behaviors as coping mechanisms. Although individual health behaviors have some impact on overall health, past research has considered the impact of smoking, drinking, obesity and physical inactivity and found that, when controlling for these factors, the lowest income group was still at significantly greater risk for negative health outcomes including death (Williams, 1997). These findings suggest that coping strategies that are manifest as unhealthy individual behaviors do not account for all of the health disparities observed among racial/ethnic minorities, and that other contributory factors should be considered.

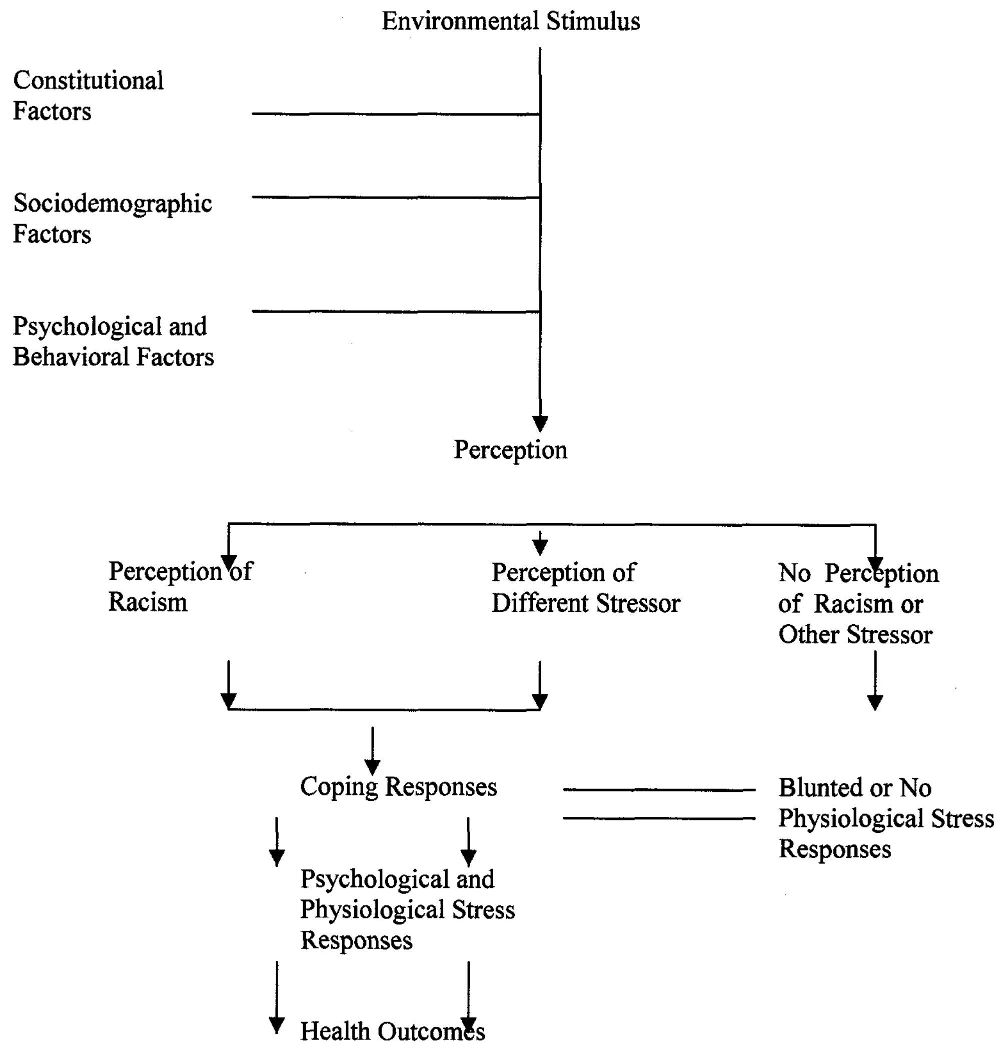
The model illustrates two-way effects between SEP and biomedical factors (constitutional factors such as skin tone and family history of hypertension (Clark, 2002)). In essence, lower SEP-persons are more likely to have certain constitutional or biomedical factors such as being a darker-skinned minority or having certain chronic diseases (Kessler, 1979). This relationship may also be reciprocal in that individuals with these constitutional factors may have trouble gaining employment and may therefore be of lower SEP. Likewise, reciprocal relationships are observed between psychosocial factors and medical care. For example, over time, someone who engages in unhealthy behaviors, such as cigarette smoking, excessive alcohol use, poor dietary habits and a lack of physical activity, may require more frequent doctor visits due to diminished overall health and subsequent disease conditions when compared to those who do not engage in these behaviors. On the other hand, medical care may also have an impact on psychosocial factors in that individuals receiving regular preventive medical care may be more likely to receive ancillary services providing support in their lives, increasing their perception of control, and decreasing the impact of stressors.

Finally, the Paradigm for Research on Socioeconomic Status and Health takes into account the independent impact that demographic characteristics (age, race and sex) have on the other factors in the model (biomedical, psychosocial, SEP, medical care and self-rated health status). Therefore, for purposes of this study, the focus is on race and ethnicity, which is conceptualized as having a direct effect on biomedical factors (racial/ethnic minorities experience higher rates of certain disease conditions), SEP (racial/ethnic minorities are more likely to be of low SEP), psychosocial factors (racial/ethnic minorities are more likely to experience family, occupational and residential stressors, have fewer social ties, lower perceptions of control and are more likely to engage in unhealthy behaviors), medical factors (racial/ethnic minorities are less likely to be insured), and health outcomes (racial/ethnic minorities report worse overall health).

Although this paradigm provides a basic framework for the relationships that will be explored in this study, some of the variables depicted in the model will not be tested in this study, such as psychosocial factors (social ties, perceptions of control and other outside stressors) and early environmental, genetic and other biomedical factors. Further, the model seems to minimize the complexity of the relationship between race/ethnicity and overall health status. The present study predicts that there may be other interaction effects that are not depicted such as that between race and SEP. Specifically, SEP may be a more significant determinant of health for certain racial/ethnic groups when compared to others. Additionally, in the case of psychobiological effects from the experience of racism, the above model does not seem to account for the importance of perception of racism. In fact, it has been reported that there are differences in coping responses and health outcomes dependent on whether one actually perceives the experience of racism. Therefore, it is proposed that an intermediary step between race, psychosocial factors and health status, mainly perception of discrimination or racism, may be important in the causal pathway of interest. Finally, it seems illogical to lump the psychosocial factors together that are depicted in the model in that it is likely that there are relationships between the factors. Instead, it is proposed that health practices are intermediate steps, or coping responses, on the pathway to overall health status between other psychosocial factors such as life stressors, perceptions of control and social ties. Further, it is hypothesized that health practices vary depending on the degree to which these other psychosocial factors are present.

The Contextual Model to Examine Biopsychosocial Effects of Perceived Racism (Clark et al., 2002) offers another approach to examining the variables of interest in this study, and includes the impact of perception in the causal pathway between race, racism and health outcomes **(Figure 1)** .

Figure 1: A Contextual Model to Examine the Biopsychosocial Effects of Perceived Racism



Taken from : Clark, et al. (2002). Racism as a stressor for African-Americans in Race, Ethnicity, and Health. T. LaVeist, editor. Jossey-Bass, San Francisco, CA.

The Contextual Model to Examine the Biopsychosocial Effects of Perceived Racism (2002) was constructed to explain racism as a stressor with negative health effects among African Americans. The model assumes that African-Americans are disproportionately affected by environmental stimuli that are the sources of chronic and acute stress (James, 1993; Outlaw, 1993; Sears, 1991; Thompson, 1996). As discussed previously, this racial group has experienced unique forms and extreme levels of discrimination throughout history when compared to other racial/ethnic groups. The model is therefore concerned with environmental stimuli that could be perceived as racism (i.e. substandard housing, lower wages, and lack of skilled or managerial jobs (Sigelman and Welch, 1991)). Differentiating between chronic and acute experiences of racism is important as each may have unique physiological responses and outcomes.

Constitutional, sociodemographic, and psychological and behavioral factors are viewed as moderator variables in this model. Constitutional factors (referred to as biomedical factors in other models) include genetic or inherent traits such as skin color. Sociodemographic variables include SEP, which has been associated with perceptions of racism (Forman et al., 1997); however, this relationship is complex (Forman et al., 1997). For example, some previous research has reported a positive relationship between SEP and discrimination, whereas other studies have reported that SEP is inversely related to experiences of discrimination among African Americans (Sigelman and Welch, 1991). This suggests that the association between SEP and racism among African Americans varies depending on what dimension of racism is assessed. Psychological and behavioral factors are thought to influence how individuals perceive and respond to environmental stimuli (Adams and Dressler, 1988; Clark et al., 1982; Pearlin, 1989; Wiebe and Williams, 1992). The psychosocial and behavioral factors thought to influence the stress process, cardiovascular outcomes and immune functioning include Type A behavior, cynical hostility, neuroticism, self-esteem, obsessive-compulsive disorder, hardiness, perceived control, and anger expression-suppression (Adams and Dressler, 1988; Bandura et al., 1985; Everson et al., 1998; Larkin, et al., 1998; Miller et al., 1999; Pearlin, 1989; Wiebe and Williams, 1992).

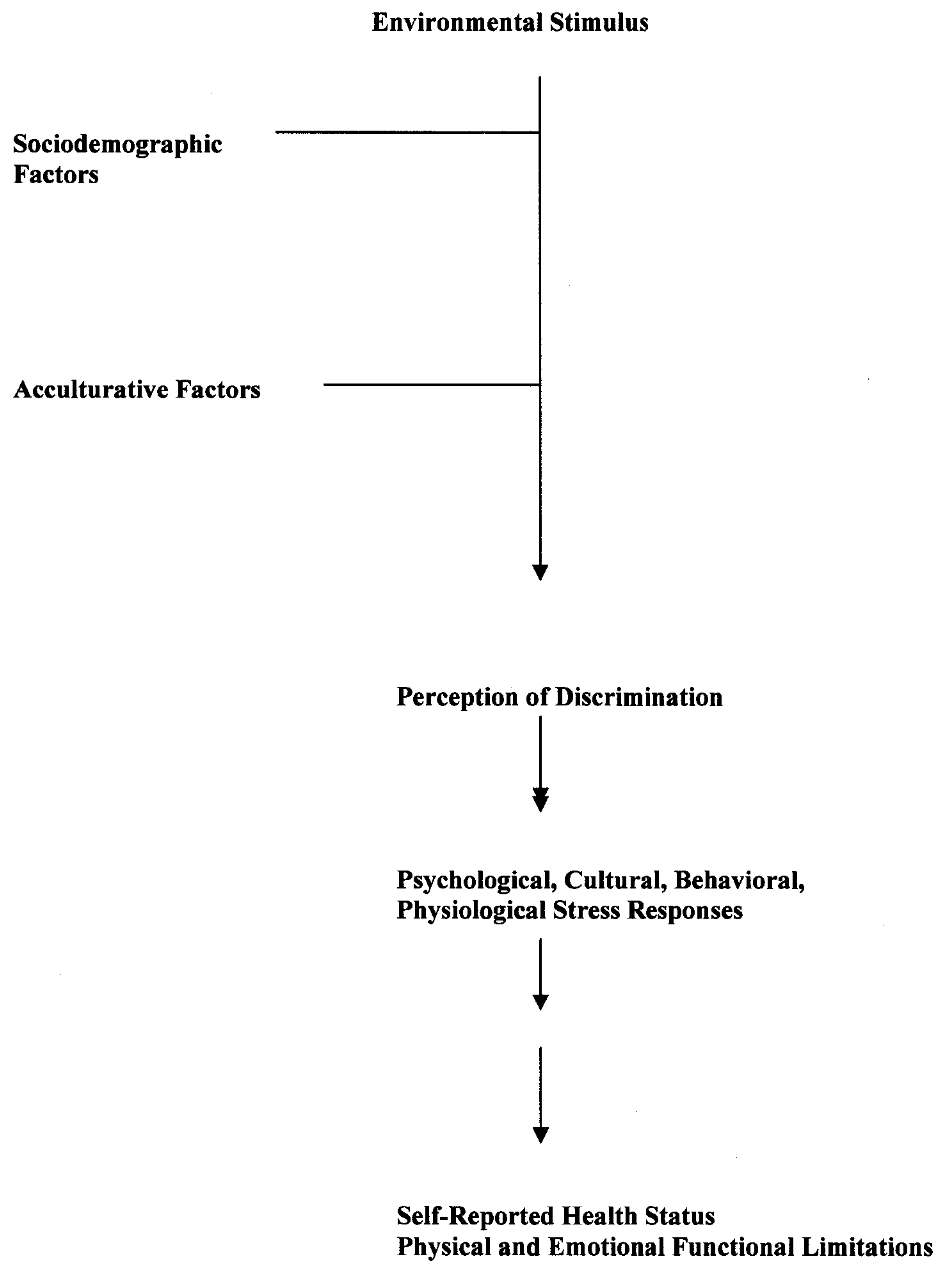
Racism as a perceived stressor is depicted as a mediator variable in this model. Perceived racism is viewed as a subjective variable and is therefore not limited to overt experiences that would "objectively" be viewed as racism. This is consistent with the stress literature, which highlights the importance of the appraisal process in determining whether a psychological stress response will follow an event (Clark, et al., 2002). Coping responses determine the magnitude and duration of stress responses and are differentiated as being either maladaptive or adaptive. Maladaptive responses are predicted to result in a continued state of heightened psychological and physiological activity (Selye, 1976), whereas adaptive coping responses are postulated to mitigate enduring psychological and physiological stress responses, thereby reducing the potentially negative effects of racism on health (Clark, et al., 2002). Stress responses can range from anger, paranoia, anxiety, helplessness-hopelessness, frustration, resentment, and fear (Bullock and Houston, 1987), which in turn can lead to further coping responses including suppression, hostility, aggression, verbal expression of the anger, or the use of alcohol or other substances to blunt angry feelings (Armstead, et al., 1989; Cooper, 1993; Cornell, et al., 1999; Grier and Cobbs, 1968; Harris, 1992; Novaco, 1985). Further, stress responses may be prolonged leading to passivity, overeating, avoidance, or efforts to gain control (Bullock and Houston, 1987).

Finally, psychological and physiological responses to perceptions of racism may, over time, be related to numerous health outcomes. Although there is a paucity of studies examining long-term health effects of perceived racism, the general stress literature indicates that long-term stress is linked to low birth weight and infant mortality (James, 1993), depression (Kendler et al., 1995), the healing process (Kiecolt-Glaser, 1995), breast cancer survival (Spiegel et al., 1989), heart disease, (Jiang et al., 1996; Kamarck, 1991; Rozanski, et al., 1999, mean arterial blood pressure changes (Clark and Armstead, 2002), chronic obstructive pulmonary disease (Narsavage and Weaver, 1994), and upper respiratory infections and clinical colds (Cohen et al., 1991), although cold susceptibility findings are somewhat limited to chronic as opposed to acute stressors (Clark, 2002).

In summary, this model provides a second framework that is useful in postulating the relationships between race, SEP, psychosocial factors, medical factors and overall health status. Having said this, it, like the previous model, considers factors that will not be analyzed in the present study including constitutional factors such as skin color, and certain sociodemographic, psychological and behavioral factors that are thought to modify or explain the relationship between race and overall health status. Therefore, components from each model have been borrowed to create a modified version of the Contextual

Model to Examine Biopsychosocial Effects of Perceived Racism (Clark et al., 2002) (**Figure 2**), which is the conceptual framework for the present study.

Figure 2. Conceptual Model for Understanding Self-Reported Health Status



This revised paradigm depicts the specific dimensions of interest that were included in this study. It also takes into account the importance of acculturative factors and perceiving the environmental or stress event. In this model, perception is conceptualized as a modifier between sociodemographic and acculturative factors, and self-rated health status, which is further modified by stress responses. In addition, as in the Clark (2002) paradigm, the perception of the environmental event is also directly influenced by race/ethnicity, SEP, and other sociodemographic factors such as gender and marital status. Further, in this model, individual health behaviors are conceptualized as coping or stress responses, whereas in the original Williams (1990) model they were classified as psychosocial factors.

CHAPTER 5: SAMPLE DESCRIPTION

Why Study California?

The diverse California population offers a unique opportunity to study racial/ethnic health disparities. In California, non-Hispanic whites are a minority group comprising 47% of the population, whereas in the United States population overall, non-Hispanic whites still comprise a majority (68%) (The Henry J. Kaiser Family Foundation, 2004). It is projected that by the year 2060 minorities will comprise 50% of the U.S. population, and that by the year 2070 this group will constitute a majority of the population (LaVeist, 2002; U.S. Census Bureau). Therefore, California provides a "window into the future" of the nation with regard to the growing number of racial/ethnic minorities, and the complex issues that present as a result of disparate racial/ethnic health status.

The composition of California's minority population does not reflect that of the U.S. It is comprised of 6% blacks (compared to 12% in the U.S. overall), 33% Hispanics (compared to 14% in the U.S.), and 14% Others (which includes Asian-Americans, Pacific Islanders, American Indians, Aleutians, and Eskimos) compared to 6% in the U.S. as a whole. Further, California has a large immigrant population, the majority of which are from Mexico. As a result, California has a much higher percentage of non-US citizens (16%) when compared to the US as a whole (7%) (The Henry J. Kaiser Family Foundation, 2004). The large California Hispanic population, and specifically the sizeable subgroup of Mexicans, provides an opportunity to study health issues that are unique to this group.

The distribution of California's population by Federal Poverty Level (FPL) is very similar to that of the United States as a whole, with 19% of the population living under 100% of the FPL, 21% at 100-199% of the FPL, and 61% living at 200% and above the FPL. (In 2001, the federal poverty threshold for a family of three was $14,128.) In addition, the population distribution by household employment status is virtually the same as the country as a whole with 74% of households having at least one full time worker, 7% having part time workers, and 19% having non workers (The Henry J. Kaiser Family Foundation, 2004). Similar to the country as a whole, there are marked disparities in SEP within the state of California in that 28% of Blacks, 28% of Hispanics and 17% of Others (as defined above) make less than the federal poverty threshold as compared to 11% of whites.

California's racial/ethnic minority groups and African-Americans in particular, have higher mortality rates. In 2001, for example, African-Americans living in California had a higher age-adjusted, mortality rate (1061.1 per 100,000 population) when compared to whites (790.7). Selected disease-specific, age-adjusted mortality rates by race/ethnicity also reflect significant racial/ethnic disparities within the state of California. For example, comparing African-American and white rates per 100,000 population for the year 2001 indicate that African-Americans are far more likely to die from heart disease (330.6 vs. 234.3), stroke

(86.1 vs. 60.1), diabetes (42.3 vs. 20.6), and cancer (238.3 vs. 183.1) (Henry J. Kaiser Family Foundation, 2004).

Although these data are sobering, they are limited in that they reflect only comparisons between African-American and white population groups. Because California is home to individuals with a rich array of racial/ethnic backgrounds, it is important to examine differences between other groups. Therefore, prevalence rates for the most common chronic disease conditions diagnosed in adults are briefly reviewed here, which indicate further racial/ethnic health disparities within the state of California. These data lend opportunities for further exploration regarding contributory factors. The following data are taken from CHIS 2001. It is important to note that these findings are self-reported diagnoses, and that actual morbidity rates may be understated in the event that portions of the population experiencing various health conditions had never received a diagnosis. This would be expected more often among uninsured individuals who have limited access to healthcare when compared to insured individuals.

Arthritis.

Approximately 20% of California adults were diagnosed with arthritis at some time in their lives, the majority of which were age 65 and older. Overall, women are significantly more likely to be diagnosed when compared to men (22.8% vs. 15.7%, respectively). The lifetime prevalence of arthritis among American

Indian/Alaska Natives (29.7%) is significantly greater than the prevalence of all other groups, except African-Americans (24.5%). Latinos and Asians are the least likely to have been diagnosed with arthritis (10.4% and 10.2%, respectively). Further, among all adults, the lifetime prevalence for those with health insurance coverage is more than double that of the uninsured (21.3% vs. 8.9%) (Holtby, et al., 2004), supporting the notion that the uninsured are less likely to receive a diagnosis.

Asthma.

The self-reported lifetime prevalence of asthma in California adults ages 18-24 is significantly greater than all other age groups at 14.5%, and it is greater among females than males (13.0% vs. 10.0%, respectively). African-Americans (16.2%) and American Indian/Alaska Natives (20.9%) have significantly higher rates than all other groups, and Latinos (7.0%) and Asians (9.2%) have significantly lower lifetime prevalence compared to other racial and ethnic groups (Holtby, et al., 2004). Further, diagnosis of asthma varies by SEP. Lifetime prevalence of asthma is greater among those with health insurance when compared to those without (12.1% vs. 8.3%), and individuals in households at or above 300% of FPL are more likely to have been diagnosed with asthma than those in households below 100% FPL (Holtby, et al., 2004). Again, it is probable that those without health insurance are not seeking medical attention and are therefore not diagnosed.

Cancer.

Racial/ethnic differences in death rates attributable to cancer mortality indicate significant disparities in the state of California. In 2001, the number of cancer deaths per 100,000 population of African-Americans was 238.3 as compared to 183.1 for whites and 123.1 for all other racial/ethnic groups (Henry J. Kaiser Foundation, 2004). Further, racial/ethnic disparities are noted in rates of cancer screening. For example, statewide, California women fall short of the Healthy People 2010 goal that at least 90% of women receive a Pap smear test for cervical cancer during the past three years (HP 2010 Objective 3-11b). The Pap smear test rate in California is 84.2%. Asian women are the least likely to have had this test in the past three years (70.9% report having had one) as compared to other racial/ethnic groups. Not surprisingly, women who are of higher socioeconomic status and those who have health insurance are more likely to receive Pap smear testing (Holtby et al., 2004).

Screening rates for other forms of cancer indicate similar disparities. For example, overall, Asian women have the lowest rates of mammography screening, and Asian men have the lowest rates of prostate screening, whereas Latinos and Asians overall are significantly less likely to receive a colorectal cancer screening test when compared to other groups (Holtby et al., 2004).

Diabetes.

The prevalence of diabetes within California (excluding diabetes associated with pregnancy) is extremely high; approximately 1.4 million adults. The highest prevalence of diagnosed diabetes is among adults age 65 and older and among those who are insured and those below 300% of FPL. In terms of racial/ethnic differences, more African-Americans (10.3%) and American Indian/Alaska Natives (9.3%) have diagnosed diabetes than whites (5.6%), Latinos (6.0%) or Asians (4.7%) (Holtby et al., 2004).

Heart Disease.

Heart disease is the leading cause of death across the nation and in California. Over 1.6 million California adults have some form of heart disease and among California adults, males and females are equally as likely to have heart disease. The overall prevalence is higher among the insured (7.7%) than the uninsured (2.7%). The most significant finding of CHIS 2001 is the low occurrence of heart disease among Latinos (3.2%) and Asians (4.8%) compared to African Americans (8.2%), Whites (8.9%), and American Indian/Alaska Natives (11.2%) (Holtby, et al., 2004).

High Blood Pressure.

Finally, the lifetime prevalence of hypertension among California adults is 21.8% with an estimated 5.2 million Californians reporting that they have been told by a doctor that they have hypertension. Men and women appear to be equally likely to have hypertension, whereas racial/ethnic differences are significant. Hypertension is almost twice as prevalent among African-Americans and American Indian/Alaska Natives (32.9% and 31.5%, respectively) than among Latinos (14.3%) and Asians (17.7%). Similar to diseases noted above, significantly higher proportions of adults with health insurance have been diagnosed with hypertension than those without insurance (23.6% vs. 12.4%).

It is important to mention that there are also racial/ethnic disparities in access to medical care within the state of California. The percentage of those who are uninsured is greater for racial/ethnic minorities. Approximately 12% of whites living in California are uninsured whereas 18% of blacks, 32% of Hispanics, and 19% of Others (Asian-Americans, Pacific Islanders, American Indians, Aleutians, Eskimos and people of two or more races) (Henry J. Kaiser Family Foundation, 2004).

CHAPTER 6: RESEARCH DESIGN AND METHODS

Data and Methods

Sample Design and Selection. This study is a secondary analysis of data that were drawn from the 2001 California Health Interview Survey (CHIS 2001). CHIS 2001 is a collaborative project of the UCLA Center for Health Policy Research, the California Department of Health Services, and the Public Health Institute. Conducted as a random digit dial (RDD) telephone survey of California households, it is the largest state health survey ever undertaken in the United States, and it is the first of a series of cross-sectional surveys of the California population conducted every two years to monitor health related indicators and relative changes (UCLA Center for Health Policy Research, 2002a).

The survey included a variety of topics that are relevant to assessing racial/ethnic disparities in health. Major content areas of the survey include demographic information such as age, sex, race/ethnicity; a number of socioeconomic position indicators including, but not limited to, education, employment and income; self-reported physical and mental health status; a variety of questions regarding specific physical health condition and related medical care/advice; mental and dental health; health-related behaviors, including diet, exercise, and alcohol and cigarette use; access and utilization of health care services, and compliance with recommended tests, treatment and prescriptions; perception of discrimination in health care settings; immigrant status and other acculturative measures; health insurance coverage; gun access and training; and sexual orientation (UCLA Center for Health Policy Research, 2002a).

The two main objectives of the survey were: 1) to provide local-level estimates for counties with populations of 100,000 or more; and 2) to provide statewide estimates for California's overall population and its larger racial/ethnic groups, and, in some cases, smaller ethnic groups. The sample was allocated by county and aggregates of smaller counties, with supplemental samples of (1) selected populations, (2) three counties that contracted for additional samples to enhance their estimates, and (3) three cities that each has its own local health department. Larger sample sizes were obtained among larger urban counties in which the majority of populations of color reside to obtain adequate samples for major ethnic groups of color, and supplemental samples were drawn to improve estimates for specific ethnic subgroups (UCLA Center for Health Policy Research, 2002a).

The sampling frame consisted of California households with listed land-line telephone numbers. Therefore, households without phones and cell phone users were outside of the sampling frame. The exclusion of households without phones may have resulted in a systematic bias toward a sample that is higher in socioeconomic position. Therefore, weighting is used to attempt to correct for this bias based on the known proportion of households that are without telephones according to the 2000 Census (UCLA Center for Health Policy Research, 2002b). In general, placing calls to cell phones presents a higher likelihood of reaching voice mail than a live person (UCLA Center for Health Policy Research, 2002b) making this population more difficult to reach. Therefore, the exclusion of cell phone users may have resulted in a systematic bias excluding households that may be more "mobile" (for business or for other reasons), or may be more reliant on cell phones because their household telephone service is periodically interrupted.

Telephone numbers were randomly generated by computer and an arbitrary sample of these numbers were drawn within 41 predetermined geographic areas or "strata" comprised of California's 58 counties. Thirty-three of the strata were comprised of one county each (those with a population of at least 100,000), whereas the remaining 8 were comprised of smaller, regionally grouped counties (DiSogra, 2004). The minimum sample size for any stratum is 800, which could be increased pursuant to a request and additional funding from the involved county.

The randomly generated telephone numbers were then dialed and screened prior to data collection to eliminate nonworking and nonresidential numbers. Adults, children below age 12 (represented by their parents), and adolescents (ages 12-17) residing in California households were the eligible respondents to the survey. (Methods described here will focus on the adult RDD survey from which the sample is drawn for this study). One adult per household was randomly selected to be interviewed between November 2000 and October 2001, and only this adult was eligible for the survey. Interviews were adapted for cultural differences and conducted in six languages: English, Spanish, Chinese (Mandarin and Cantonese dialects), Vietnamese, Korean, and Khmer (Ponce, et al., 2004). A private firm that specializes in statistical research and large scale sample surveys (Westat) was hired to conduct the interviewing. Interviews in English, Spanish and Vietnamese were administered using a computer-assisted telephone interviewing (CATI) system. Interviews conducted in Cantonese, Mandarin, Korean, and Khmer used English CATI screens and paper translations simultaneously. The average adult interview took 32 minutes to complete. Approximately 12% of the adult interviews were completed in a language other than English, and these generally took longer to complete (UCLA Center for Health Policy Research, 2002b).

No incentives were provided for participation in the interview process. To maximize the survey response rate, approximately 66% of the sample received an advance letter. This advance letter, (constructed in five languages), was mailed to all sampled telephone numbers, which had an address obtained from reverse directory services. Response rates varied by sampling stratum and were slightly higher in households that received an advance letter. A minimum of 17 attempts were made to contact a member of a designated household. The proportion of individuals contacted who completed the screener (indicates success in introducing the survey to a household in order to select a respondent) was 59.2%, and refusers did not have a statistically different screener completion rate than acceptors. (DiSogra, 2004). The extended interview completion rate (success in getting the selected respondent to complete the full interview) for the CHIS 2001 adult survey was 63.7%. The product of the screener completion rate and the extended interview rate yields the overall response rate of 37.7%. This rate is comparable to other population-based telephone survey efforts such as the Behavioral Risk Factor Survey (Ponce, 2004). In 397 cases, interviews were considered complete and included in the final adult survey data when 80% of the questionnaire was completed after exhaustive follow-up techniques. In addition, proxy interviews were allowed for adults who were over age 64 or too ill to participate in the survey (n=316) (UCLA Center for Health Policy Research, 2002b).

Weighting

In an ideal situation, all the individuals within the sampling frame would be eligible for selection to participate in the survey, and all those selected would agree to participate. In reality, this never occurs. Instead, many individuals are not eligible for the sample, and some of the individuals selected do not respond, which can result in selection biases termed undercoverage and nonresponse, respectively. These selection biases occur when characteristics of those who respond to the survey are different than those who do not respond, and the magnitude of the bias depends on the level of difference between the two groups and the response rate (Groves, 1989). The nonresponse adjustment procedure used in CHIS 2001 is the weighting class adjustment (Brick and Kalton, 1996). Nonresponse adjustments are computed and applied separately to individual cells, which are defined using characteristics that are known for nonresponders and responders. For example, telephone numbers can be used to identify the county of residence, which can then be used to define cells, and weighting adjustments can be computed separately for each cell. Nonresponse adjustments have drawbacks, however, in that they may increase the variability of the weights and increase the sampling variance of the estimates (Kish, 1992). Therefore, these types of adjustments are only useful when the reduction in the bias compensates for the increase in variance (UCLA Center for Health Policy and Research, 2002c). In this case, the distributions of the weights were examined and those weights that appeared to have a large potential influence on the estimates or the variance of the estimates were reduced through the statistical method of trimming (UCLA Center for Health Policy Research, 2002c).

Nonresponse adjustments can only be made if the same type of data are available for nonresponding and responding units. For CHIS 2001, nonresponse adjustments were made at each level of data collection and the unit of analysis available for forming cells varied depending on the level of data collection. For example, the nonresponse unit at the stage of conducting the screener is a household or telephone number, whereas the adjustment for an extended interview would be the type of person (adult, adolescent or child) (UCLA Center for Health Policy and Research, 2002c).

The process involved in adjusting for undercoverage is different than that used for nonresponse in that units were never eligible to be sampled. Therefore, "control totals" (data from external sources) are used in a process called poststratification (Holt and Smith, 1979). Poststratification is primarily used to lessen potential biases arising from response errors, sampling frame undercoverage, and nonresponse. A secondary objective of this method is to reduce sampling errors, which is important for CHIS 2001 in that sample sizes within counties are relatively small for some subclasses, such as race/ethnicity (UCLA Center for Health Policy and Research, 2002c). In other words, undercoverage adjustments are designed to ensure that each subclass is adequately represented by the survey so that estimates can be constructed for respective subclasses.

The RDD sample was drawn using a list-assisted approach from a stratified frame of 100 banks (a bank is 100 consecutive telephone numbers with the same first 8 digits including area code) with at least one listed telephone number in the state of California. A bank is drawn for the frame and the last two digits are randomly generated to complete the sampled telephone number (UCLA Center for Health Policy Research, 2002c). The base weight of the telephone number is computed as the inverse of the probability of selecting that number; the ratio of the total number of 100 banks in the strata multiplied by 100 and divided by the number of telephone numbers sampled. This describes the procedure that would be used when only one sample is drawn and/or the number of banks remains the same during a second sample. The RDD sample for CHIS was drawn at two different times, and the number of banks per frame changed, therefore, the average number of banks was used to compute the base weight. (The formula for this computation is described in detail in the UCLA Center for Health Policy Research, 2002c.)

Substrata were created within each strata based on the working status of the telephone number (residential, business or nonworking number), whether the number was listed or not, and whether the telephone number had a "mailable" address or not

(UCLA Center for Health Policy Research, 2002c). Different sampling rates were constructed for each substrata as discussed in UCLA Center for Health Policy Research, Technical Paper #5.

Therefore, to minimize selection bias and to produce correct population estimates from the CHIS 2001 RDD sample that match the U.S. Census 2000 Summary File 1 for California, weights were applied to: 1) Compensate for differential probabilities of selection for households and persons. For example, households that had listed addresses were eligible for an advance letter and were therefore assigned a probability of selection of 1.25 over unlisted households because those who receive an advance letter were more likely to participate in the survey. In addition, an adjustment was made to account for the increased probability of certain adults (i.e., those who were not working) being selected within each household. 2) Reduce biases occurring due to differential characteristics of non-respondents. As discussed, bias occurs if individuals who agreed to answer the questionnaire are characteristically different than non-respondents thereby making the sample less representative of the population as a whole. 3) Adjust for under-coverage in the sampling frames and conduct of the survey. In some counties or geographic regions it may have been more difficult to obtain an adequate number of respondents from each racial/ethnic category from which to base population estimates, therefore an adjustment is needed to ensure adequate representation of each group within each sampling cell. 4) Reduce variance of estimates by using supplemental information. Because respondents were assigned a confidential identifier, missing information could be estimated from answers to similar questions, which reduces the number of missing values.

Screener Interview Weighting. Each stratum of the overall RDD sample was considered an independent sample and a household weight ("base weight") was created for all households that completed the screener interview. This was computed as the inverse of the probability of selection of the sample telephone number adjusted for: 1) Subsampling for listed address/advance letter status. This adjustment reduces selection bias in that households with listed addresses were eligible to receive an advance letter, and those who received an advance letter were more likely to participate in the interview process. 2) Unknown residential status. This refers to the phone numbers that were not confirmed as residences (i.e., they were not answered, or they were answered by an answering machine) in spite of several screening attempts. An estimated proportion of residential households among the unknown residential telephone numbers was computed using a survival method with censored data (Brick, Montaquila, and Scheuren, 2002), and this estimate was used to adjust the weights for unknown residential status (UCLA Center for Health Policy and Research, 2002c). 3) Screener interview non-response. This is designed to adjust for the differences between non-respondents and respondents to improve the generalizability of the sample. 4) Multiple telephone numbers. Households with multiple telephone numbers have a greater likelihood of being selected for participation in the survey. The final step in weighting the screener interviews was: 5) Household post-stratification. In this step, household weights were poststratified to household control totals taken from the Census 2000 data. The post-stratification cells were created for households with individuals 18 years and younger and those without. This adjustment is important in that one of these types of households may be more likely to respond to the screener interview than the other due to a variety of factors such as time constraints, concern for health issues, likelihood of having health insurance, etc. The cells resulting from the post-stratification were combined depending on the number of respondents and the size of the county of geographic region, which is described in detail in the UCLA Center for Health Policy and Research, 2002c.

Extended Interview Weighting. A "post-stratified household weight" was then used to compute a person-level weight, which incorporates the within-household probability of selection of the sample person adjusting for non-response and "raking" the data to personal-level control totals (Brackstone and Rao, 1979). The person-level weight was devised for all adults that completed or partially completed the extended interview. The initial adult weight is the product of the final household weight and the reciprocal of the probability of selecting the adult from all adults in the household (UCLA Center for Health Policy and Research, 2002c). In a series of steps, the initial weight is adjusted for non-response and "raked" to known control totals. First, an adjustment was made for differential probability of selecting an adult. For example, within households with adults younger than 24 years of age, or 40 years and over, and no adults for whom their age was unknown, the probability of selecting an adult 40 years and older was two times that of selecting a younger adult. This adjustment limited the selection of adult children and increased the likelihood of obtaining enough adolescents and children in those respective samples in that children 18 years and younger were linked to an adult in the house whereas adults were screened independently. Further, the initial adult weight was adjusted to account for a certain proportion of adults who completed the screener interview, but did not complete the extended interview (non-response) (UCLA Center for Health Policy and Research, 2002c). Response rates were most variable by sex and age groups, therefore non-response cells were created by grouping adults into sex and age groups. Cells that had less than 30 respondents or those that had been adjusted considerably were grouped with other cells (UCLA Center for Health Policy and Research, 2002c). The distributions of the weights were examined and those weights that appeared to have a large potential influence on the estimates or the variance of the estimates were reduced through the statistical method of trimming (UCLA Center for Health Policy Research, 2002c).

The final weighting step was to "rake" the trimmed adult weight. Raking is a multidimensional post-stratification procedure because weights are post-stratified to one set of controls or dimension, in this case according to Census 2000 results. These adjusted weights are then post-stratified to another dimension. For CHIS 2001 results, raking was preferred to simple post-stratification because additional information or "dimensions" can be included simultaneously. In fact, a total of eleven dimensions were used in CHIS 2001, the first 10 of which were created by combining demographic variables (age, sex, race, and ethnicity) and different geographic areas (city, county, group of counties and state). The 11^{th} dimension adjusts the weights for households without a telephone number. After all dimensions were adjusted, the process was iterated until control totals for all dimensions were simultaneously satisfied within a specified level of tolerance. Adjustments were considered satisfactory when they were within 1% of the population total (UCLA Center for Health Policy Research, 2002c).

This weighting design allows for accurate calculation of the variance for population estimates. It also creates some complications for statistical analysis. Therefore, to analyze these data correctly, special survey software, such as SUDAAN or WesVAR that are specifically designed to handle replicate weights must be used (Yen, 2004). Further, the weighting techniques described above are designed to reduce bias within the sample as a whole. Therefore, the weighting methods may actually increase bias when statistical analysis techniques, such as regression analysis, are used to examine sub-samples of the population, which must be considered when analyzing the findings.

Imputation Methods

Three different imputation methods were used in CHIS 2001 to fill in missing responses for weighting and descriptive purposes. The first was deterministic imputation, which was used to fill in missing items for self-reported county of residence (which is not used in the present analysis). This imputation did not require randomization because other data are available that can be used to determine the respondent's county of residence with a high level of probability. The respondent's self-reported zip code was the most common source of information for imputing county of residence (UCLA Center for Health Policy and Research, 2002c).

The second method was a random selection from the observed distribution, which was used only when a very small percentage of the items were missing. As one example, this method was used to fill in missing values for self-reported age. In this case, distributions of the responses for age by type of interview (adult, adolescent or child) were used to randomly assign an age using probabilities associated with these distributions (UCLA Center for Health Policy and Research, 2002c).

The third method is "hot-deck" imputation, which was used to impute race, ethnicity and household income. This method constructs a randomly selected pool of individuals who have similar household structures to the person who did not respond. This group, with no missing values on the variable of interest, functions as the "donor" group and cases are randomly selected and the recipient is imputed the same value for the missing item (i.e. household income or race/ethnicity). Once a donor response is used, it is removed from the pool of donors. The "hot-deck" method of imputation is the most commonly used method for assigning values for missing responses in large-scale household surveys (UCLA Center for Health Policy and Research, 2002c. The drawback to using "hot-deck" imputation, as with any imputation method, is that there is the possibility for a higher degree of bias and variance in the population estimates. Having said this, when the amount of missing data is small and the data are missing at random, then the bias of the estimates and the variance of the estimates due to the missing data should be minimal (UCLA Center for Health Policy and Research, 2002c). In fact, "hot-deck" imputation was used for two key variables used in this study; race for which 1,754 responses were imputed (or 3.03% of the adult interviews), and Hispanic origin for which 216 responses were imputed (or 0.37%) (UCLA Center for Health Policy and Research, 2002c). These cases represent a small proportion of the interviewed sample and, therefore, it is estimated that the effect of the imputation methods is relatively small. In addition, for race and ethnicity, the imputation method was applied at the household level based on the household structure (i.e. one adult, two adults, adults with children, etc.), which improves the likelihood that the pool of donors from which responses are imputed is a good match.

Strengths of the CHIS 2001 Data

The sample for the present study is drawn from the CHIS 2001 Adult Interview Dataset comprised of 55,428 adults, ages 18 years and older. Distributions of unweighted sample characteristics are included in **Table 1.** For purposes of this study, Department of Finance definitions of race and ethnicity are used. Therefore, self-identification as Latino is given precedence over other categories. The large sample and sample design reflects the diversity of the California population and allows for the provision of health estimates for California's major race/ethnic groups.

(Sub-samples were drawn to allow for estimates within smaller ethnic groups but are not utilized in this study.) The relatively large sample of Latino respondents (n=11,840) will allow for the evaluation of the effects of acculturative processes on racial/ethnic and socioeconomic health disparities. Finally, the randomized study design and complex weighting procedures consistent with the U.S. Census allow for the provision of estimates that can be generalized to the California population as a whole.

CHAPTER 7: OPERATIONALIZATION OF VARIABLES

Indicators of all variables used in the present study are based on self-reported information obtained during the CHIS 2001 telephone survey.

Dependent Variables

Self-Rated Health Status. For this study, the first outcome or dependent variable of interest is self-rated health status. CHIS 2001 respondents were asked to select one of the response choices to the following question: "In general, would you say your health is (1) excellent, (2) very good, (3) good, (4) fair, or (5) poor?" This ordinal variable was recoded to reverse the values so that the higher values corresponded with better health status.

Self-rated health as a measure of perceived health status has been used frequently in the public health literature (McDonough, et al., 1997; Lantz, et al., 2001). This measure has been shown to be highly predictive of mortality and other health outcomes (Bosworth et al., 1999; Idler and Benyamini, 1997), and to have high test-retest reliability (Lundberg and Manderbacka, 1996). In addition, both self-reported health status and self-assessments of physical functioning are valid and useful indicators for measuring population health (Avlund, 1997; Lundberg and Manderbacka, 1996; Miilunpalo, et al., 1997).

Studies have noted that self-rated health status varies by racial/ethnic group (Ren and Amick, 1996). For example, Latinos and African-Americans typically report poorer general health, and certain Latino subgroups report increased functional limitations when compared to whites (Morales, et al., 2000; Ren and Amick, 1996). One study found that among Latinos, Mexicans were more likely than Non-Hispanic Whites to report poor health, whereas Puerto Ricans were more likely than whites to experience functional limitations (Ren and Amick, 1996). Further, Morales and others (2000) found that Latinos were significantly more dissatisfied with interpersonal and technical aspects of medical care than Whites.

Asians and Pacific Islanders, on the other hand, traditionally rate their health better than or equal to that of Non-Hispanic Whites, but these groups were less satisfied and perceived less sharing in the doctor-patient relationship compared with other ethnic groups in at least one study (Meredith and Siu, 1995).

Studies examining racial/ethnic differences in self-rated health have reported mixed findings. For example, one study found that racial/ethnic differences were significantly reduced when controlling for language and access variables (Seid, et al., 2003). Further, researchers have questioned whether standard functioning measures can be interpreted the same across racial/ethnic groups (Meredith and Siu, 1995). Taken together, however, current findings suggest that race and ethnicity are important factors in explaining disparities in self-rated health status, independent of SEP (Ren and Amick, 1996).

Physical Functional Limitations. The second dependent variable of interest is physical functional status. This variable was operationalized using the question:

"During the past 4 weeks, did your physical health limit the kind of work or other activities you do?" This variable was dichotomized into (0) no and (1) yes.

Emotional Functional Limitations. The final dependent variable of interest assesses emotional functional limitations. This dimension of mental health status was measured by asking the question, "During the past 4 weeks did you not do your work or other activities as well as usual because of emotional problems such as feeling anxious or depressed?" The variable was dichotomized into (0) no and (1) yes.

Independent Variables

Focal Independent Variable: Race/Ethnicity. Race/ethnicity categorizations were based on self-report from a compilation of separate questions. CHIS 2001 respondents were first asked, "Are you of Latino or Hispanic origin?" Individuals who responded "yes" were asked to specify this origin. All participants were subsequently asked which one or more of the following they would use to describe themselves: Native Hawaiian; Other Pacific Islander; American Indian; Alaska Native; Asian; Black; African-American; White; or Other. A race/ethnicity composite measure was created giving priority to identification of Hispanic or Latino origin. For purposes of this study, the race/ethnicity variable was recoded to match Department of Finance definitions of race and ethnicity, and categories are limited to single-race definitions. In addition, Asian, Native Hawaiian and Other Pacific Islander were combined, and American Indian and Alaska Native were combined to maximize sample size. "Non-Latino Other 1 race" was combined with "Non-Latino

2+ races" to form the newly constructed "Other" category. Therefore, the final racial/ethnic categories used in this study are: Non-Hispanic white; Asian/Pacific Islander; American Indian/Alaska Native; African American; Latino; and Other. Non-Hispanic white was the comparison group for all analyses.

Intervening or Mediating Variables

Socioeconomic Position.

SEP Indicators that previous studies have found to be associated with racial/ethnic health disparities were examined for inclusion in this analysis and include: Education, Household Income, Employment Status, Assets over $5,000, and Federal Poverty Level. Recent research highlights the importance of focusing on economic indicators of SEP (Duncan, et al., 2002). Specifically, knowledge of one's assets may be more descriptive of one's economic condition when compared to income, which is prone to fluctuation and does not reflect other economic burdens or outflows (Krieger, et al. 1997). In fact, indicators of wealth are related to health independent of traditional indicators of SEP (House, 1996; Filakti & Fox, 1995). Although wealth is also subject to some "reverse-causation" problems, it is more stable than income in that it usually reflects a condition developed over a lifetime, whereas income is subject to fluctuation (Duncan et al., 2002). Therefore, when wealth is measured as an indicator of SEP, the racial gaps in SEP widen. In fact, at every level of income, blacks have considerably less wealth than whites (Filakti and Fox, 1995; Williams and Collins, 2001).

One measure of wealth is captured in CHIS 2001. This question asks whether the respondent possessed assets over $5,000, but it was found to have severe limitations. For example, it was only asked of those individuals whose annual income was less than 300% of Federal Poverty Level (FPL). As a result, it was not included in the present analysis because 29,000 individuals who were 300% of FPL and above were not asked this question. In addition, Federal Poverty Level was dropped from this analysis as a measure of SEP because it is a calculated variable using the household income variable and it has a large number of missing cases. Therefore, only three measures of SEP are included in this study; education, household income and employment status.

Educational Attainment. Educational attainment was assessed by asking the question, "What is the highest grade of education you have completed and received credit for?" For the purposes of this study, responses were collapsed to form the following categories: 1) less than a high school diploma; 2) high school diploma or equivalent; 3) some college, an associate of arts degree or vocational schooling; 4) a bachelor of arts or bachelor of science degree; 5) some graduate school, a master's degree or higher.

Education is an important determinant of one's work and economic situations, which have influences on health through specific work environments and levels of consumption (Psacharoupoulos, 1985). Education is also associated with health in that health behaviors vary by education level with greater likelihood of engaging in health-enhancing behaviors occurring at higher levels of education

(Lynch et al., 1997; Ross & Wu, 1995). The highest education level attained is an indicator of SEP that is commonly used because these data are relatively easy and reliable to collect. In addition, education data have further benefits in that they are a marker of early life circumstances, which is important in examining the lifetime effect of SEP as opposed to the effects of more immediate circumstances such as current occupation or income (Davey-Smith et al., 1998). Having said this, education level has limitations as an indicator of SEP in that it does not account for other career training or investments that individuals may make later in life, nor does it account for the adverse impacts that volatility in economic status during adulthood may have on health (Duncan et al., 2002; McDonough, et al., 1997).

Employment Status. In this study, employment status differentiates between individuals who were employed and those who were not employed at the time of the survey. This measure was operationalized as, "These next questions are about the work you do. Which of the following were you doing last week? 1) working at a job/business; 2) with a job/business but not at work; 3) looking for work; 4) not working at a job/business. Those who were working (category 1) and those who were employed, but not physically at work (i.e. they were on vacation or some other type of leave) (category 2) were combined to reflect those who were (1) "employed" at the time of the survey. Respondents who were looking for work (category 3), or not working at a job/business (category 4) were combined as (2) "not employed" at the time of the survey. Individuals who are employed were used as the comparison group for all analyses.

Although it has been "found to be robust in predicting variations in health status" (Krieger et al., 1997), employment status is a problematic measurement for certain groups such as teenage mothers or others who do not participate in the labor market. These individuals may not be expected to work, or they may not be eligible to work and therefore they should not suffer ill health effects as a result of being unemployed. In addition, occupation status may reflect later-life circumstances, making it difficult to differentiate between causation (low occupation level resulting in poor health outcomes), or selection (poor health resulting in low occupation level) (Duncan et al., 2002). This question of the ordering of events is essential to estimating the strength of associations between race/ethnicity, employment status and health status.

Household Income. Household income was measured with the following question: "We don't need to know exactly, but could you tell me if your Household's ANNUAL income from all sources before taxes is more than $20,000 per year or is it less?" Based on their answers to this initial question, respondents were then offered various income ranges from which to choose. A total of 13 income categories with intervals of $5,000 and $10,000, and a final range of $135,000+ were established. This is an ordinal variable in that the intervals between categories are not equal. This variable was recoded into categories reflecting the midpoint of each range (with the exception of $135,000+, which is top coded).

U.S. studies have used the construct of household income as an indicator of SEP status more often than other countries. Household income is useful in that it is indicative of a household standard of living experienced by all members of the household who theoretically share goods and services (Duncan et al., 2002). However, household members do not always have equal access to income, goods or services. Specifically, females are typically the disadvantaged members of the household (Pahl, 1990; Volger and Pahl, 1994). Therefore, household income does not account for differential access to income within a household and may overstate one's access to resources at the individual level. In addition, income understates racial differences in household economic resources (Williams, 1996). Further, household income may not be an accurate representation of standard of living for certain groups such as retired individuals or those who have other sources of family wealth. Finally, a one-time measure such as household income does not capture information relative to the cumulative effects of a lifetime of deprivation or privilege (House, 1996).

In preliminary analyses, a composite of these three variables was created using Principal Components Analysis. The explanatory value of the composite variable was compared to that of the individual SEP predictors in the final analysis. The individual SEP predictors were significantly correlated with each other (see Table 4), with highest education level attained and household income being highly correlated (.468). In addition, the R^2 value did not change appreciably when comparing the SEP factor to individual SEP predictors. Therefore, the SEP factor was retained for final analyses in order to examine the impact that an overall socioeconomic position has on self-rated health status. Further, previous studies have indicated that socioeconomic position is a complex social construct resulting from a combination of factors such as education level, household income, employment status and other factors not measured in this study, such as financial assets. SEP is also influenced by historical events such as prolonged experiences of poverty during childhood. The approach employed in this study allows for the analysis of what these predictors have in common, instead of attempting to isolate the unique contributions of each.

Behavioral Risk Factor Measures

Smoking Behavior. Participants who reported they had not smoked a minimum of 100 cigarettes in their lifetime were coded as "nonsmokers," whereas those who reported they smoke every, or some days, were coded as "current smokers." "Former smokers" comprised the third category, and the "nonsmokers" category was the comparison group for all analyses.

Alcohol Use. Respondents were asked if they had a drink in the last month. Those who had were then asked the number of times they had 5 or more drinks in the past month. Those who reported they had 5 drinks 18 times or less in the past month, or those who had fewer than 5 drinks at one time, were coded as "moderate alcohol users," whereas those who had 5 drinks 19 times or more were considered "heavy alcohol users" (Lantz et al., 2001). The comparison group for all analyses is the participants who reported no alcohol use in the past 30 days. Various approaches to measuring alcohol use have been used in the public health literature. Specific categories for this variable were adopted from previous research similar to that proposed in this study (Lantz et al., 2001).

Physical Activity. Several questions were used to compute indicator variables measuring overall physical activity level including: "Over the past 30 days, did you do any (hard/vigorous, moderate or light) activities that caused (heavy or slight/moderate) sweating or increases in breathing?" Those who responded yes were asked how many times and how many minutes they did these activities per (day/week/month). Using the approach reported by Babey et al. (2005), "physical inactivity" is defined as performing no vigorous activity (activity that made the respondent "sweat or breathe hard" for at least 20 minutes) and performing no light to moderate activity (such as walking or bicycling for at least 30 minutes) during an average seven day period. "Some physical activity" is defined as performing some level of physical activity during a seven day period, but less than the current recommended standard levels of physical activity. "Regular physical activity" is defined as performing at least 20 minutes of vigorous activity on three or more days out of a seven day period, or at least 30 minutes of moderate activity on five or more days of a seven day period.

Body Mass Index. Body mass index (BMI) is the ratio of weight to height squared. Using the Centers for Disease Control and Prevention categories, a BMI of 18.5 or less is categorized as "underweight," 18.6 to 24.9 is "healthy weight," 25 to 29.9 is "overweight," and 30 or higher is "obese" (CDC, 2004).

Medical Care Factors

Previous research has noted that factors related to medical care access and utilization are relevant in the causal pathway between SEP and overall health status (Williams, 1990). Therefore, three measures were included to attempt to assess the impact of medical care.

Chronic Morbidity. Being diagnosed with chronic disease is negatively associated with self-rated health status in this dataset. The most common adult chronic diseases were selected for inclusion in the present analysis. In CHIS 2001, respondents were asked whether a doctor had ever told them that they had specific chronic conditions including: arthritis, asthma, cancer (other than breast cancer, which was dealt with separately in the survey), diabetes, heart disease, and high blood pressure. Because overall health status, and not specific conditions, is the focus of this study, a count variable was constructed to indicate the number of chronic conditions individuals reported.

Health Insurance Status. Although it might be anticipated that increased access to health care afforded through health insurance would result in better ratings in overall health status, findings indicate that although health insurance is important, it only accounts for a relatively small portion of overall health status (Smedley et al., 2003; Zuvekas et al., 2003). Health insurance status was examined as a potential intervening variable that might explain a portion of the focal relationship between race/ethnicity and self-rated health status.

Individuals who had health insurance during the past 12 months were considered (1) insured and those who did not have health insurance during any of the past 12 months were defined as (0) "uninsured," and the uninsured group was the referent for the analyses.

Usual Source of Care. This variable was measured with the question, "Is there a place where you usually go when you are sick or need advice about your health?" Responses were recoded into a dichotomous no (0) and yes (1) variable. The comparison group was comprised of those who did not attend a regular place for health-related issues.

Discrimination

Discrimination in a Health Care Setting. One question in CHIS 2001 attempted to measure the concept of experiencing discrimination and was focused on the context of health care settings: "Thinking of your experiences with receiving health care in the past 12 months, have you felt you were discriminated against for any reason?" This variable was dichotomized into no (0) and yes (1). Respondents who indicated they had experienced discrimination were then asked, "What do you think was the reason that you were discriminated against?" Possible responses include: age, race or ethnic group, language/accent, health or disability, body weight, insurance type, income level, religion, sexual orientation, gender/sex, or some other reason (specified). The CHIS variable that recorded the first response given to this question was used for all analyses in order to ensure those who reported more than one type of discrimination were only counted once. For full sample analysis, this variable was recoded into three indicator variables: 1) racial/ethnic discrimination, which combined the race/ethnic group and language/accent reasons for discrimination; 2) other discrimination, which collapsed all other reasons for discrimination, and 3) no discrimination reported. For the Latino sub-analysis, only the yes/no indicator variable for any discrimination was used in that the racial/ethnic reasons for discrimination was designed to measure differences between racial/ethnic groups as was done in the full sample, whereas simply accounting for the health impacts from the experience of any type of discrimination is relevant in a fairly homogeneous sample of Latinos, the majority of whom are Mexican.

Acculturation Level

Previous research has indicated that amount of time spent in the U.S. has an effect on health outcomes, with greater time in the U.S. being negatively associated with physical and mental health (Finch & Vega, 2003; Finch, et al., 2000; House and Williams, 2000; Hubert, et al., 2005; Kaplan & Marks, 1990; Rogler, 1999; Vega and Amaro, 1994).

The impact of acculturation was therefore taken into account in this study. A number of potential "acculturation" measures were included within the CHIS 2001 adult survey. Because this study examines a multi-ethnic sample, it is likely that these indicators of acculturation may not measure the same dimension for all racial/ethnic groups. Therefore, variables used in previous studies to measure acculturation within the Latino population were selected.

Four variables were examined for inclusion in this analysis to analyze whether there are differences in health status between "acculturated" and "non-acculturated" Latinos: "What languages do you speak at home?" This variable was recoded to (0) "other language(s), "(1) "Spanish, "(2)"English and Spanish," and (3) English and indicator variables were constructed for each category. Those who indicated that they spoke English were also asked, "Would you say you speak English very well, well, or not well?" This variable was recoded as (0) "Not at all (those who indicated that they did not speak English at all taken from a previous question)," (1) "Not well," (2) "Well," (3) "Very well" and indicator variables were constructed for each category.

Native language retention is an important measure in that it is thought to be an indicator of level of acculturation. Portes and Rumbaut (2001) found that Mexican-Americans were more likely to hold onto their native language, and Latin-origin students were more likely to be bilingual when compared to other immigrant groups. Further, there is a relationship between reduced parental control and Spanish fluency among second-generation immigrant youth. Overall, Spanish is more present in the Latino population than it was in the postwar years. Numerous television networks, radio stations, newspapers and magazines "...stick together the Latino community, providing a homogeneity of taste, opinion and discourse that was unknown in the early 1940s and 1950s" (Hayes-Bautista 1997).

The third acculturative variable was measured by asking, "Are you a citizen of the United States?" This variable was recoded as (0) "Non-citizen," (1) "Naturalized Citizen," (2) "US-Born Citizen," and indicator variables reflecting each category were used. Finally, time in the U.S. was measured by asking, "About how many years have you lived in the United States?" This variable was considered, but eventually rejected after the inclusion in some models resulted in problematic findings because it was already incorporated in the model as a component of the computed immigrant status variable discussed below.

In addition to assessing the impact acculturation level, this study seeks to identify the effects of age at immigration. Using the continuous age variable, the continuous number of years spent in the U.S., and a variable indicating birth country a new variable entitled "adult immigrant" was created to differentiate between Latinos who were U.S. born, those who immigrated to the U.S. as children (age 14 years and younger), and those who immigrated as adults (age 15 years and older). The formula used for this variable was (age-years in U.S. >=15 if not born in the U.S.). This adult immigrant measure was then recoded into three dichotomous indicator variables.

Other Independent Variables

Previous studies have demonstrated that a number of demographic characteristics are correlated with health status, SEP, and health behaviors (Lantz et al., 1998; Lantz et al., 2001; Williams, 1990). Therefore, in order to isolate the effects of these characteristics, measures of these constructs were included in the analyses.

Age. Respondents reported their age at the time of the survey. Age was retained as a continuous variable.

Gender. Participants self-reported whether they were male or female and the variable was recoded into an indicator variable, and females were the comparison group for all full sample analyses, however, some final models were also stratified by gender...

Marital Status. Marital status was measured by asking, "Are you now married, living with a partner in a marriage-like relationship, widowed, divorced, separated or never married?" The original variable was recoded into an indicator variable: (1) "married or living with partner;" compared to (0) "widowed, separated, or divorced and never married."

Data Preparation Plan

For preliminary analyses, the full, unweighted sample was used in order to assess the relationships between the variables within the sample before extrapolating findings to the population level. Missing responses were imputed for key variables used in the weighting process according to the methods described in the "Analytic Strategies" section. In addition, remaining observations with responses of "not applicable," "don't know" or "refused" were set to missing and dropped from the analyses. In these cases, missing data for single variables did not exceed 1% of the total responses. Therefore, no further exclusions were made from the data set. Prior to model building, standard univariate and bivariate procedures were used to examine the distribution of all variables included in the study. Non-weighted, preliminary data analysis was conducted using SPSS 11.5. STATA 9 was used to conduct final, weighted analyses. STATA 9 is equipped to analyze population and replicate weights, which are included in the CHIS 2001 data set.

CHAPTER 8: ANALYTIC STRATEGIES

The primary objective of the proposed research is to understand the degree to which mediating factors including, 1) socioeconomic position (SEP), 2) level of acculturation (among a subsample of Latinos only), 3) health risk behaviors, 4) medical care factors, 5) chronic disease conditions, and 6) experiences of discrimination, explain racial/ethnic disparities in self-rated health status among a large, diverse, random sample of California adults. Preliminary analyses were conducted using unweighted data from the CHIS 2001 Random-Digit-Dial (RDD) survey of adults. The results of these analyses are presented in the section entitled "Preliminary Results." Final analyses were conducted using weighted data from the CHIS 2001 RDD survey of adults and these results are reported in the section entitled "Study Findings."

Data Analysis Procedures

To evaluate the characteristics of the sample, unweighted distributions were examined using SPSS version 11.5. Unweighted data were selected in order to examine results at the sample level before using weighted data to make inferences about population-based trends. Principal Components Analysis was used within SPSS 11.5 to develop a composite measure for indicators of SEP. Bivariate relationships between the unweighted dimensions of interest were examined using linear regression. Final analyses were conducted using multivariate analyses techniques in STATA 9 to analyze a series of models that successively add covariates to the relationship examined in each previous model.

Linear regression analysis is appropriate for dependent variables that are ordinal, such as the 5-point health status rating scale used in this study (Aneshensel, 2002). Coefficients obtained through this analysis indicate whether the association between the independent and dependent variables are positive or negative. In addition, the coefficients provide the numeric value of an increase or decrease on the health status scale depending on racial/ethnic category as compared to non-Hispanic Whites.

Binomial logistic regression analysis is appropriate for dependent variables that are dichotomous, such as the physical and mental health limitation variables. Odds ratios indicate the likelihood that one will have a limitation based on their racial/ethnic category relative to the reference category (non-Hispanic White) (Hosmer & Lemeshow, 1989). Odds ratios greater than 1.0 indicate an increased likelihood of a health limitation relative to the reference group, whereas those less than 1.0 indicate a decreased likelihood.

Analytic Strategies

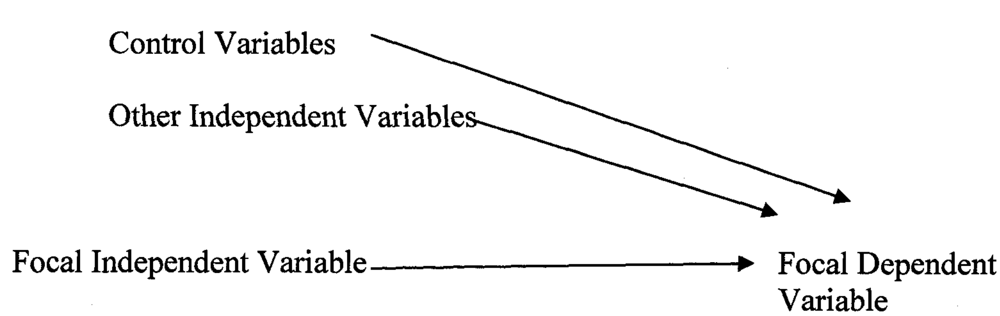
Two general strategies are used to establish the internal validity of the relationship between race/ethnicity and self-reported physical and emotional health status. Analytic approaches developed by Aneshensel (2002) are used to frame the present study. Therefore, for purposes of this study, the main independent variable of interest (race/ethnicity) is referred to as the "focal independent variable" and the main dependent variables of interest (overall health status, physical functional limitations, and mental functional limitations) are referred to as the "focal dependent variables." The relationship between the focal independent and focal dependent variables is referred to as the "focal relationship" (Aneshensel, 2002).

The first analytic strategy is an "exclusionary strategy" in that independent variables will be considered to rule out alternative explanations for the focal relationship (Aneshensel, 2002). The second strategy is an "inclusive strategy" in that additional variables are considered as mediators or intervening variables in the causal pathway between the focal independent and focal dependent variables (Aneshensel, 2002).

Exclusionary Strategy.

Figure 3 is an illustration of an exclusionary strategy to elaborate the focal relationship using other independent and control variables.

Figure 3. Exclusionary Analysis Strategy



Taken from: Aneshensel (2002). Theory-Based Data Analysis for the Social Sciences. Pine Forge Press. Thousand Oaks, CA.

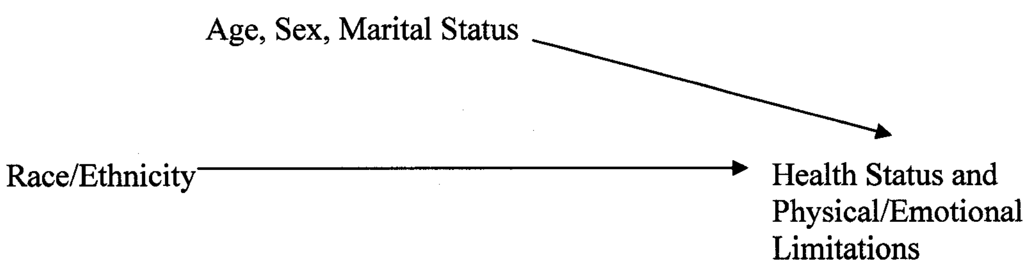
Control variables and other independent variables may account for variability within the dependent variable. As seen in **Figure 3,** however, these variables do not help to explain the focal relationship. When appropriate, control variables are included in the model to rule out spuriousness where "...values on the independent variable coincide with values on the dependent variable because these variables change in unison in response to a third variable" (Aneshensel, 2002). In other words, the focal independent and focal dependent variables only appear to be related to each other in the absence of the third variable. In order to generate spuriousness, the control variable must be associated with both the focal independent and the focal dependent variables.

If covariation remains between the focal independent and focal dependent variables after control variables are considered, additional analysis is needed to rule out alternative theories for the focal relationship. For example, the focal independent variable may cause the same effect (redundancy) on the dependent variable as other independent variables. The goal of analyzing other independent variables, therefore, is to determine whether the focal relationship is unique from other theoretical explanations (Aneshensel, 2002). Other independent variables that 1) are theoretically linked to the dependent variable and 2) covary with the focal independent variable are selected and the procedure used for analyzing other independent variables is the same as that for control variables. There are four possible outcomes for this analysis: 1) the association between the focal independent and focal dependent variables is eliminated (redundancy); 2) the alternative independent variable(s) accounts for some, but not all of the nonspurious focal association (partial redundancy); 3) the association remains unchanged; 4) the magnitude of the association is increased (suppression) (Aneshensel, 2002).

In this study, no potential control variables were identified that would generate spuriousness. Therefore, fixed sociodemographic factors known to be associated with health status (sex and age) were controlled as other independent variables. Marital status was also included as an independent variable that it is known to covary with overall health status.

In summary, the exclusionary strategy is concerned with the covariation that remains after other sources of covariation (i.e. control and other independent variables) are excluded from the estimate of the focal relationship (Aneshensel, 2002). The hypothesized focal relationship is supported if an association remains after the control and independent variables are excluded. The specific exclusionary analysis model for the proposed study is illustrated in **Figure 4**.

Figure 4. Exclusionary Analysis Model for Proposed Study



Taken from: Aneshensel (2002). Theory-Based Data Analysis for the Social Sciences. Pine Forge Press. Thousand Oaks, CA.

Model-Building within an Exclusionary Strategy. Successive analytic models were constructed to address the specific research aims of the proposed study. The first specific aim of this study is: ***To determine if self-reported overall health status, physical functional limitation, and emotional functional limitation vary as a function of race/ethnicity among participants in the California Health Interview Survey (CHIS), 2001.*** Accordingly, a base model of the focal relationship with the first focal dependent variable (**Model 1a**) was constructed to illustrate the relationship between minority racial/ethnic identification and self-reported health status when compared to the reference group of non-Hispanic Whites. This model is reflected by the equation:

$$HS^* = B_0 + B_1\,(\text{race1}) + B_2\,(\text{race2}) + B_3\,(\text{race3}) + B_4\,(\text{race4}) + B_5\,(\text{race5}) + e \;(\mathbf{1a})$$

*Where HS= (1=excellent; 2=very good; 3=good; 4= fair; 5= poor)

where B_0 is the intercept and represents the health status score when all of the predictors in the model have a value of zero. Indicator variables were created to account for each racial/ethnic category. Compared to the referent race category, non-Hispanic whites, B1-B5 is the change associated with an increase in the health status score for each race category: Asian/Pacific Islander (race 1), African-American (race2), American Indian/Alaska Native (race 3), Latino (race 4), and Other Race(s) (race 5).

The base model was modified to analyze the relationship between race/ethnicity and the two dichotomous dependent variables measuring the presence of physical or mental functional limitations (**Models 1b and 1c**), which are represented by the equations:

$$\text{Log odds physical limitations} = 1 = B_0 + B_1\,(\text{race1}) + B_2\,(\text{race2}) + B_3\,(\text{race 3}) + B_4(\text{race 4}) + B_5\,(\text{race 5}) + e \quad \textbf{(1b)}$$

$$\text{Log odds mental limitations} = 1 = B_0 + B_1\,(\text{race1}) + B_2\,(\text{race2}) + B_3\,(\text{race 3}) + B_4(\text{race 4}) + B_5\,(\text{race 5}) + e \quad \textbf{(1c)}$$

It was anticipated that minority racial/ethnic status would be negatively associated with all three of the outcome variables when compared to non-Hispanic whites. It was also predicted that race and ethnicity independent of other factors are important predictors of disparities in self-assessed health status. As discussed previously, current research suggests that Latinos and Asians rate their health poorly compared to Whites; more so than do African Americans, however, African-Americans have an increased risk of reporting functional limitations when compared to Whites and Latinos (Ren and Amick, 1996). Further, within the Latino subgroup, Mexicans are more likely than Whites to report poor health, whereas Puerto Ricans are more likely to experience functional limitations (Ren and Amick, 1996) In addition, the California African American CHIS 2001 sample is higher income compared to U.S. African Americans. Therefore, black-white differentials may be attenuated for this group (Ponce, 2005).

Subsequent models building on the base model were constructed to account for the independent effects that other variables may have on the dependent variables. For example, in **Model 2,** three demographic variables (age, sex and marital status) were added to Model 1.

This model is represented by the equation:

$HS^* = B_0 + B_1 \text{(race1)} + B_2 \text{(race2)} + B_3 \text{(race3)} + B_4 \text{(race4)} + B_5 \text{(race5)} + B_6\text{age} + B_7\text{sex} + B_8\text{mar} + e$ **(2a)**

*Where HS= (1=excellent; 2=very good; 3=good; 4= fair; 5= poor)

B_0 is the intercept and represents the health status score when the values of all of the predictors in the model are zero. Age is a continuous variable representing the respondent's age in years. Sex is coded 1 for males and 0 for females, and marital status is coded as three indicator variables; "other married" and "never married," which are compared to the third category of "married."

Model 2 was adjusted to reflect the two dichotomous dependent variables, which is illustrated with the following equations:

Log odds physical limitations=1= $B_0 + B_1 \text{(race1)} + B_2 \text{(race2)} + B_3 \text{(race 3)} + B_4 \text{(race 4)} + B_5 \text{(race 5)}\ B_6\text{age} + B_7\text{sex} + B_8\text{mar} + e$ **(2b)**

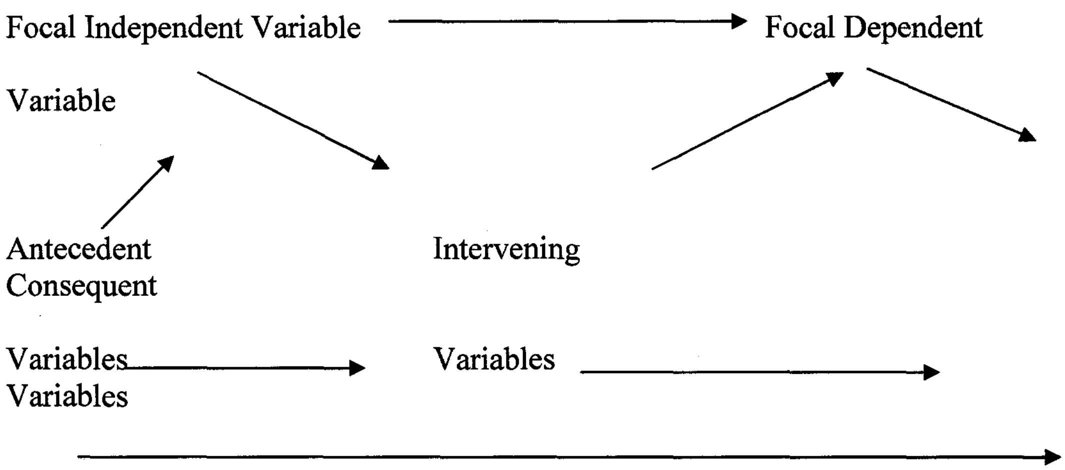
Log odds mental limitations=1= $B_0 + B_1 \text{(race1)} + B_2 \text{(race2)} + B_3 \text{(race 3)} + B_4 \text{(race 4)} + B_5 \text{(race 5)}\ B_6\text{age} + B_7\text{sex} + B_8\text{mar} + e$ **(2c)**

Linear regression was used in bivariate analyses to determine whether significant relationships exist between age, sex and marital status and self-reported health status. Multiple linear regression was used to conduct multivariate analyses to examine how the focal relationship changes when each independent variable is added sequentially to the model. Logistic regression was used to conduct bivariate and multivariate analyses assessing differences by age, sex and marital status in the two dichotomous dependent variables measuring the presence of physical or mental functional limitations. It was expected that increased age, female sex and never or non-married marital status (as compared to the referent group of married individuals) would be negatively associated with health status.

Inclusive Strategy

Figure 5 depicts the second strategy, which is an "inclusive strategy" in that additional variables are considered as mediators or intervening variables in the causal pathway between the focal independent and focal dependent variables (Aneshensel, 2002).

Figure 5. Inclusive Analysis Strategy



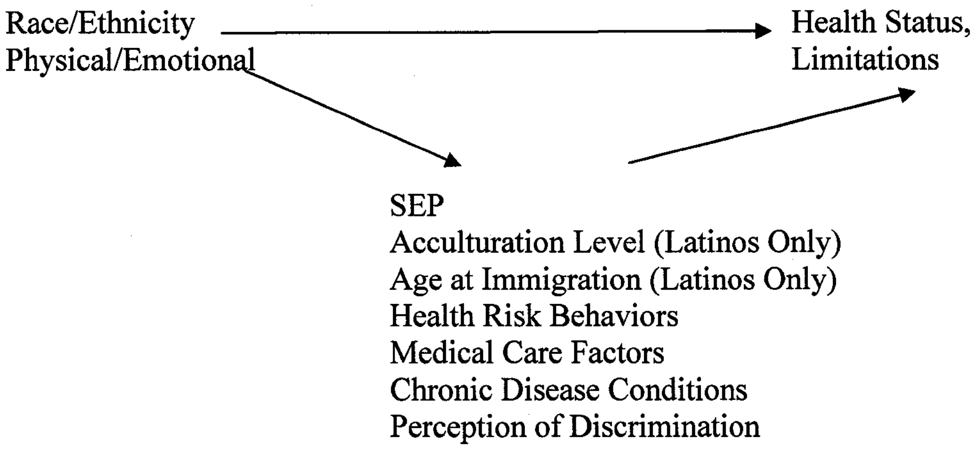
Taken from: Aneshensel (2002). Theory-Based Data Analysis for the Social Sciences. Pine Forge Press. Thousand Oaks, CA.

Contrary to the exclusionary strategy, the inclusive strategy seeks to incorporate additional variables into the model for the purpose of elaborating the causal explanation. In order to qualify as an intervening or mediating variable, the variable must be correlated with the focal independent variable (race/ethnicity in this case) and the focal dependent variable (overall and functional health status) (Aneshensel, 2002). In addition, the level of mediation may vary. Full mediation occurs when the entire focal relationship is explained (or disappears) with the inclusion of the mediating variable(s). This is unusual in that it is difficult to account for all of the factors involved in creating a particular outcome or relationship. More often, partial mediation occurs where a portion of the focal relationship is explained by the mediating variable(s), but a significant independent relationship still exists. Alternatively, the relationship may be unchanged signaling a potential deficiency in the theoretical justification for the inclusion of the variables in the analysis. The final possibility is that the focal relationship may be enhanced by the inclusion of potential mediators, which would indicate that those variables have a suppressive effect on the relationship between the independent and dependent variables of interest (Aneshensel, 2002).

In this study, a number of potential mediator variables will be included in successive models to evaluate the extent to which these factors account for the relationship between race/ethnicity and health status. These variables include SEP, acculturation level and age at immigration (for Latino sub-group only), health risk behaviors, access to and utilization of medical care, chronic disease conditions, and the perception of discrimination in health care settings. Factors occurring prior to racial/ethnic identification (such as macro-level, societal impacts) are not considered. Therefore, there are no antecedent variables depicted in this model. In addition, this study is concerned with explaining the causal pathway between race/ethnicity and health status. As a result, consequent variables or factors are also not considered.

The specific inclusive model for the proposed study is shown in **Figure 6**.

Figure 6. Inclusive Analysis Strategy for Proposed Study



Taken from: Aneshensel (2002). Theory-Based Data Analysis for the Social Sciences. Pine Forge Press. Thousand Oaks, CA.

This model is a simple illustration designed to describe the proposed analytic strategy. Theoretical relationships between the intervening variables are depicted in **Figure 1**, and discussed in the "Conceptual Framework" section of this proposal. In brief, this model indicates that the effect of race/ethnicity on health status is modified to various degrees and through various mechanisms.

The first step on the inclusive analysis addresses the second aim of this study; to: ***Examine the relationships between race/ethnicity, socioeconomic position (SEP), health status, including physical and emotional functional limitations;*** and the third aim is: ***To test whether a composite measure for SEP explains more of the***

relationship between race/ethnicity and health status compared to individual SEP indicators. Two strategies were considered to accomplish these aims. First, unweighted distributions of the socioeconomic variables selected for analyses (education, household income and employment status) were examined using descriptive statistics. A composite measure of SEP was constructed using Principal Components Analysis (PCA). The factor variable obtained from PCA was added to linear regression analyses. Multiple linear regression and binomial logistic regression analyses techniques were used to assess the degree to which SEP explains the relationship between race/ethnicity and the health status outcome variables when compared to the reference group (**Models 3a, 3b and 3c**). The equations depicting these models were as follows:

$HS^* = B_0 + B_1$ (race1) $+ B_2$ (race2) $+ B_3$ (race3) $+ B_4$ (race4) $+ B_5$ (race5) $+ B_6$age $+ B_7$sex $+ B_8$mar $+ B^9$ SEP + e **(3a)**

*Where HS= (1=excellent; 2=very good; 3=good; 4= fair; 5= poor)

Log odds physical limitations=1= $B_0 + B_1$ (race1) $+ B_2$ (race2) $+ B_3$ (race 3) $+ B_4$ (race 4) $+ B_5$ (race 5) $+ B_6$age $+ B_7$sex $+ B_8$mar $+ B_9$ SEP + e **(3b)**

Log odds mental limitations=1= $B_0 + B_1$ (race1) $+ B_2$ (race2) $+ B_3$ (race 3) $+ B_4$ (race 4) $+ B_5$ (race 5) B_6age+ B_7sex $+ B_8$mar $+ B_9$ SEP + e **(3c)**

In the final analyses, the SEP indicators used in the composite (highest education level attained, employment status and household income) were analyzed as individual predictors. The equations used for this analysis were as follows:

$HS^* = B_0 + B_1 (race1) + B_2 (race2) + B_3 (race3) + B_4 (race4) + B_5 (race5) + B_6age + B_7sex + B_8mar + B_9educ + B_{10}employ + B_{11}hhinc + e$ **(3d)**

*Where HS= (1=excellent; 2=very good; 3=good; 4= fair; 5= poor)

Log odds physical limitations=1= $B_0 + B_1 (race1) + B_2 (race2) + B_3 (race 3) + B_4 (race 4) + B_5 (race 5) B_6age+ B_7sex + B_8mar + B_9educ + B_{10}employ + B_{11}hhinc + e$ **(3e)**

Log odds mental limitations=1= $B_0 + B_1 (race1) + B_2 (race2) + B_3 (race 3) + B_4 (race 4) + B_5 (race 5) B_6age + B_7sex + B_8mar + B_9educ + B_{10}employ + B_{11}hhinc + e$ **(3f)**

It was expected that initial analyses would reveal a negative relationship between minority racial/ethnic status and SEP when compared to non-Hispanic whites, and a positive relationship between SEP and health status.

The fourth aim of the study is: ***To determine whether the relationship between risk factors and health status varies as a function of race/ethnicity. The risk factors to be considered include sociodemographic (e.g. gender, age, marital status), psychosocial (e.g. health risk behaviors, perceived discrimination), medical factors (e.g. health insurance status, having a usual source for health care, use of alternative health care professionals, and frequency of utilization of health services), and presence of chronic disease.*** Sociodemographic risk factors were considered previously as independent variables in the exclusionary analytic strategy. Therefore, the remaining risk factors were considered at this stage. **Models 4-7** adopt an inclusive analysis strategy and include a number of potential intervening variables to determine whether they help to explain the focal relationship between race/ethnicity and health status. These variables include a set of health risk behavior variables and medical care factors, respectively, and the models are represented by the following equations:

Health Risk Behaviors—Model 4

HS* = $B_0 + B_1$ (race1) + B_2 (race2) + B_3 (race3) + B_4 (race4) + B_5 (race5) + B_6age + B_7sex + B_8mar + B_9SEP + B_{10}smokecur + B_{11}smokefor + B_{12}alcoholheavy + B_{13}alcoholmod + B_{14}recoact + B_{15}someact + B_{16}BMI + e **(4a)**

*Where HS= (1=excellent; 2=very good; 3=good; 4= fair; 5= poor)

Log odds physical limitations=1= $B_0 + B_1$ (race1) + B_2 (race2) + B_3 (race 3) + B_4 (race 4) + B_5 (race 5) B_6age + B_7sex + B_8mar + B_9SEP + B_{10}smokecur + B_{11}smokefor + B_{12}alcoholheavy + B_{13}alcoholmod + B_{14}recoact + B_{15}someact + B_{16}BMI + e **(4b)**

Log odds mental limitations=1= $B_0 + B_1$ (race1) + B_2 (race2) + B_3 (race 3) + B_4 (race 4) + B_5 (race 5) B_6age + B_7sex + B_8mar + B_9SEP + B_{10}smokecur + B_{11}smokefor + B_{12}alcoholheavy + B_{13}alcoholmod + B_{14}recoact + B_{15}someacti + B_{17}BMI + e **(4c)**

Medical Care Factors—Model 5

HS* = $B_0 + B_1$ race1 + B_2 race2 + B_3 race3 + B_4 race4 + B_5 race5 + B_6age + B_7sex + B_8 mar + B_9SEP + B_{10} smokecur + B_{11}smokefor + B_{12}alcoholheavy + B_{13}alcoholmod + B_{14}recoact + B_{15}someact + B_{16}BMI + B_{17}insurance + B_{18}source + e **(5a)**

*Where HS= (1=excellent; 2=very good; 3=good; 4= fair; 5= poor)

Log odds physical limitations=1= $B_0 + B_1$ (race1) + B_2 (race2) + B_3 (race 3) + B_4 (race 4) + B_5 (race 5) B_6age + B_7sex + B_8 mar + B_9SEP + B_{10} smokecur + B_{11}smokefor + B_{12}alcoholheavy + B_{13}alcoholmod + B_{14}recoact + B_{15}someact + B_{16}BMI + B_{17}insurance + B_{18}source + e **(5b)**

Log odds mental limitations=1= $B_0 + B_1$ (race1) + B_2 (race2) + B_3 (race 3) + B_4 (race 4) + B_5 (race 5) B_6age + B_7sex + B_8 mar + B_9SEP + B_{10} smokecur + B_{11}smokefor + B_{12}alcoholheavy + B_{13}alcoholmod + B_{14}recoact + B_{15}someact + B_{16}BMI + B_{17}insurance + B_{18}source + e **(5b)**

Chronic Disease Conditions—Model 6

HS* = $B_0 + B_1$ (race1) + B_2 (race2) + B_3 (race3) + B_4 (race4) + B_5 (race5) + B_6age + B_7sex + B_8 mar + B_9SEP + B_{10} smokecur + B_{11}smokefor + B_{12}alcoholheavy + B_{13}alcoholmod + B_{14}recoact + B_{15}someact + B_{16}BMI + B_{17}insurance + B_{18}source + B_{19}chronic + e **(6a)**

*Where HS= (1=excellent; 2=very good; 3=good; 4= fair; 5= poor)

Log odds physical limitations=1= $B_0 + B_1$ (race1) + B_2 (race2) + B_3 (race 3) + B_4 (race 4) + B_5 (race5) B_6age + B_7sex + B_8 mar + B_9SEP + B_{10} smokecur + B_{11}smokefor + B_{12}alcoholheavy + B_{13}alcoholmod + B_{14}recoact + B_{15}someact + B_{16}BMI + B_{17}insurance + B_{18}source + B_{19}chronic + e **(6b)**

Log odds mental limitations=1= $B_0 + B_1$ (race1) + B_2 (race2) + B_3 (race 3) + B_4 (race 4) + B_5 (race 5) B_6age + B_7sex + B_8 mar + B_9SEP + B_{10} smokecur + B_{11}smokefor + B_{12}alcoholheavy + B_{13}alcoholmod + B_{14}recoact + B_{15}someact + B_{16}BMI + B_{17}insurance + B_{18}source + B_{19}chronic + e **(6c)**

The relationship between these variables and the outcomes of interest are depicted in **Figure 1** and described at length in the section entitled "Conceptual Framework." It was expected that it would be possible to demonstrate correlations that are relevant for mediating variables, which was the first step in working with these variables. It was anticipated that those who are current or former smokers, heavy alcohol users, and those who are relatively inactive would report poorer health status when compared to nonsmokers, moderate to no alcohol users and individuals who engage in some regular form of physical activity. In addition, previous studies indicate that, in general, uninsured individuals have poorer health status when compared to those are insured. Further, it was hypothesized that individuals with chronic diseases (arthritis, asthma, cancer, diabetes, heart disease, and high blood pressure) would be more likely to report lower health status than those who do not have these conditions.

(Model 7) was constructed adding the discrimination variables to build on previous models. The equations for this model are as follows:

$HS = B_0 + B_1 (race1) + B_2 (race2) + B_3 (race3) + B_4 (race4) + B_5 (race5) + B_6 age + B_7 sex + B_8 mar + B_9 SEP + B_{10}\ smokecur + B_{11} smokefor + B_{12} alcoholheavy + B_{13} alcoholmod + B_{14} recoact + B_{15} someact + B_{16} BMI + B_{17} insurance + B_{18} source + B_{19} chronic + B_{20} ethracdisc + B_{21} othdisc + e$ **(7a)**

Where HS*= (1=excellent; 2=very good; 3=good; 4= fair; 5= poor)

Log odds physical limitations=1= $B_0 + B_1 (race1) + B_2 (race2) + B_3 (race\ 3) + B_4 (race\ 4) + B_5 (race5)\ B_6 age + B_7 sex + B_8 mar + B_9 SEP + B_{10}\ smokecur + B_{11} smokefor + B_{12} alcoholheavy + B_{13} alcoholmod + B_{14} recoact + B_{15} someact + B_{16} BMI + B_{17} insurance + B_{18} source + B_{19} chronic + B_{20} ethracdisc + B_{21} othdisc + e$ **(7b)**

Log odds mental limitations=1= $B_0 + B_1 (race1) + B_2 (race2) + B_3 (race\ 3) + B_4 (race\ 4) + B_5 (race\ 5)\ B_6 age + B_7 sex + B_8 mar + B_9 SEP + B_{10}\ smokecur + B_{11} smokefor + B_{12} alcoholheavy + B_{13} alcoholmod + B_{14} recoact + B_{15} someact + B_{16} BMI + B_{17} insurance + B_{18} source + B_{19} chronic + B_{20} ethracdisc + B_{21} othdisc + e$ **(7c)**

As described previously, the discrimination variables are limited measures of the dimension of perceived discrimination. As such, it was not expected that they would account for a significant portion of the focal relationship. However, it was of interest to determine whether the perceived experience of discrimination differentially effects health status depending on one's racial/ethnic category. Such an assessment requires a conditional analysis.

Conditional Analysis or Interaction Effects.

Analyses were performed to examine the modification of the relationship between race/ethnicity and health status. Interaction effect or effect modification refers to a relationship that is conditional upon the value of a third variable (Aneshensel, 2002). Two strategies may be employed to analyze conditional relationships: subgroup analysis and the analysis of interaction terms (Aneshensel, 2002). For example, in the proposed study, the effects of SEP may be significantly different depending on one's racial/ethnic category. Likewise, the perception of discrimination in health care settings may differ depending on race/ethnicity.

The proposed analytic techniques discussed thus far allow for the detection of differences between racial/ethnic minorities and non-Hispanic whites. Determining whether certain findings are conditional based on a third variable, however, is of interest in this study. Therefore, effect modification analysis was selected to allow for the detection of differences between racial/ethnic groups with respect to certain mediating variables. Specifically of interest was whether the mediating effect of SEP differs by racial/ethnic group. In other words, this analysis sought to answer the question, "Is SEP a stronger determinant of health status for some racial/ethnic groups when compared to others?" Therefore, **Model 8** includes the addition of interaction terms between the indicator variables for race/ethnicity and SEP. These models are depicted by the following equations:

HS = $B_0 + B_1$ (race1) + B_2 (race2) + B_3 (race3) + B_4 (race4) + B_5 (race5) + B_6age + B_7sex + B_8mar + B_9SEP + B_{10}smokecur + B_{11}smokefor + B_{12}alcoholheavy + B_{13}alcoholmod + B_{14}recoact + B_{15}someact + B_{16}BMI + B_{17}insurance + B_{18}source + B_{19}chronic + B_{20}ethracdisc + B_{21}othdisc + B_{22}(race1*SEP + B_{23}(race2*SEP) + B_{24} (race3*SEP) + B_{25}(race4*SEP) + B_{26} (race5*SEP) + e **(8a)**

Where HS*= (1=excellent; 2=very good; 3=good; 4= fair; 5= poor)

Log odds physical limitations=1= $B_0 + B_1$ (race1) + B_2 (race2) + B_3 (race 3) + B_4 (race 4) + B_5 (race5) B_6age + B_7sex + B_8mar + B_9SEP + B_{10}smokecur + B_{11}smokefor + B_{12}alcoholheavy + B_{13}alcoholmod + B_{14}recoact + B_{15}someact + B_{16}BMI + B_{17}insurance + B_{18}source + B_{19}chronic + B_{20}ethracdisc + B_{21}othdisc + B_{22}(race1*SEP + B_{23}(race2*SEP) + B_{24} (race3*SEP) + B_{25}(race4*SEP) + B_{26} (race5*SEP) + e **(8b)**

Log odds mental limitations=1= $B_0 + B_1$ (race1) + B_2 (race2) + B_3 (race 3) + B_4 (race 4) + B_5 (race 5) B_6age + B_7sex + B_8mar + B_9SEP + B_{10}smokecur + B_{11}smokefor + B_{12}alcoholheavy + B_{13}alcoholmod + B_{14}recoact + B_{15}someact + B_{16}BMI + B_{17}insurance + B_{18}source + B_{19}chronic + B_{20}ethracdisc + B_{21}othdisc + B_{22}(race1*SEP + B_{23}(race2*SEP) + B_{24} (race3*SEP) + B_{25}(race4*SEP) + B_{26} (race5*SEP) + e **(8c)**

In addition, to determine whether the effects of perceived discrimination in a health care setting vary by racial/ethnic group, a corresponding interaction term between race/ethnicity and the discrimination indicator variables was added to previous models in **Model 9.** The following equations illustrate these models:

HS = $B_0 + B_1$ (race1) + B_2 (race2) + B_3 (race3) + B_4 (race4) + B_5 (race5) + B_6age + B_7sex + B_8mar + B_9SEP + B_{10}smokecur + B_{11}smokefor + B_{12}alcoholheavy + B_{13}alcoholmod + B_{14}recoact + B_{15}someact + B_{16}BMI + B_{17}insurance + B_{18}source + B_{19}chronic + B_{20}ethracdisc + B_{21}othdisc + B_{22}(race1* B_{20}ethracdisc) + B_{23}(race2* B_{20}ethracdisc) +

B_{24}(race3* B_{20}ethracdisc) + B_{25} (race4* B_{20}ethracdisc) + B_{26}(race5* B_{20}ethracdisc)+ B_{27}(race5* B_{20}ethracdisc)+ B_{28}(race1* B_{20}othdisc) + B_{27}(race2* B_{20}othdisc) + B_{28}(race3* B_{20}othdisc)+ B_{29}(race4* B_{20}othdisc)+ B_{30}(race5* B_{20}othdisc) + e **(9a)**

Where HS*= (1=excellent; 2=very good; 3=good; 4= fair; 5= poor)

Log odds physical limitations=1= B_0 + B_1 (race1) + B_2 (race2) + B_3 (race 3) + B_4 (race 4) + B_5 (race5) B_6age + B_7sex + B_8mar + B_9SEP + B_{10}smokecur + B_{11}smokefor + B_{12}alcoholheavy + B_{13}alcoholmod + B_{14}recoact + B_{15}someact + B_{16}BMI + B_{17}insurance + B_{18}source + B_{19}chronic + B_{20}ethracdisc + B_{21}othdisc + B_{22}(race1* B_{20}ethracdisc) + B_{23}(race2* B_{20}ethracdisc) + B_{24}(race3* B_{20}ethracdisc) + B_{25} (race4* B_{20}ethracdisc) + B_{26}(race5* B_{20}ethracdisc)+ B_{27}(race5* B_{20}ethracdisc)+ B_{28}(race1* B_{20}othdisc) + B_{27}(race2* B_{20}othdisc) + B_{28}(race3* B_{20}othdisc)+ B_{29}(race4* B_{20}othdisc)+ B_{30}(race5* B_{20}othdisc) + e **(9b)**

Log odds mental limitations=1= B_0 + B_1 (race1) + B_2 (race2) + B_3 (race 3) + B_4 (race 4) + B_5 (race 5) B_6age + B_7sex + B_8mar + B_9SEP + B_{10}smokecur + B_{11}smokefor + B_{12}alcoholheavy + B_{13}alcoholmod + B_{14}recoact + B_{15}someact + B_{16}BMI + B_{17}insurance + B_{18}source + B_{19}chronic + B_{20}ethracdisc + B_{21}othdisc + B_{22}(race1* B_{20}ethracdisc) + B_{23}(race2* B_{20}ethracdisc) + B_{24}(race3* B_{20}ethracdisc) + B_{25} (race4* B_{20}ethracdisc) + B_{26}(race5* B_{20}ethracdisc)+ B_{27}(race5* B_{20}ethracdisc)+ B_{28}(race1* B_{20}othdisc) + B_{27}(race2* B_{20}othdisc) + B_{28}(race3* B_{20}othdisc)+ B_{29}(race4* B_{20}othdisc)+ B_{30}(race5* B_{20}othdisc) + e **(9c)**

It was expected that SEP would be a stronger determinant of health status for certain minority groups. The moderating hypotheses would be supported if the interaction term is significant in the regression analyses. The predicted differential impact of perceived discrimination in a health care setting is less certain given the limitations of the measure.

The Impact of Gender.

The impact of gender was explored in the final analyses. The full sample was stratified by gender to examine whether results from the full model (including interaction terms that were found to be significant in Models 8 and 9) vary significantly between men and women, and between women of varying racial/ethnic classifications. It was expected that considering gender when evaluating racial/ethnic health status differences would uncover differences resulting from unique experiences of subjugation, particularly among African-American women when compared to women of other racial/ethnic backgrounds.

SEP Stratification.

The full weighted sample and the weighted Latino sample (discussed below) were divided into low, medium and high SEP to determine whether the focal relationship and other health predictors varied significantly by category of SEP. In addition, this analysis was used to address the issue of relative deprivation within each SEP category.

Sub-Analyses of Latino Sample.

A sub-analysis was conducted to fulfill the fifth specific aim of this project: ***To examine the effect of age at immigration and acculturation on the relationship between race/ethnicity, health status, and physical and emotional functional limitations among a Latino sub-sample of the CHIS, 2001 population.*** The subsample consists of individuals who identified as Latino/Hispanic (N=11,840). The same models described above were run for this group; however, an additional model was constructed to include acculturation proxy measures (see description in the Data/Methods section). Linear regression and Logistic regression analyses were conducted as described above in accordance with the dependent variables of interest.

In summary, it was expected that there would be a significant difference between minority racial/ethnic groups and non-Hispanic Whites on the three measures of health status selected for this study, with minorities reporting poorer health status and greater odds for emotional functional limitations. It was expected that the independent variables of age, sex, and marital status would attenuate the focal relationship to some degree, but that it would remain significant. Further, it was predicted that SEP would function as a mediator in this relationship, explaining a significant portion of the racial/ethnic minority versus non-Hispanic White health status differences, and that the strength of this mediating effect may be conditional upon racial/ethnic categorization. It was expected that other predictors such as health risk behaviors, medical care factors, chronic disease status and the experience of perceived discrimination would also function as mediators in explaining a portion of the relationship between race/ethnicity and health status, but that this would be to a much lesser degree when compared to SEP. Finally, it is hypothesized that Latinos who are “more acculturated” may report worse overall health status, and more physical and mental functional limitations due to environmental and behavioral aspects of health status that incur with time spent in the U.S.

CHAPTER 9: PRELIMINARY ANALYSES—UNWEIGHTED RESULTS

Sample Characteristics

Table 1 indicates the unweighted sociodemographic characteristics for the full CHIS 2001 adult sample and the distribution of all the variables used for this research (N= 55,428). The intent of these tables is to demonstrate adequate sample sizes by racial/ethnic category, acculturation level and SEP, all of which is crucial for the proposed dissertation.

For purposes of this study, Department of Finance definitions of race and ethnicity were used. Therefore, self-identification as Latino took precedence over other categories. Of the 55,428 adult respondents in the sample, 11,840 (21%) self-identified as Latino, 3,809 (6.8%) as Non-Latino Asian, 189 (.3%) as Non-Latino Pacific Islander, 424 (.7%) as Non-Latino American Indian/Alaska Native, 2,498 (4.5%) as Non-Latino African-American, 34,383 (62%) as Non-Latino White, 181 (.3%) as Non-Latino Other 1 Race, and 2,104 (3.7%) as Non-Latino 2+ Races. Approximately 75% of Latinos sampled indicated that they spoke some level of English at home, and over 60% were either US-born or had attained US citizenship status. The median household income for the full sample is $45,000 annually. Approximately 62% were employed at the time of the interview, and 38% were not employed. The majority of the sample (approximately 63%) attained more than a high school education, and over 60% of the group was employed at the time of the interview. There were more female respondents (58.5%) when compared to males, and half of the sample was married at the time of the interview, 31.5% was widowed, divorced, separated or living with an unmarried partner, and 17% was never married.

Preliminary Findings: Univariate Analyses. **Table 1** depicts the distribution of the dependent variables included in this study, and the distribution of key risk factors that are expected to mediate the focal relationship(s) between race/ethnicity and self-rated health status and functional physical/emotional limitations. On a scale of 1-5 (poor, fair, good, very good and excellent), the majority of the respondents (over 80%) rated their overall health status as good, very good or excellent, with the most common response being very good (32.9%). The percentage of respondents who assessed their health as excellent or very good by race/ethnicity compared to national averages was: American Indian/Alaska Native (42.2 of CHIS respondents v. 50% of American Indian/Alaska Natives nationally), Asian-Pacific Islander (50.8 v. 68%), African-American (46.4 v. 52%), and White (59.1 v. 68%), and Latinos (36.7-available for CHIS respondents only) (CHIS 2001; CDC, 2005).

Close to 25% of the sample reported they had experienced physical limitations in the past four weeks that limited their work or other activities. By race, there is some variation in the percent of individuals who indicated they had experienced a physical limitation; American Indians/Alaska Natives (30.8%), African-Americans (26.4%), Whites (25.6%), 19.9% of Latinos and only 16.2% of Asian/Pacific Islanders. Almost 16% of the full sample reported that they did not do their work or other activities as well as usual at some point during the past four weeks because of emotional problems such as feeling anxious or depressed. Responses varied slightly by race with 21.9% of American Indians/Alaska Natives reporting they experienced mental health limitations followed by 20.8% of Latinos, 18.8% of African-Americans, 15.2% of Asian/Pacific Islanders, and only 13.5% of Whites.

Analysis indicated significant behavioral health risk factors among the sample. Approximately 17% were current cigarette smokers, and close to 29% were former smokers. Over 60% reported no physical activity or muscle strengthening exercise in the past 30 days, and over 57% were overweight or obese according to body mass index scores. A very small percent (<1%) reported heavy alcohol use, but almost 60% reported moderate alcohol use in the past 30 days. In this study, respondents were classified as moderate drinkers if they had up to five alcoholic drinks 18 times or less in the past 30 days.

Medical care factors were also analyzed as potential mediating variables. Seventeen percent of the participants did not have health insurance at some time during the past month, and over 11% did not have a usual source of health care. The percent of respondents who reported they had been diagnosed with a common chronic disease varied by disease. Arthritis was reported by 25% of the sample; over 12% had Asthma; 10% had a cancer other than breast cancer; almost 7% had Diabetes; close to 9% reported heart disease; and over 25% had high blood pressure.

Finally, approximately 5% of the full sample (n= 2,683) reported that they had experienced discrimination in a health care setting in the past 12 months. Of those reporting discrimination, approximately 14% (n=385) indicated that they were discriminated against because of their racial/ethnic group, or their language/accent.

Preliminary Findings: Bivariate and Three-Variable Models

Simple linear regressions were conducted to assess the relationship between the focal independent variable (race/ethnicity) and the focal dependent variable (self-reported health status). Non-Hispanic White was used as the reference group in all analyses. Findings from these analyses are summarized here to demonstrate thorough investigation of the relationships between the independent, intervening and dependent variables before they were assessed in a multiple regression.

In simple linear regressions (not shown) marital status, sex, and age were considered as independent variables and were regressed on self-rated health status. In the three-variable model (not shown), marital status slightly reduced the focal relationship for African-Americans, American Indians/Alaska Natives, and those of other races and therefore produced partial redundancy in these cases. However, marital status suppressed the focal relationship for Asian Pacific/Islanders, and Latinos. When accounting for gender in the three-variable model (not shown), the focal relationship was almost unchanged for each racial/ethnic group. Therefore, gender did not produce redundancy or suppression in this model. In addition, the three-variable model (not shown) revealed that age is an important suppressor variable in the focal relationship as the coefficients for all racial/ethnic groups increased.

The coefficient for SEP is reduced about 9% from .420 in the bivariate association with health status (not shown) to .381 when controlling for the demographic independent variables in the model, but still remains highly significant.

In a simple linear regression (not shown), a statistically significant linear relationship was detected between SEP and self-rated health status ($F=9657.493$; $df=1, 55{,}320$; $p<.001$). Therefore, for every unit increase in SEP (which is 1 SD in this case), self-reported health status improves by almost half a point (.420) on a 1 (poor)-5 (excellent) scale. In a three-variable model (not shown), the relationship between race/ethnicity and self-reported health status remains statistically significant for all racial/ethnic groups when controlling for SEP, with a reduction in the original relationship for all groups (the largest of which occurs for Latinos ($b=-.169$ v. $-.446$) and American Indians/Alaska Natives ($b=-.206$ v. $-.449$). The coefficient increases for Asian/Pacific Islanders. Therefore, SEP produces partial redundancy in the focal relationship for all groups except Asian/Pacific Islanders. This suggests that taking SEP into account when considering differences in self-reported health status for specific groups is important. In the case of Asian/Pacific Islanders, it appears that SEP suppresses the original relationship. Because this group may be of higher SEP overall, the relationship between race/ethnicity is diminished until SEP is controlled.

The selected health behaviors entered in the analysis were all significantly associated with health status (not shown). Individuals who were current or former smokers and those who had engaged in heavy alcohol use in the past 30 days reported poorer health status compared to non-smokers and moderate drinkers or those who did not use alcohol. In addition, obtaining at least some level of physical activity was positively associated with health. In the three-variable models (not shown), current and past smoking behavior is negatively associated with health status for all racial/ethnic groups when compared to non-smokers, and it acts as both a minimal suppressor and a redundant variable depending on the group. However, overall, this behavior only explains a small portion of the association between race/ethnicity and health (R^2= 4% and 3% respectively). Moderate alcohol use (compared to no alcohol use) is negatively associated with health status for racial/ethnic minority groups and is partially redundant in explaining the focal relationship. Heavy alcohol use remains negatively associated with health status for ethnic/racial minorities, but the coefficients for race/ethnicity do not change from the base model indicating it is not suppressive or redundant to the focal relationship. Finally, both measures of physical activity remain positively associated with health for all groups, but these variables also only explain a small portion of the focal relationship (about 3%).

Bivariate and three-variable models revealed that chronic diseases were significantly associated with poorer health status for all groups (results are not shown). Individuals who were uninsured reported significantly worse health status compared to those who were insured (F=346.024, df=1, 55381; p<.001) (not shown). Health insurance status also had a negative association with race/ethnicity in that racial/ethnic minorities were less likely to be insured when compared to non-Hispanic Whites (F=702.200, df= 5, 55361; p=<.001). Analyses were conducted to determine whether insurance status may actually be placed on the causal pathway between SEP and self-rated health status. Although no association was found in this three-variable model, the variable was retained in subsequent models given the theoretical support for inclusion in the model.

In this dataset, individuals who had experienced discrimination in health care settings during the past year reported significantly poorer health status (not shown) when compared to those who had not experienced discrimination ($F=820.823$, $df=1, 54,925$; $p=< .001$). In a three-variable model, the coefficients for each racial group were slightly reduced indicating minimal redundancy, with the exception of Asian/Pacific Islanders, for whom this variable served to slightly suppress the strength of the focal relationship (not shown).

CHAPTER 10: STUDY FINDINGS

The weighted distributions for all study variables can be found in **Table 2.**

Self-Reported Health Status

Main Effects Models. Multiple linear regression analyses were conducted including the focal independent and dependent variables, other independent and intervening variables **(Table 3)**. The regression analysis **(Table 3: Model 1)** revealed that each indicator variable for race/ethnicity differed from the reference group and had a negative coefficient. Therefore, the null hypothesis that there is no difference in health status between each racial/ethnic group when compared to Whites was rejected (F=186.00, df= 5, 75, p=<.001). The largest negative coefficients for American Indian/Alaska Natives and Latinos indicate these groups reported the poorest perceived health status when compared to non-Hispanic Whites. The percent of variance in the dependent variable explained by race/ethnicity was only about 4% (R^2 =.039).

Introducing the independent demographic variables (**Table 3: Model 2**) to the base model increased the R^2 value from .039 to .080. Individuals who were married or living with their partner, reported significantly better health status when compared to those who were not married at the time of the survey, or those who were never married. There were differences by gender in that males reported significantly better health status when compared to females. A statistically significant relationship between age and health status was noted in that for every increase of one year in age, self-rated health status decreased by .01 units from the mean on the five-point self-rated health status scale. Marital status, gender and age were significant predictors of health status and appeared to suppress the focal relationship for all racial/ethnic groups when compared to non-Hispanic Whites. The coefficients increased slightly for American Indians/Alaska Natives and African-Americans, moderately for other races, and substantially for Latinos and Asian/Pacific Islanders when these variables were included in the model. This suggests that ethnic minority groups in this sample were more likely to be married, female and younger, which are associated with reporting better health when compared to non-Hispanic Whites, and that when these variables are controlled, diminished health status is even more apparent among these groups.

Similar studies have analyzed SEP indicators as individual predictors, an approach which considers only the uniqueness of each variable. In this dataset, educational attainment was significantly correlated with employment status (.181) and household income (.468), and employment status was correlated with household income (.270) (**Table 4**). Correlation among variables indicates a limitation in the ability to analyze the unique contribution of each variable while holding the others constant. Therefore, due to the moderately high correlation between household income and education, the data reduction method of Principal Components Analysis (PCA) was used. A composite, numeric, factor variable reflecting SEP was created using PCA to analyze the commonalities shared between the socioeconomic variables. Three variables were entered into the PCA: Education, Employment Status and Household Income. One component was extracted with an Eigenvalue of 1.630, which accounted for 54.336% of the variance. This "SEP Factor" was used in all analyses for this proposal (**Table 5**). Therefore, SEP is a composite measure comprised of three variables: (1) educational attainment (factor loading of .781); (2) employment status (.579 loading), and (3) household income (.828 loading). Sixty-one individuals were missing data on at least one of these three variables and were dropped from the analyses.

In Model 3 **(Table 3)**, SEP was added, which resulted in a significant increase in the R^2 value to .175 (118%). With SEP in the model, the coefficients for each racial/ethnic group, were reduced substantially from Model 2, but remained significant. This suggests that SEP explains a sizeable portion of the relationship between racial/ethnic minority status and self-rated health status. In the case of Asian/Pacific Islanders, the reduction in the coefficient was not as sizeable as for other groups, and controlling for this factor does not account for the differences in health status when compared to non-Hispanic Whites.

Interestingly, the addition of SEP changed the sign of the coefficient for "being married" from positive to negative, meaning that these individuals were no longer significantly different from those who are not married. This indicates that SEP accounted for a significant portion of the differences in health status between individuals who are married and those who are not married. In addition, the coefficient for male gender also became negative, which suggests that higher SEP accounts for improved self-rated health among men. Finally, the age coefficient is reduced only slightly indicating that SEP accounts for a small portion of the age differential, although increased age remains a significant predictor of poorer health status.

At this stage, the same model was analyzed using individual SEP predictors (results not shown). The R^2 remained about the same as that of Model 3 described above (.178 compared to .175). Therefore, using individual predictors did not explain any additional portion of racial/ethnic differences in self-rated health when compared to using the SEP factor. Further, the coefficients representing the focal relationship did not change appreciably. All three SEP variables were significant predictors of self-rated health status with increased education, higher household income levels and being employed at the time of the survey having positive relationships with self-rated health. Therefore, due to the relatively high correlation between the SEP indicators, and the interest in examining commonalities between dimensions that together construct the social phenomenon of "Socioeconomic Position," it was decided to use the SEP factor for the remainder of the analyses. An additional SEP comparison using a later model is discussed below (relative to Model 6) to support this decision.

A number of health risk factors were added in Model 4 **(Table 3)**. The R^2 increases 30% to .228 from Model 3 indicating that the addition of these variables resulted in a model that explains a greater proportion of the variance in the dependent variable. This model indicates that being a former or current smoker was negatively associated with health status (p=<.001), whereas being a moderate drinker and engaging in at least some level of physical activity was positively associated with health status. Finally, greater BMI had a significant negative association with health status. The focal relationship is also mediated in this model. There were decreases in the coefficients for all racial/ethnic groups indicating that these variables explain a portion of the focal relationship for these groups.

Finally, the coefficient for SEP also decreased significantly (19%), which indicates that the additional variables explain some of the association between SEP and health status. However, the fact that a significant portion of the SEP effects remained after taking health-risk behaviors into account suggests that the behaviors considered in this analysis are not likely to be the important mechanisms by which SEP disparities in health status are created.

In Model 5 **(Table 3)**, the medical care factors were added and the R^2 value increased only slightly to .229. There was a positive relationship between having health insurance and self-reported health status, and a negative relationship between having a place for regular medical care, both of which were significant in this model. The addition of these variables had mixed effects on the focal relationship. The coefficients increased only slightly for Asian/Pacific Islanders, indicating that medical care factors suppress self-rated health status for this group, whereas for all other groups the coefficients decreased indicating that medical care factors explain a portion of the focal relationship for these groups. The coefficient for SEP decreased further in this model (2%), which indicates that the additional variables explained some of the association between SEP and health status. As in Model 4, however, SEP remained a significant predictor of self-rated health status in this model.

The effects of chronic morbidity were considered in Model 6 **(Table 3)**. The explanatory value of this model is significantly improved over the previous model as noted by the increase in R^2 to .287 (25%). Taken together, chronic disease accounted for a large portion of the negative relationship with health status for American Indian/Alaska Natives, and Other races whose coefficients drop and, to a lesser degree, African-Americans. This was not the case, however, for Asian/Pacific Islanders and Latinos whose coefficients increase indicating that chronic disease was suppressing a stronger negative association with self-rated health status for these groups. SEP is attenuated to a large degree in this model (11% from the previous model), which suggests that a good portion of the relationship between SEP and health status was accounted for by chronic disease. Even still, SEP remained a significant predictor in this model.

At this point, an additional comparison was made between the SEP composite factor and the individual SEP predictors (see **Table 6**). Like the SEP composite factor, each individual SEP indicator had a significantly positive relationship with self-rated health status. The coefficients, and their respective level of significance, did not vary appreciably between the two models. Further, in the model using the SEP factor, the R^2 was .287, an almost undetectable difference from that using the individual SEP indicators (R^2=.288). Therefore, it was again confirmed that using individual predictors did not provide additional explanation for the variance in this outcome, supporting the continued use of the SEP factor.

Final Main Effects Model. Model 7 **(Table 3)** takes into account the impact that discrimination in a health care setting had on the focal relationship. Two indicator variables, one for racial/ethnic reasons for discrimination combined with language/accent reasons, and one for other reasons for discrimination, were entered and they were both highly significant predictors of self-rated health status (b=-.298 and -.351, respectively, p=<.001). Therefore, if one experienced any type of discrimination in a health care setting they rated their health worse than individuals who did not have this experience. Discrimination other than racial/ethnic discrimination was actually more detrimental to health as evidenced by the larger negative coefficient (-.351). As seen in Table 3, the addition of these variables added little to the explanatory value of the model (R^2=.291, 1% change). The discrimination variable had a uniform effect on the focal relationship for all groups, except Asian/Pacific Islanders. The addition of the discrimination measure slightly decreased coefficients for each racial/ethnic indicator variable (except Asian/Pacific Islanders) thereby indicating that it explained a small portion of the focal relationship for these groups. It also suggests that discrimination results in poorer health status for all racial/ethnic groups when compared to non-Hispanic Whites.

The coefficient for SEP was decreased by less than 1% (b= .254, p=<.001), and SEP therefore remained a significant predictor in this model. All but one of the health risk behaviors remained significant predictors of health status with moderate alcohol use (b=.102, p=<.001), at least some regular physical activity (b=<.130, p=<.001), and meeting recommended levels for physical activity (b=.322, p=<.001) having positive relationships, and past and current smoking (b= -.035, p=<.01, and -.228 p=< .001, respectively) and greater BMI (b= -.137, p=<.001) having negative relationships. Having health insurance was a significant predictor of better health status in the final model (b=.102, p=<.001), whereas having a place for regular medical care was not significant. Chronic conditions also significantly influenced self-rated health status with those having a greater number of chronic conditions reporting significantly poorer health status (b= -.308, p=<.001).

Interaction Effects. SEP emerged as a significant predictor of health status, and lower SEP was significantly associated with racial/ethnic minority status. Therefore, a cross-product interaction term between race/ethnicity and SEP was included in the multiple linear regression (**Table 7:** Model 8). This analysis revealed that the interaction effect was highly significant for Asian/Pacific Islanders (b= .059+.216=.275) and Latinos (b=.148+.216=.364). This means that compared to non-Hispanic Whites, an increase in SEP has a greater effect on improving self-rated health status among Asian/Pacific Islanders and Latinos. Further, the effect of SEP is much greater for Latinos, as evidenced by a steeper slope (Figure 8). Therefore, the relationship between Latino ethnicity and SEP is explored further in the present study.

Finally, in order to further explore the effect of discrimination by race/ethnicity, cross-product interaction terms were added between race/ethnicity and racial/ethnic discrimination and other types of discrimination experienced in a health care setting. This analysis revealed that there were no significant interaction effects for any of the racial/ethnic groups.

Gender Stratification. The final main effects and interaction models were further stratified by gender to evaluate significant differences between men and women in predictors of self-rated health status. Slight differences were detected **(Table 8).** For example, African-American women rated their health significantly lower than did Non-Hispanic White women; however, there were no significant differences between African-American men and Non-Latino White men. Higher SEP was a strong predictor of improved health status for both groups. Former smoking behavior had a significant negative relationship with self-reported health status for men, but not for women, suggesting perhaps that men were more likely to be former smokers. Having health insurance was positively associated with self-rated health status for both groups. The experience of racial/ethnic discrimination in a health care setting was significantly associated with negative self-rated health for women (b=-.410, p=<.001) and men (b=-.196, p=<.01). Although an increase in age was associated with slightly better health status for women, this was not true for men. Finally, the overall R^2 for this model was higher for women (.308 compared to .275 for men, an 11% difference), indicating that the predictors in the model had better explanatory value for women when compared to men.

Some differences by gender were also detected when examining the interaction effect between race/ethnicity and SEP **(Table 9)**. A significant positive interaction for Asian/Pacific Islander women (b=.061, p=<.05), but not men, was detected, indicating that compared to White women, increasing SEP among API women would have a greater effect on self-rated health status. A significant negative interaction was found for men of "Other Races" (b= -.089/.142), but not women of the same group. This indicates that increased SEP among men of this group has an attenuated effect in improving health status, when compared to SEP's effect on self-rated health among non-Latino Whites. Finally, significant positive interactions were found for Latina women and Latino men, indicating that increasing SEP for both genders would have a greater effect on improving health status when compared to non-Hispanic Whites.

Interaction effects were not found between race/ethnicity indicators and discrimination indicators for women. For men, a significant interaction was detected for Latinos who experienced racial/ethnic discrimination in a health care setting (b=.346-.547=-.201). This means that experiencing racial/ethnic discrimination had negative impacts on the health of Latino men, but that these impacts were somewhat reduced when compared to those of White men (b= -.547). Conversely, men of "Other Races" who experienced the same type of discrimination (b=.804-.257=.257) **(Table 10)** report better health status when compared to Non-Hispanic White men.

<u>SEP Stratification.</u> The SEP composite factor used in this study and described in "Operationalization of Variables" was divided into tertiles using the "xtile" function in STATA 9 to create three strata of SEP: low, medium and high. A stratified logistic regression analysis was then conducted using these newly-created

cut-offs **(Table 11)**. With the exception of African-Americans of medium SEP, and individuals of "Other Races" who were of low and medium SEP, each racial/ethnic group in the three SEP strata reported significantly worse health when compared to Non-Hispanic Whites in the same groups. Being of higher SEP attenuated the strength of this association for most groups as evidenced by the decreased coefficients at the higher SEP levels. This was particularly true for Latinos (-.429 low SEP; -.210 medium SEP,

-.128 high SEP), again suggesting the importance of SEP in determining health status for this group. This was not the case for African-Americans, however, as the coefficient remained about the same from low to high SEP (-.102 to -.103), but, their overall health rating was also not as low as that of most other racial/ethnic groups.

The importance of the health risk behaviors used in this study did not vary greatly between SEP strata. One exception to this finding was former smoking behavior which was significantly related to poorer health for low and medium SEP groups, but not those in the highest socioeconomic stratum. Being male had health deficits for those in low (b=-.079, p=<.01) and medium (b=<-.062, p=<.01) SEP, but there was no gender difference among those of high SEP.

Finally, racial/ethnic discrimination was significantly predictive of worse health, but only for those in low (b= -.286, p=<.01) and medium SEP (b= -.267, p=<.05), respectively) (Table 11). Other forms of discrimination actually had stronger effects on health when compared to racial/ethnic discrimination evidenced by the larger negative coefficients. Further, higher SEP did not completely diminish the effects of other types of discrimination as it did for racial/ethnic discrimination.

Physical Functional Limitations

Main Effects Models. The first model **(Table 12: Model 1)** depicts the focal relationship between race/ethnicity and self-reported physical limitations using logistic regression analysis techniques. Asians/Pacific Islanders and Latinos had significantly fewer physical limitations when compared to Non-Hispanic Whites, whereas other racial/ethnic groups are not significantly different from Non-Hispanic Whites (F=33.78, 5, 75, p=<.001). In Model 2 **(Table 12)**, the addition of demographic variables changes the nature of the focal relationship in that African-Americans, American Indians/Alaska Natives, and Other Races have significantly greater odds of reporting physical limitations when compared to Whites (F=154.54, 8, 72, p=<.001). Only Asians/Pacific Islanders are significantly less likely than Whites to report physical limitations.

In Model 3 (**Table 12**), SEP was added which attenuated the focal relationship for all racial/ethnic groups. In this model, both Asian/Pacific Islanders and Latinos were significantly less likely to report physical limitations, and only Other Races had significantly greater odds when compared to Whites. In addition, those of higher SEP had significantly lower odds of reporting physical functional limitations (F=170.83, 9, 71, p=<.001).

Risk behaviors were added in Model 4 (**Table 12**), which did not change the nature of the focal relationship appreciably, and SEP remained a significant predictor of reduced odds for physical limitations (F=95.66, 16, 64, p=<.001). Risk behaviors had the expected relationship with the dependent variable. Those who were current or former smokers and those who were overweight reported greater odds for physical functional limitations, whereas those who used alcohol moderately and those who maintained at least some level of physical activity had significantly lower odds for physical functional limitations.

In Model 5 (**Table 12**), medical care factors were added. Only having a place for regular medical care was a significant predictor, with those who had a regular place for care reporting greater odds for physical functional limitations (F=84.59, 18, 62, p=<.001). The addition of these predictors did not appreciably change the odds ratios from the previous model.

In Model 6 (**Table 12**), the count variable for number of chronic conditions was added. Accounting for chronic conditions absorbed some of the main effect for former smokers, those who were married and older individuals. In addition, being of an "Other Race" became insignificant, whereas being African-American became significantly related to lower odds for reporting physical functional limitations (F=124.48, 19, 61, p=<.001).

As was done with self-rated health status, model 6 was run comparing the SEP composite factor with the individual SEP predictors. Results from this comparison can be found in Table 13. The individual SEP indicators were each significant; education (p=<.001), household income (p=<.001), and employment status (p=<.001). Odds ratios and their respective significance levels did not vary appreciably from one model to the next, with the exception of age, which was significant at the p=.05 level in the SEP composite model, but not significant in the individual SEP predictor model.

Final Main Effects Model. In the final model (**Table 12: Model 7**), Asian/Pacific Islanders (OR=.733, p=<.001), African Americans (OR=.847, p=<.01) and Latinos (OR=.761, p=<.001) had significantly reduced odds of reporting physical functional limitations when compared to Non-Hispanic Whites. This finding is counterintuitive in that one would expect those who reported worse health status to also have increased physical functional limitations. It is possible then, that these groups do not have as much flexibility to refrain from performing regular duties even when they are not feeling well. For all other racial/ethnic groups, the relationship was not significant. After controlling for all of the mediators in the full model, an increase in SEP was a highly significant predictor of fewer odds of having physical functional limitations (OR=.818, p=<.001). Two risk behaviors were significantly related to greater odds of having physical functional limitations; being a current smoker (OR=1.17, p=<.01), and greater BMI (OR=1.06, p=<.001). Using alcohol moderately (OR=.788, p=<.001) and getting recommended levels of physical activity (OR=.669, p=<.001), or even some level of physical activity (OR=.778, p=<.001) were significantly associated with fewer odds of physical limitations. Having health insurance was not a significant predictor, but those who had a place for regular medical care reported greater odds for physical limitations (OR=1.14, p=< .01). This finding is intuitive in that those who experience physical symptoms are probably more likely to obtain medical attention.

The experience of discrimination in a health care setting was added to this model. Individuals who reported they had experienced discrimination related to race/ethnicity or language/accent were 2.23 times more likely to have physical functional limitations (p=<.001). Those who reported any other type of discrimination had even greater odds (2.73) for physical functional limitations (p=<.001). Finally, being married (OR=.933, p=<.05), male (OR=.795, p=<.001) were protective for physical functional limitations, whereas being of older age resulted in greater odds for this outcome (OR=1.00, p=<.01).

Interaction Effects. Cross-product interaction terms between race/ethnicity and SEP were significant and less than 1 for African-Americans (OR=.800 x .812=.649) and American-Indian/Alaska Natives (OR=.660 x .812=.660) (**Table 14**). These findings suggest that increasing SEP among American Indians/Alaska Natives in particular (and to a lesser extent among African-Americans), would reduce the level of physical limitations among this group when compared to Non-Hispanic Whites.

Finally, as was the case with self-rated health, cross product interaction terms between race/ethnicity and the discrimination indicators used in this study were found to be not significant.

Gender Stratification. The final main effects and interaction models were further stratified by gender to evaluate any significant differences between men and women in predicting greater odds for physical functional limitations (**Table 14**). Differences by race/ethnicity were detected between men and women with African-American men (OR=.735, p=<.01) and American-Indian/Alaska Native men (OR=.562, p=<.05) reporting significantly fewer odds of having physical functional limitations when compared to non-Latino White men. Within the category of "Other Races," women were more likely to report this outcome compared to non-Latino Whites. For men, but not women, being a current smoker increased the odds for physical functional limitations (OR=1.19, p=<.05), whereas women were more likely to have increased odds due to greater BMI (OR=1.07. p=<.01). Age was significant for greater odds for physical functional limitations for men only (OR=1.00, p=<.001).

Gender differences in interaction effects were noted for the cross-product interaction terms comprised of race/ethnicity and SEP (**Table 16**). Specifically, Asian/Pacific Islander men had a significant interaction effect (OR=1.21 x .736=.890), which indicates that increasing SEP among API men would reduce the odds for physical functional limitations, but not quite as much as it would for Non-Latino White men (OR=.736). The interaction effect for African-American men (OR=.704 x .736=.518) indicated that when compared to Non-Latino White men, the effect of SEP among African-American men further reduces the odds for physical functional limitations. Finally, the interaction effect among Latina women of

(OR=1.16 x .883=1.02) indicates that improving SEP among this group would actually increase physical functional limitations when compared to Non-Latino Whites. In the case of Asian-Pacific Islanders and Latinos, these significant interactions are diminished entirely when the sample is not stratified by gender and therefore, these racial/ethnic differences are missed when evaluating men and women together. For American-Indians/Alaska Natives, the interaction effect only becomes significant in the full sample, suggesting that there might not be enough power within this group to detect the relationship when it is divided by gender.

Cross-product interaction terms between race/ethnicity and the discrimination indicators used in this study were also stratified by gender. Results revealed only a significant interaction effect for Latinas who reported racial/ethnic discrimination in a health care setting, (OR=.371 x 3.28=1.21—table not shown). This finding indicates that Latina women experiencing this type of discrimination had significantly greater odds of reporting physical functional limitations compared to non-Latina White women experiencing the same stressor.

SEP Stratification. In general, most racial/ethnic groups were more likely to report fewer physical limitations when compared to Whites, at all levels of SEP, but these odds were somewhat attenuated at the highest level of SEP indicated by the smaller odds ratios (Table 17). However, a few differences were noted by race/ethnicity. For example, African-Americans of low SEP were not significantly different than Whites, whereas African-Americans of medium and high SEP had significantly improved odds for this outcome **(Table 17)**. Additionally, Latinos of low and medium SEP were significantly less likely to report physical functional limitations, but at the highest SEP Latinos were not different from Whites.

SEP was significantly related to fewer odds for physical functional limitations for individuals in the low and medium SEP strata; however, for those of high SEP, it was not a significant predictor for this outcome. Further, there is evidence of a greater impact of relative deprivation within low SEP levels indicating that even increasing SEP a little within this SEP group would have significant health benefits (Table 17).

Of the health risk behaviors studied, only two varied by SEP: for individuals of low SEP, being a current smoker was related to increased odds for physical functional limitations (OR=1.39, p=<.001), whereas increased BMI also has increased odds for this outcome, this is only the case among individuals of high SEP (OR=1.13, p=<.01). Having a place for receiving health care was associated with greater odds for individuals of high SEP (OR=1.24, p=<.05), but not for other groups, being married was protective only for those in low SEP (OR=.886, p=<.05), whereas being male was protective for those of medium and high SEP (OR=.692, p=<.001 and OR=.652, p=<.001).

<u>Emotional Functional Limitations</u>

In the first model **(Table 18)**, which indicates the focal relationship, all racial/ethnic groups had greater odds of having emotional functional limitations when compared to Non-Hispanic Whites (F=37.34, 5, 75, p=<.001); the greatest of which is among Latinos (OR=1.67, p=<.001). In model 2 (**Table 18**), the addition of sociodemographic factors attenuated the focal relationship to different degrees for all groups except American Indian/Alaska Natives. This indicates that being married, of male gender and of increased age accounted for only a small portion of the differences in reporting emotional functional limitations for these groups. In spite of these additional factors, each group retained significantly greater odds of having the outcome of interest when compared to Non-Hispanic Whites (F=68.51, 8, 72, p=<.001).

In Model 3 (**Table 18**), the introduction of SEP in the model accounts for a proportion of the focal relationship and therefore attenuates the relationships for all groups (F=115.61, 9, 71, p=< .001). This means that improved SEP among all groups (with the exception of American Indians/Alaska Natives for whom the result was not significant) would reduce the level of emotional functional limitations. SEP explained the greatest proportion of the focal relationship for Latinos reducing the odds ratio from 1.59 to 1.15, however, the odds ratio remained statistically significant. This suggests that SEP was more important for Latinos in affecting their perception of mental health and functional limitations related thereof. Overall, SEP was a significant predictor of emotional functional limitations with those of higher SEP having reduced odds for this outcome.

In model 4 (**Table 18**), health risk behaviors accounted for a very small portion of the focal relationship for African-Americans and Other Races. For Asians/Pacific Islanders and Latinos the odds ratios increased indicating that risk behaviors were suppressing the focal relationship slightly and that the differences between these two groups and Non-Hispanic Whites were larger when the behaviors were taken into account. Being a current or past smoker, and having greater BMI increased the odds for emotional functional limitations, whereas meeting recommended levels of physical activity was protective for this outcome (F=66.97, 16, 64), p=<.001).

Model 5 (**Table 18)** takes into account the impact of medical factors including health insurance status and whether one has a usual place for health care. Only having health insurance was a significant predictor of emotional functional limitations (F=58.62, 18, 62, p=<.001). This factor only changed the odds ratios for racial/ethnic groups slightly; attenuating the relationship for Asian/Pacific Islanders and Latinos, and barely suppressing it for African-Americans. This suggests that a very small portion of the difference in reporting emotional functional limitations between Asians/Pacific Islanders and Latinos was due to not having health insurance, whereas for African-Americans, having health insurance seemed to mask some of the differences.

In Model 6 (**Table 18**), the number of chronic conditions is controlled for and, expectedly, was a highly significant predictor of emotional functional limitations. This variable suppressed the focal relationship for Asians/Pacific Islanders and Latinos indicating that these groups have fewer chronic conditions when compared to others and that this factor, therefore, did not explain the greater odds for reporting emotional function limitations among these groups (F=90.13, 19, 61, p=<.001).

As was the case with the previous two outcome measures, individual SEP predictors entered into model 6 in place of the SEP composite factor did not change the odds ratios or the respective significance levels appreciably (**Table 19**). Only one difference was detected between the two models: heavy alcohol use was a significant predictor of increased emotional functional limitations in the model with individual SEP predictors, but was not significant in the model with the SEP composite factor. Therefore, the SEP factor was retained for all future analyses.

Final Main Effects Model. In the final model (**Table 18: Model 7**), Asian-Pacific Islanders (OR=1.28, p=<.001), African-Americans (OR=1.20, p=<.05), Latinos (OR=1.21, p=<.001) and Other Races (OR=1.28, p=< .05), all had increased odds for reporting emotional functional limitations when compared to Non-Hispanic Whites. The odds were very similar across all racial/ethnic groups ranging from 1.20 to 1.28. Findings were not significant for American-Indian/Alaska Natives.

After controlling for all other factors in the model, SEP remained a significant predictor of reduced odds for emotional functional limitations (OR=.746, p=< .001), meaning that those with higher SEP were less likely to report emotional functional limitations.

Current smokers had greater odds for emotional functional limitations (OR=1.43, p=<.001), and attaining recommended levels of physical activity (OR=.854, p=<.001) resulted in reduced risk for this outcome. Health insurance remained a significant predictor in that those who had health insurance at some point during the past 12 months had fewer odds of reporting emotional functional limitations (OR= .803, p=<.001) when compared to those who did not have health insurance at any time during the past 12 months.

Two indicator variables capturing the experience of discrimination in a health care setting were added to this model and both were highly significant. Individuals who reported racial/ethnic discrimination were 2.45 times more likely to have emotional functional limitations (p=<.001) when compared to those who reported no discrimination. Individuals who reported any other type of discrimination were 2.77 times more likely to report the same outcome (p=<.001).

Finally, being married, of male gender and of increased age were protective for having emotional functional limitations at the p=<.001 level.

<u>Interaction Effects.</u> Cross product interaction effects were tested between racial/ethnic indicators and SEP (**Table 20**). Findings were significant for Asian/Pacific Islanders (OR=.844 x .822=.693) and Latinos (OR=.764 x .822=.628), indicating that increasing SEP among these two groups in particular would have a stronger protective effect from emotional functional limitations when compared to other groups.

Significant interactions were also detected between race/ethnicity and discrimination for certain racial/ethnic groups **(Table 20)**. For example, a significant interaction was noted between racial/ethnic discrimination and "Other Races" (OR=.205 x 3.02=.619), which indicates that those of Other Races who experience discrimination have reduced likelihood for mental health limitations when compared to Whites. For American-Indian/ Alaska Natives (OR= 12.38 x 3.02=37.38), experiencing racial/ethnic discrimination had a much greater effect on increasing mental health limitations when compared to Non-Latino Whites, and "all other types of discrimination" increased the odds for this outcome among Latinos when compared to Non-Latino Whites (OR=1.44 x 2.50=3.60). Finally, overall, discrimination appears to have unique impacts on mental health when compared to overall self-rated health status, and physical functional limitations.

Gender Stratification. As was done for the previous two outcomes, the final main effects and interaction models were further stratified by gender to evaluate any significant differences between men and women in predicting greater odds for emotional functional limitations (**Table 21**). Regarding racial/ethnic differences, African-American women (OR=1.19), but not men, were significantly more likely than Non-Hispanic Whites to report emotional functional limitations. For men, being of an "Other Race" increased the odds for this outcome when compared to Non-Hispanic Whites. Women had additional negative relationships between health risk factors and mental health. Using alcohol moderately (OR=1.10) and having greater BMI (OR=1.06) increased the odds for emotional functional limitations among women. All other predictors were not significantly different between men and women.

Gender also influenced interaction effects (**Table 22**). Significant interactions were detected between race/ethnicity and SEP for Asian/Pacific Islander women (.756 x .842=.636), African-American women (.766 x .842=.644), and Latina women (OR=.784 x .842=.660). This means that compared to Non-Hispanic White women, functional limitations due to mental health reasons would significantly decrease among women in these groups if their SEP was increased. A significant interaction was also detected for Latino men (OR= .727 x .798=.580), which indicated that increasing SEP would reduce mental health limitations among this group as compared to Non-Latino Whites. For men, but not women, there was a significant SEP effect for "Other Race" (OR=1.35 x .798=1.07), indicating that compared to Non-Latino Whites, higher SEP alone would not reduce the increased odds for this outcome among this group.

Consistent with previous models, cross-product interaction terms were entered between race/ethnicity and both indicators for the experience of discrimination in a health care setting. Significant interactions were detected for Latina women (OR=1.42 x 2.45) and men of "Other Races" (OR=5.43 x 2.53) (**Table 23**). Therefore, for these two groups, experiencing racial/ethnic discrimination has added negative effects on mental health status when compared to Non-Latino Whites.

SEP Stratification. Using the SEP factor to construct low, medium and high SEP groups revealed racial/ethnic differences in the odds of having emotional functional limitations. For example, low SEP Asian/Pacific Islanders (OR=1.57, p=<.001), low SEP African-Americans (OR=1.43, p=<.01), low SEP Latinos (OR=1.41, p=<.001) and low SEP individuals of "Other Races" (OR=1.38, p=<.05), were more likely than Whites of low SEP to report emotional functional limitations (**Table 24**). Only Latinos of medium SEP were more likely than Whites to have this outcome (OR=1.15, p=<.05), and no racial/ethnic minorities of high SEP were significantly different than Whites on this outcome. Therefore, being of high SEP completely attenuated the risk for increased emotional functional limitations among racial/ethnic minorities. In fact, only individuals of higher SEP had significantly fewer odds for emotional functional limitations.

Of the behavioral health risk factors measured in this study, SEP had a differential effect on alcohol use, with only those of low SEP reporting increased odds for emotional functional limitations (OR=1.11, p=<.01). Physical activity also varied by SEP with individuals of medium (OR=.811, p=<.01) and high SEP (OR=.777, p=<.001) who obtained recommended levels of physical activity having significantly reduced odds for this outcome when compared to those of low SEP. Having health insurance was a significant positive predictor of fewer emotional functional limitations, but only for those of medium (OR=.683, p=<.001) and high SEP (OR=.803, p=<.05).

Finally, racial/ethnic discrimination increased odds for emotional functional limitations among individuals of low SEP (OR=2.59, p=<.001). Interestingly, however, being of high SEP had a much greater odds (almost four-fold) for emotional functional limitations (OR=3.85, p=<.001). Experiencing other types of discrimination was significantly related to poorer health outcomes across SEP groups, and was only somewhat attenuated from mid (OR= 2.76) to high (OR= 2.31) SEP. All other predictors in the model did not vary in significance based on SEP.

CHAPTER 11: LATINO SUB-ANALYSIS FINDINGS

Latino Sample Characteristics

Table 1 indicates the unweighted sociodemographic characteristics for adult Latinos who participated in the 2001 CHIS (N=11,840). The median household income for Latinos was significantly lower than that of the full sample ($34,652 as opposed to $45,000 annually). A larger percent of Latinos had not graduated high school (38% v. 13% for the full sample), and only 8% had attained a college education, whereas almost 20% of the full sample completed a BA degree. Sixty-five percent of Latinos were employed at the time of the survey, a slightly higher percent than that of all racial/ethnic groups combined. Female respondents comprised over 58% of the Latino sample, and 62% were married.

Only 72% of Latinos rated their health as good, very good or excellent, whereas approximately 82% of the full sample did so. Fewer physical functional limitations were reported when compared to the full sample (20% v. 24%); however, greater emotional functional limitations were reported (21% v. 16%). When compared to the full sample, fewer Latinos were current or former smokers, more Latinos failed to meet recommended, or some levels of physical activity, more Latinos were overweight or obese, and greater numbers were uninsured. Use of alcohol during the past 30 days was roughly the same for full and Latino samples. Distributions for additional mediating variables examined in this study can be found in Table 1.

Weighted distributions for the variables used in the Latino sub-analysis closely mirror the sample distributions and can be found in **Table 2**.

Self-Rated Health Status

Main Effects Models. The Latino sub-analysis began where the main effects analysis left off for the full sample. Specifically, Model 5 in the Latino sub-analysis corresponds to Model 6 for the full sample (**Table 25**). These predictors were retained in that they were demonstrated to be important predictors of self-reported health status in the full sample analysis. A discrimination indicator was added later in the sub-analysis after acculturative factors were taken into account.

In Model 5 (**Table 25**), it is noted that the relationships between predictors and self-rated health status are similar to that of the full sample (**Table 3**). For example, higher SEP was a significant predictor of better self-reported health status for Latinos. Further, Latinos who were current or former smokers and those with greater BMI had significantly poorer self-rated health when compared to non smokers and those of lower BMI, respectively. Moderate alcohol use and obtaining recommended levels, or at least some level, of physical activity were significant predictors of improved health status for this group. Having an increased number of chronic conditions was negatively associated with the outcome of interest, whereas having health insurance was associated with better self-rated health status. Finally, unlike the full sample, none of the sociodemographic factors were significant predictors of self-rated health status for Latinos. The R^2 for this model was .238.

A group of acculturative factors were added to this model to comprise Model 6 (**Table 25**). The R^2 increased over 10% to .263 indicating that the added predictors helped to explain more of the variance in the outcome. Of the acculturative proxy factors added, three were found to be significant and negatively related to self-rated health status: Speaking only Spanish language at home, speaking both English and Spanish at home, and having no English proficiency. Interestingly, SEP was attenuated significantly (25%) from the previous model, which suggests that acculturative factors absorbed much of the difference in self-rated health status thought to be related to SEP. Health risk behaviors and medical care factors that were significant in the previous model remained significant (although attenuated or suppressed slightly in some cases), with the exception of moderate alcohol use and meeting some level of physical activity, which became not significant. Finally, being married became significantly related to improved self-rated health in this model.

In Model 7 (**Table 25**), additional acculturative proxy factors were added to capture health status differences by age at immigration. Neither being an adult at the time of immigration, nor being a child at the time of immigration, resulted in significantly different self-rated health status when compared to those who were U.S. born. Further, in a separate analysis (results not shown), those who immigrated as adults were not significantly different than those who immigrated as children. Coefficients for other predictors in the model did not change appreciably, and the R^2 remained exactly the same as the previous model indicating that these variables did not provide any additional explanatory value.

Final Main Effects Model. Finally, in Model 8 (**Table 25**) the discrimination indicator is added and it is thus considered the final model for Latinos. Reporting the experience of discrimination (of any type) in a health care setting was a highly significant predictor of poorer self-rated health for Latinos (b=-.338, p=<.001). SEP remained a highly significant predictor, with every increase SEP (1 SD) resulting in over a quarter point increase on the self-rated health status scale (b=.269, p=<.001). Former smoking (b=-.091, p=<.001) and current smoking (b=-.198, p=<.001) behaviors, and higher BMI (b=-.116, p=<.001) were highly significant predictors of poorer health status, whereas obtaining recommended levels of physical activity was a positive predictor (b=.252, p=<.001). Having increased numbers of chronic conditions was associated with poorer health status (b=-.321, p=<.001), and having health insurance was an important positive predictor for Latinos (b=.084, p=<.01). The acculturative factors significant in previous models predicted significantly poorer self-rated health status in the final model and included: Speaking only Spanish at home (b=-.383, p=<.001), speaking Spanish and some English at home (b=-.284, p=<.001), and having no English proficiency (b=-.267, p=.001). Finally, being married was the only significant sociodemographic predictor in the final model; married individuals rated their health status better compared to those who were not married at the time of the survey, or never married (b=.056, p=<.05).

Interaction Effects. SEP was a highly significant predictor of Latino self-rated health, more so than any other racial/ethnic group, therefore, cross-product interactions were tested between all acculturative proxy factors included in the study and SEP, and all acculturative proxy factors and the discrimination indicator. Only one significant interaction was detected between being an adult immigrant and SEP (b=.062+.249=.311) (**Table 26**). This positive interaction suggests that increasing SEP had a greater effect in improving self-rated health status when one was an adult immigrant as compared to those who immigrated as a child, and those who were US born.

SEP Stratification. Increasing SEP remained a significant predictor of self-rated health status across SEP groups; low (b=.275, p=<.001), medium (b=.317, p=<.001), and high SEP (b=.177, p=<.01). The differing coefficients indicate that increasing SEP is more important in improving health when Latinos are of mid-level SEP than of low SEP; however, at the highest level of SEP the diminishing return of SEP is evident.

Some of the health risk behaviors examined in this study also varied by SEP. For example, only individuals of medium SEP were significantly affected with respect to this outcome by being former smokers (b=-.168, p=<.01), whereas current smokers of low (b=-.209, p=<.001) and medium SEP (b=-.236, p=<.001), but not those of high SEP, reported significantly worse health status. High income Latinos who used alcohol moderately reported improved health status (b=.124, p=<.05), whereas individuals of low (b=.453, p=<.05) and medium SEP (b=.730, p=<.05) who reported heavy alcohol use in the past 30 days had improved self-rated health. Having health insurance was only a significant positive predictor for individuals of medium SEP (b=.158, p=<.01).

The significance of acculturative proxy factors in predicting self-rated health status among Latinos also varied by SEP. Speaking Spanish only at home was associated with poorer health across SEP groupings, whereas speaking some English and Spanish was associated with poorer health only among those of low (b=-.200, p=<.01) and medium SEP(b=-.363, p=<.001). Likewise, having no English proficiency was negatively related to health only within low (b=-.241, p=<.001) and medium (b=-.328, p=<.001) SEP groups. Finally, immigrating to the U.S. as a child was protective for overall health only among Latinos of high SEP (b=.345, p=<.05).

Physical Functional Limitations

The same predictors as described above for self-rated health status were stepped in to various models to evaluate their relationships with physical functional limitations among Latinos (**Table 28**). The odds ratios for each predictor did not change appreciably in each model, and predictors that were significant in earlier models remained significant in the final model. Therefore, a summary is offered here for the final model only. In model 8 (**Table 28**), SEP was a highly significant predictor of having physical functional limitations (OR=.783, p=<.001), with those of higher SEP reporting fewer functional limitations. The only health risk factors found to be significant were obtaining some level of physical activity (OR=.869, p=<.05) and obtaining recommended levels of activity (OR=.699, p=<.001), which resulted in fewer odds for having this health outcome. Finally, the only other significant predictors in the model were an increased number of chronic conditions

(OR=1.81, p=<.001), and experiencing any type of discrimination in a health care setting (OR=2.65, p=<.001), both of which were related to greater odds for having physical functional limitations.

Interaction Effects. To determine whether SEP was related to level of acculturation among California Latinos, cross-product interactions were tested between all acculturative factors and SEP. A significant interaction was detected between having no English proficiency and SEP (OR=.856 x .847=.725), which indicates that increasing SEP among this group compared to Latinos who are English proficient, further reduces the odds for having physical limitations (**Table 29**).

SEP Stratification. Increasing SEP within the lowest SEP was significantly associated with fewer odds for this health outcome (OR=.556, p=<.001), but SEP was not a significant predictor of physical functional limitations for Latinos in medium or high SEP groups **(Table 30)**.

Obtaining some regular activity was associated with reduced odds for physical functional limitations among medium SEP Latinos (OR=.738, p=<.05), whereas obtaining recommended levels of physical activity was protective for those of high SEP.

Unlike self-rated health status, speaking Spanish only (OR=.624, p=<.01), or Spanish and English at home (OR=.683, p=<.05), were significantly related to better health outcomes for Latinos of low SEP. Finally, demographic variables varied by SEP in that being married was protective for low SEP Latinos (OR=.817, p=<.05), and male Latinos had fewer odds for physical functional limitations if they were of medium or high SEP.

Emotional Functional Limitations

The same predictors as described above for self-rated health status were stepped in to various models to evaluate their relationships with physical functional limitations among Latinos (**Table 31**). The odds ratios for most of the predictors did not change appreciably in each model, and most of the predictors that were significant in earlier models remained significant in the final model. The one exception was for having health insurance, which was a significant predictor of fewer odds for having emotional functional limitations in earlier models. The addition of the discrimination indicator in Model 8 rendered this variable non-significant in the final model. In the final model (Model 8, **Table 31**), SEP was a significant predictor of this health outcome with those of higher SEP reporting fewer emotional functional limitations. Current smokers were 1.36 times (p=<.001) more likely to have emotional functional limitations when compared to non-smokers, and those with more chronic conditions had greater odds (OR=1.53, p=<.001) for reporting the same outcome. Having a usual place for health care was positively associated with having fewer emotional functional limitations (OR=.799, p=<.01), as was being married (OR=.715, p=<.001), male (.718, p=<.001), and of increased age (OR=.987, p=<.001).

Interaction Effects. Cross-product interactions were tested between all acculturative factors and SEP, and all acculturative factors and the discrimination indicator to determine if there were any additional effects from belonging to any of these groups. None of the interactions terms were significant for this outcome.

SEP Stratification. Again, as was the case for physical functional limitations, increasing SEP within the lowest SEP only (OR=.468) was a significant predictor of fewer odds for emotional functional limitations **(Table 32).** Current smokers who were also of low SEP were particularly at risk for emotional functional limitations, and those of low SEP who identified a regular place of health care had significantly fewer odds for this outcome when compared to individuals with a regular place for health care who were of medium or high SEP.

The only other significant difference in predictors by SEP was that men of medium SEP, as compared to women of medium SEP, were significantly less likely to report emotional functional limitations.

CHAPTER 12: DISCUSSION

Health Disparities Persist Among Racial/Ethnic Minorities in California

As discussed previously, racial/ethnic disparities in health outcomes are persistent and widely documented (Byrd and Clayton, 1992, Jones et al., 1991, National Center for Health Statistics, 2001; Savitt, 1982). In general, racial/ethnic minorities fare worse on a number of health indicators, including higher morbidity and mortality rates, when compared to non-Hispanic whites (LaViest, 2002; Williams, 1999).

Studies examining racial/ethnic differences in one popular measure of health, self-rated health status, have reported mixed findings (Ren and Amick, 1996; Seid, et al., 2003; Morales, et al., 2000). For example, Latinos and African-Americans typically report poorer general health, and certain Latino subgroups report increased functional limitations when compared to whites (Morales, et al., 2000; Ren and Amick, 1996). Asians/Pacific Islanders, on the other hand, traditionally rate their health better than or equal to that of Non-Hispanic Whites (Meredith and Siu, 1995). Finally, linguistic minorities have reported worse health care than other racial/ethnic minorities and Whites (Weech-Maldonado, et al., 2003).

Self-Rated Health Status. The current findings, based on a large, racially and ethnically diverse, RDD sample of California residents showed that California racial/ethnic minorities had significantly poorer self-rated health status when compared to non-Latino Whites, with Asian/Pacific-Islanders (b=-.290) and Latinos (b=-.282) being worse off as evidenced by the relatively larger negative coefficients (**Table 3: Model** 7). This finding is consistent with other studies that have demonstrated that cultural and linguistic minorities rate their health lower than non-Latino Whites (Weech-Maldonado, 2003; Green et al., 2005). When controlling for a number of predictors, the score on the self-rated health scale was very similar for these two groups. This suggests that, regardless of differing immigration patterns and cultural influences, the experience of health within these two groups is similar, or that the frame of reference for health (i.e. what is excellent, good, poor, etc.) may be analogous between these groups. American Indian/Alaska Natives were the exception to this pattern, which may be the result of a small sample size (**Table 1**).

Racial/ethnic minority women rated their health worse than Non-Latino White women, and worse than men from the same racial/ethnic groups (Table 8). This finding suggests that minority women are at particular risk for poorer health, with Asian/Pacific Islander and Latina women at the greatest risk. Potential explanations for this finding may be that women are more willing to talk about health problems and may be more likely to label their health as being less than optimal. Further, it is probable that minority women have additional health burdens and may experience other life stressors causing them to rate their overall health lower than that of white women, or men from the same racial/ethnic group.

Although men rated their health higher than did women, men from certain racial/ethnic groups reported health disadvantages compared to non-Latino White men. Specifically, Asian/Pacific-Islander men, Latino men, and men of "Other

Races" rated their health lower than did non-Latino White men. Again, these differences may be partially influenced by limited English proficiency. Further, the ratings may be reflective of other aspects of health, such as access and provider compatibility, which may be different aspects of health considered by other groups when selecting an overall health rating.

Physical Functional Limitations. To deepen the analysis of racial/ethnic health differences among California adults, an additional measure of health status was used. It was operationalized using the question: "During the past 4 weeks, did your physical health limit the kind of work or other activities you do?" This dimension of physical health limitations is a valid and useful indicator for measuring population health (Avlund, 1997; Lundberg and Manderbacka, 1996; Miilunpalo, et al., 1997).

The present study found that each racial/ethnic minority group was significantly less likely to report physical functional limitations when compared to Non-Latino Whites, with the exception of American Indians/Alaska Natives and those of "Other Races" who were not significantly different than non-Latino Whites (**Table 12: Model 7**). Asian/Pacific-Islanders and Latinos were the least likely to report this outcome, even though they reported the lowest self-rated health. These findings are not surprising in that the propensity to report fewer physical limitations among racial/ethnic minorities has been cited in previous research, even among groups who have reported worse overall health. Explanations for this finding include the possibility that racial/ethnic minorities do not have the luxury or flexibility to limit activities such as work when they are not physically well. Or, there may be some level of stigma associated with not being able to complete one's work or normal activities among these groups. Such stigma may result in a perception of poorer overall health, but a reluctance to admit that typical responsibilities and activities could not be completed.

Unexpectedly, Latinos reported fewer physical functional limitations when compared to non-Latino Whites. Previous research has shown that Latinos consistently report increased functional limitations when compared to Non-Hispanic Whites (Morales et al., 2000; Ren and Amick, 1996). One possible explanation for this finding is that Latinos in this study were almost exclusively Mexican-born or U.S.-born Mexicans, further it is not clear whether this population was of the same average age as other studies. Therefore, findings for this group may be slightly different than that of other studies where Latino samples are less homogeneous. It is possible, then, that California Latinos actually have fewer physical limitations than the comparison group. This conclusion is supported by the fact that compared to non-Latino Whites, Latino CHIS 2001 respondents had lower rates for four of the five most common chronic conditions (arthritis, asthma, high blood pressure, heart disease and cancer) and comparable rates for diabetes. This suggests that for Latinos, their poorer self-rated health is based on factors other than an actual diagnoses or physical symptoms.

The occurrence of physical functional limitations among racial/ethnic groups was dependent on gender. African-American men and American Indian/Alaska

Native men were significantly less likely to report this outcome when compared to women from the same groups, and Non-Latino White men. Women of Other Races, on the other hand, were more likely to report physical functional limitations compared to men from the same racial group and Non-Latino White women (**Table 15**).

Emotional Functional Limitations. Finally, emotional functional limitations were measured among California adults by asking, "During the past 4 weeks did you not do your work or other activities as well as usual because of emotional problems such as feeling anxious or depressed?" The findings for this outcome were very similar to those for self-reported health status. Each racial/ethnic group was significantly more likely to have emotional functional limitations (with the exception of American Indians/Alaska Natives) when compared to Non-Latino Whites (**Table 18: Model 7**). All groups were almost equally disadvantaged when compared to non-Latino Whites, which indicates that being a racial/ethnic minority in California increases one's risk for negative mental health outcomes. This disparity is likely the result of living in a stratified social order, with Whites in a position of advantage in the socioeconomic arenas within which individuals conduct daily interactions, thus creating stressors for racial/ethnic minorities.

Overall, men in each racial/ethnic group had greater odds (even if only slightly) for emotional functional limitations than the women from the same group (Table 21). This finding is interesting in that women are usually thought of as being more affected by depression or anxiety, due to the higher prevalence of these disorders among women. It is possible, then, that men are less able to perform regular activities such as work when feeling depressed, whereas women may be more accustomed to feeling this way and therefore more able to perform their regular activities.

Finally, results varied within racial/ethnic groups by gender suggesting that it is important to consider the impact of gender and race/ethnicity concurrently (**Table 19**). For example, African American women, but not men, were significantly more likely to report emotional functional limitations when compared to Non-Latino Whites, as were men of "Other Races," but not women.

Why do Minority Racial/Ethnic Groups Have Poorer Health?

Several explanatory theories have been offered to account for the observed racial/ethnic disparities in health. These theories were reviewed in detail in the "Examining Relationships and Potential Causal Pathways" section of this manuscript. In summary, one popular hypothesis is that racial/ethnic identity determines socioeconomic position, which directly affects health by creating superior living conditions, more education, better employment opportunities, reduced numbers of life stressors, better health behaviors including diets and exercise, and increased access to health care (Everson et al., 1997). Contrary to this theory, however, health risk behaviors and medical care factors have been shown to only account for a very small portion of racial/ethnic health inequality (Lantz et al., 1998; Lynch et al., 1996; Marmot et al., 1997).

Self-Rated Health. In this study, a number of health risk behaviors were significant predictors of self-rated health status, and the relationships were in the expected directions. For example, individuals who were former or current smokers had significantly worse self-rated health compared to non-smokers, as did those with higher BMIs. Conversely, individuals who maintained at least some level of regular physical activity rated their health better than did those who were physically inactive (**Table 3: Model 7**). Although many of the predictors in the model were highly significant indicators of self-rated health status, the overall R^2 for the final model was about 30% indicating that other unmeasured constructs contributed to self-rated health. Therefore, these findings indicate that health behaviors alone do not account for a large portion of the racial/ethnic differences in health among California residents.

Physical Functional Limitations. A number of behavioral health risk factors, and having a usual place for health care, were also significantly associated with physical functional limitations in the expected directions (**Table 12: Model 7**). The inclusion of these behavioral factors attenuated the focal relationship slightly for all racial/ethnic groups, but did not completely account for the fact that racial/ethnic minorities reported less physical limitations.

Emotional Functional Limitations. Being a current smoker (increased odds) and meeting recommended levels for physical activity (reduced odds) were the only significant health risk behaviors for emotional functional limitations. Having health insurance, and a regular place for health care were positive predictors for fewer emotional functional limitations, whereas an increased number of chronic health conditions was a negative predictor of emotional functional limitations (**Table 18: Model** 7).

<u>Discrimination is Detrimental to Health</u>

There are other possible explanations for the observed disparities including experiences of institutionalized and individual racism and resultant chronic discrimination, and other acculturative stressors. These additional potential predictors were not measured in CHIS 2001 and were therefore not considered in this study. Instead, this research sought to determine whether experiencing an isolated type of discrimination was associated with self-rated health, and whether this relationship varied by racial/ethnic group. Respondents were asked, "Thinking of your experiences with receiving health care in the past 12 months, have you felt you were discriminated against for any reason?" Those who had experienced discrimination were then asked, "What do you think was the reason that you were discriminated against?"

<u>Self-Rated Health</u>. Indeed, the experiences of racial/ethnic discrimination and other types of discrimination in a health care setting negatively influenced overall health rating (**Table 3: Model** 7). Other types of discrimination (age, health, disability, body weight, insurance type, income level, religion, sexual orientation or gender/sex), were even more detrimental to health than discrimination that was identified as being related to race/ethnicity, language or accent.

Unexpectedly, racial/ethnic minorities were not more likely to have their health compromised by discrimination when compared to Non-Latino Whites. This is counterintuitive, but it is consistent with previous research that has found that some racial/ethnic minorities are unwilling to report discrimination due to the stigma attached to such a label. Additionally, for some individuals, discriminatory experiences are so familiar that certain events may not be recognized as discrimination by the victim (Krieger and Sidney, 1996). Therefore, this finding should not be interpreted to mean that racial/ethnic minorities experience fewer negative health repercussions due to discrimination. Instead, the fact that racial/ethnic groups reported worse overall health, that was not attributable to other mediators, indicates that discrimination may explain the observed differences.

The effect of discrimination was dependent on gender in that both indicators of discrimination were stronger predictors of overall poor health for women when compared to men (Table 8). A racial/ethnic effect by gender was also noted in that experiencing racial/ethnic discrimination diminished health for Latino men, but not quite as much as is did for Non-Latino White men. This suggests that the experience of discrimination is probably rare for Whites, but when it does happen it has significant health impacts. Men of "Other Races" who experienced the same type of discrimination actually reported improved health status compared to Non-Latino Whites (**Table 10**). One possible interpretation is that the negative effects of experiencing discrimination are offset by some type of social support for men of "Other Races." Alternatively, discrimination may be a common experience for this group resulting in only a negligible impact on self-rated health. Due to the heterogeneous make up of the "Other Races" group, there may not be a single explanation for this outcome.

The results reported here are limited to a single response per person; specifically, the first type of discrimination each respondent reported. Additional analyses indicated that reporting more than one type of discrimination was related to significantly poorer health, suggesting that negative health effects from discrimination are additive.

Physical Functional Limitations. The experience of racial/ethnic and other types of discrimination in a health care setting was associated with 2.23 and 2.72 times the likelihood of experiencing physical functional limitations, respectively (Table 12: Model 7). This effect was significantly greater for Latinas when compared to all other groups (see **Table 16** Note). For men, racial/ethnic discrimination was more detrimental to health, whereas women were more affected by other types of discrimination.

Emotional Functional Limitations. Finally, racial/ethnic discrimination and other types of discrimination increased the likelihood for emotional functional limitations by 2.45 and 2.77 times, respectively (Table 16: Model 7). Significant racial/ethnic effects were found for both discrimination indicators. This means that compared to the other two health measures used in this study, discrimination was particularly damaging for certain racial/ethnic minorities. (**Table 20; Table 21**).

Therefore, the effects of discrimination are not uniform across groups. For example, men and women may be differentially impacted by discrimination depending on what type of discrimination they experience. Further, Latinas seem to be particularly affected by discrimination and the most likely to experience increased physical and emotional functional limitations resulting thereof.

Finally, although the measure of discrimination used in this study was limited and cannot be used to approximate other experiences of discrimination, findings indicate that even an isolated experience of discrimination has significant health impacts. It is concluded then, that negative health impacts from more severe and/or chronic experiences of discrimination would be even more detrimental to one's health.

The Racial/Ethnic SEP Effect

Self-Rated Health. SEP had a strong, graded association with self-rated health status for all racial/ethnic groups, a finding consistent with other studies of diverse populations (Duncan et al., 2002; Everson et al., 1997; Link & Phelan, 1995; Macintyre & Hunt, 1997; Williams, 1997). In the present study, every increase in SEP (measured as 1 SD) was associated with slightly more than a quarter-point increase from the mean on the self-rated health status scale as shown in Model 7 **(Table 3)**. Controlling for health behaviors, medical care factors, number of chronic morbidities, and sociodemographic factors somewhat attenuated, but did not dissolve the strength of this relationship for all racial/ethnic groups, with the exception of

Asian/Pacific Islanders. This suggests that there may be additional, unique predictors of health status for this group that were not considered in this study, such as acculturative processes or limited English proficiency.

When considering self-rated health, increasing SEP has substantial additive benefits for Latino men and women, and Asian/Pacific-Islander women (although less so than for Latinos), when compared to non-Latino White men and women **(Table 9)**. This finding suggests that increasing SEP among Latinos in particular may have a greater impact on improving health status when compared to other racial/ethnic groups.

Physical Functional Limitations. Increasing SEP significantly reduced the odds for physical functional limitations among Asian/Pacific Islander men, African-American men, and American-Indian/Alaska Natives **(Table 16)**. The SEP effect for Asian/Pacific-Islander men was slightly less than what non-Latino Whites would experience when increasing SEP by the same amount. This suggests that although important, there are factors other than SEP driving the level of physical functional limitations among Asian/Pacific-Islander men. For African-American men, increasing SEP had a greater positive health effect when compared to non-Latino Whites.

Interestingly, increasing SEP among Latinas would make this group more likely to report physical functional limitations when compared to non-Latina Whites (**Table 16**). Although previous studies have reported increased odds for this outcome among Latinos in general, it is counterintuitive that increasing SEP among this group would result in additional physical functional limitations. One possible explanation is that increasing SEP is associated with an increase in other stressors such as additional workload, physical demands, or other psychosocial stressors which in turn may create physical issues and limitations. Alternatively, increasing SEP may be associated with additional flexibility in meeting work and other life obligations. Therefore, individuals of higher SEP may have the luxury to refrain from certain activities, whereas those of lower SEP must complete their duties regardless of their physical condition.

Emotional Functional Limitations. Finally, there was an SEP effect on emotional functional limitations for Asian/Pacific Islander women, African-American women, and Latino women and men (**Table 22**). For these groups, increasing SEP significantly reduced emotional functional limitations further than it did for non-Latino Whites. For men of "Other" races, increasing SEP resulted in a greater likelihood for this outcome when compared to non-Latino Whites. It is unclear why this would be the case in that increasing SEP should reduce mental health stressors associated with lower SEP that have negative health impacts. Perhaps for this group of men, increasing SEP is associated with other mental health stressors such as becoming more acculturated or assimilated in employment arenas.

In summary, these findings point to the importance of examining the unique impacts that SEP may have on different racial/ethnic groups. Further, within groups, the impact of SEP varies by gender. These distinctions are important in that they assist in isolating the causal pathways involved in racial/ethnic disparities. For example, increasing SEP among racial/ethnic minorities would not be enough to close the widening divide in health outcomes between these groups and non-Latino Whites. Instead, it is important to consider that, as one example, increasing SEP may improve health for Latinos and African-American men, but it does not appear to have the same effect for African-American women. This means that other determinants of diminished health must be explored.

Racial/Ethnic Health Differences Exist at Every Level of SEP

The primary goal of this research was to add to the literature regarding the role of SEP in explaining racial/ethnic health disparities. Therefore, the weighted sample was stratified on SEP, and SEP was retained in the model to evaluate the relative importance of this construct.

Self-Rated Health. Results from this analysis suggest that race/ethnicity matter in determining self-rated health regardless of SEP, and that the differences are not simply a result of racial/ethnic minorities being of lower SEP. For example, with only two exceptions (African-Americans of medium SEP and "Other Races" of low and medium SEP), all racial/ethnic minorities had significantly worse self-rated health compared to non-Latino Whites within each of the same SEP stratum (**Table 11**). This relationship was particularly strong for Latinos, again emphasizing the important role SEP plays as a determinant of health status for this group. Interestingly, at the highest level of SEP, the relationship between racial/ethnic minority status and poor health was attenuated for all groups, except African-

Americans and those of "Other Races." This suggests that African-Americans and Others are particularly susceptible to health determinants, such as discrimination and prejudice, which are not alleviated by having better social standing. In summary then, relative deprivation seems to apply within each SEP stratum, and increasing SEP among racial/ethnic groups would not equalize self-rated health status between racial/ethnic minorities and Whites.

In general, SEP was a significant predictor of improved health status for each SEP group; however, the coefficient was largely attenuated among those of highest SEP. This again suggests the importance of relative SEP. Specifically, it appears that within SEP groups, individuals at the higher end of the SEP scale have improved health.

Physical Functional Limitations. The stratified SEP findings indicate that racial/ethnic minorities reported fewer or about the same physical functional limitations, when compared to Non-Latino Whites, regardless of SEP. As discussed previously, this finding is somewhat unexpected for Latinos who have typically reported increased functional limitations in similar studies. At the lower levels of SEP, increasing SEP was predictive of fewer physical functional limitations. However, the phenomenon of diminishing returns seems to apply at the highest level of SEP where the dimension of SEP is not significant. In other words, at some point, having additional socioeconomic benefits does not improve one's chances of having fewer physical limitations.

The importance of the behavioral risk factors considered in this study also varied by SEP. Individuals of lower SEP who smoke were unduly burdened with increased physical functional limitations. This finding seems to indicate that smoking is associated with other life stressors particularly germane to those of lower SEP. Further, being overweight is highly significantly related to having physical functional limitations, but only among those of high SEP. Medical factors had consistent predictive power across socioeconomic groups, with the exception of having a place of regular medical care, which was associated with increased odds for physical functional limitations only among those of high SEP. This indicates that with increased resources one might be more likely to obtain additional medical services when compared to those of low or medium SEP. Finally, the importance of the sociodemographic factors included in this study varied by SEP. Being married was particularly helpful to individuals of low SEP, whereas being male offered health benefits for those of medium and high SEP.

Emotional Functional Limitations. With respect to emotional functional limitations, racial/ethnic minorities of lowest SEP were significantly more disadvantaged when compared to non-Latino Whites. Only Latinos of medium SEP were equally disadvantaged. This finding points to the importance of SEP in affecting emotional functional limitations among racial/ethnic minorities. Interestingly, Latinos had more emotional functional limitations when compared to non-Hispanic Whites, even when of the same SEP (**Table 24**). This finding is supportive of other studies, which have found that Latinos, and Mexicans in particular, of higher SEP who are more assimilated experience more resistance, discrimination and other acculturative stressors (Finch & Vega, 2003; Finch, et al., 2000), which could result in an increased number of emotional functional limitations. Evidence was not found to indicate relative deprivation in this health outcome between individuals of low and medium SEP. There was however, a graded finding for those of highest SEP.

Other predictors of emotional functional limitations had varied results dependent upon SEP. For example, those of lowest SEP had higher odds for this outcome when using alcohol moderately, whereas those in other SEP groups did not **(Table 24)**. Meeting recommended physical activity levels had a significant positive effect for those of medium and high SEP, but not those of low SEP, which seems to suggest that other life factors associated with being low SEP cancel out the positive benefits that physical activity might otherwise yield. Having health insurance resulted in reduced odds for emotional functional limitations, for those of medium and high SEP, but the same result was not true for those of low SEP. This again suggests that there are other factors influencing emotional functional limitations for individuals of low SEP that are not mitigated simply by having access to health care.

<u>Is SEP an Important Mitigator for Discrimination?</u>

<u>Self-Rated Health Status.</u> SEP seems to be protective for the experience of racial/ethnic discrimination in that having an experience of racial/ethnic discrimination within a health care setting was not a significant predictor of poorer health among those of the highest SEP. Although it was attenuated from low to high SEP (b=-.450 to b=-.260), a strong relationship between other types of discrimination and poorer health was observed regardless of SEP level.

<u>Physical Functional Limitations.</u> Racial/ethnic discrimination was associated with increased physical functional limitations at each level of SEP. At the highest SEP, the odds ratio is actually greater than at low or medium SEP levels. This finding is contrary to the expectation that higher SEP would be protective for fewer physical functional limitations among those experiencing racial/ethnic discrimination. Therefore, it is interpreted to mean that individuals of higher SEP are not accustomed to experiencing racial/ethnic discrimination and therefore may have stronger negative health repercussions. Alternatively, these individuals may have more flexibility to refrain from participation in their work or other settings where they may have experienced discrimination.

Although significant at all SEP levels, the detrimental health effects from other types of discrimination were in fact attenuated somewhat as SEP level increased. Even so, the risk was greater than two-fold for those of the highest SEP.

This indicates that discrimination, even in a limited form, is a powerful predictor of poorer health outcomes.

Emotional Functional Limitations. Individuals of low and high SEP were 2.59 times and 3.85 times more likely (respectively) to report emotional functional limitations, whereas individuals of medium SEP were not significantly different from those who had not reported this type of discrimination. For individuals of low SEP, the additional burden of racial/ethnic discrimination on top of other life stressors seems to increase emotional functional limitations. It is unclear, however, why this would be the case for those of the highest SEP. One explanation may be that individuals in this group are more "mainstreamed" in their life in general, integrated with non-Latino Whites on various levels, so that when they are met with discrimination of this type it is particularly upsetting or difficult to accept leading to mental health repercussions.

Increasing SEP among Latinos of Mid-Level SEP

Self-Rated Health. In the full sample analyses, SEP was found to unduly impact Latinos' health when compared to other racial/ethnic minority groups, and compared to non-Latino Whites. To explore the relationship between SEP and health among this ethnic group further, Latinos were stratified by low, medium and high SEP **(Table 27)**. Although SEP remained a significant predictor for Latinos in each stratum, the coefficient was larger for those of medium SEP when compared to those of low SEP suggesting that increasing SEP among the medium SEP strata would have a larger effect on health when compared to those in the low strata, for whom other factors may be more important.

As was true for the full sample, the coefficient for SEP decreased significantly for Latinos in the upper SEP, suggesting that SEP has diminishing returns. Even so, SEP remained a significant predictor of health among Latinos who were of the highest SEP.

Interestingly, other predictors in the model varied depending on SEP. For example, past and current smoking behaviors were not significantly associated with self-rated health for those of high SEP. Those of lower SEP seemed to benefit from heavy alcohol use, whereas those of upper SEP benefited from moderate alcohol use **(Table 27)**. This suggests that health behaviors may be used as coping mechanisms for life stressors that are directly influenced by SEP. Medical factors also varied by SEP with health insurance having a greater influence on health status for those in the medium SEP stratum. This is intuitive in that public health insurance programs are available for those of low income, and those of high SEP most likely have other resources to pay for health care.

<u>Physical Functional Limitations.</u> Increasing SEP significantly reduces the likelihood for physical functional limitations for Latinos of low SEP, but not for those of medium or high SEP **(Table 30)**. This finding indicates that even increasing SEP slightly among low SEP Latinos would have positive health benefits.

An analysis of other health predictors for this population revealed that physical activity level had varying implications for Latinos depending on SEP. For example, those of medium SEP benefited significantly from obtaining some level of regular physical activity, whereas those of high SEP only had significant health benefits if they met recommended levels for physical activity. These findings have relevance for health interventions designed to increase physical activity in that different levels of activity may yield similar results dependent on other life factors.

Finally, being married had significant benefits only for Latinos of low SEP. The additional social support associated with being married, therefore, may provide additional health benefits to those with limited outside resources. Further, being male was associated with less physical functional limitations among medium and high SEP Latinos. This suggests that female Latinas in particular are at highest risk for this outcome even at medium and high levels of SEP.

Emotional Functional Limitations. Increasing SEP among Latinos of low SEP would significantly reduce emotional functional limitations, whereas increases in SEP among medium and high SEP groups would not have the same positive outcome on mental health (**Table 32**). This suggests that targeting low SEP Latinos, as opposed to all Latinos, with mental health and other social services that increase community capital, would have the greatest mental health benefits.

Current smokers were particularly disadvantaged with respect to emotional functional limitations if they were also of low SEP, which, as stated previously, indicates that smoking behavior is associated with additional health deficits for this group. Having a place of regular health care varied by SEP, with those of the lowest SEP reaping benefits from having a place of regular care. Finally, Latino males of medium SEP were significantly less likely to have emotional functional limitations when compared to women of the same SEP, and compared to men of low or high SEP. Although it is not surprising that Latino men of medium SEP are protected from the life stressors associated with being of low SEP, it is notable that this would not be true for high SEP Latinos. It is probable that Latinos of high SEP are more acculturated and more assimilated, and therefore more likely to experience discrimination as they integrate with non-Latino Whites, which in turn is associated with poorer mental health outcomes.

Increasing SEP among Latinos of low SEP would reduce physical and emotional functional limitations, but Latinos of mid-level SEP would gain the most in overall health status from the same increase in SEP. This is not as straightforward as it seems in that overall health rating among Latinos may be influenced by other factors such as level of acculturation and English proficiency (discussed next), or differing cultural perceptions of what it means to have "good health." In contrast, physical and emotional functional limitations may be measures of practical performance, which seems to be unduly influenced by lower SEP. In other words, these measures may be examining different things for this population.

One potential explanation for the self-rated health finding is that Latinos who are of low SEP are probably less acculturated and enjoy health benefits from social support more characteristic of living and interacting within cultural enclaves. Additionally, low SEP Latinos would most likely qualify for community-based and government-funded health and social support programs, which may serve to improve one's perception of their overall health. Latinos of mid-level SEP are probably more acculturated and integrated and therefore rely more on the positive health effects of SEP to influence their overall health rating. For example, being of mid-level SEP would negatively affect one's ability to qualify for certain assistance programs. Additionally, individuals of mid-level SEP may not qualify for employer-sponsored health care, or may not be able to afford health promotion related services and programs. Therefore, the responsibility for creating improved health would fall on the individual, and the value of SEP relative to health may increase.

The Effect of Acculturation on Latinos' Health

Evidence indicates that longer stay in the United States and hence increased acculturation results in deteriorated health habits and health status (Vega and Amaro, 1994). The process of acculturation is stressful for Latinos in that attachments to supportive networks are disrupted while the migrant is simultaneously trying to adapt to economic and social systems in the United States (Vega and Amaro, 1994). Vega and others (1991) reported that Latino migrants experience discrimination, prejudice, and exclusion that frustrate expectations of improved social and economic status, which is exacerbated as the migrant adopts the host culture's values. Simultaneously, the migrant is faced with the task of incorporating into his or her identity the newly acquired status as a "minority." Health risk behaviors are then adopted within the new host country in order to cope with the new stressors, and concomitantly, health indicators have been shown to deteriorate. The relationship between risk behaviors and the acculturative process can be striking as is the case with adolescent pregnancy, low birth weight infants and use of illicit drugs (Ventura, 1985; Guendelman, et al., 1986; Amaro et al., 1990; National Institute on Drug Abuse, 1987; Page, 1980; Perez et al., 1980; Scopetta, et al., 1977; Vega, et al., 1993).

One of the goals of this study was to determine whether length of stay in the United States, or age at immigration, measured by a group of acculturative proxy variables, resulted in increased risk for unhealthy behaviors and poorer health status.

Self-Rated Health Status. Weighted estimates were obtained in order to make inferences about California's growing Latino population. In the main effects model, language in particular proved to be an important predictor of health status for Latinos. Latinos who spoke Spanish only, or a combination of Spanish and English at home, and those who had no English proficiency reported significantly worse health than those who spoke only English at home and those who had good English proficiency (**Table 25: Model 8**).

The acculturative proxy factors examined in this study attenuated the influence of SEP (**Table 25: Model 8**), and had varying effects depending on level of SEP. For example, speaking Spanish exclusively remained a significant predictor of worse health within all strata, which would seem to indicate that lesser acculturated Latinos have poorer self-rated health. This finding is contrary to many previous studies that have found that increased acculturation results in poorer health outcomes such as infant mortality, low birth weight, cancer, high blood pressure, higher rates of adolescent pregnancy, and increases in psychiatric disorders (Finch and Vega, 2003). Specifically, Latinos who are more highly acculturated are more likely to experience discrimination, stressors related to legal status, and language conflict (Finch and Vega, 2003). Conversely, Latinos who are lesser acculturated have had less time to adopt health risk behaviors associated with the host country, and are more likely to conduct daily interactions within cultural enclaves, which have been shown to be protective for health (Berry, 1980). Therefore, it is unclear why non-acculturated California Latinos would be different from previously studied Latinos.

One explanation may be the relationship between limited English proficiency (LEP) and lower self-rated health status. Previous research has found that patients with LEP have greater difficulty communicating with health care providers and are in general less satisfied with their care (Green et al., 2005). For example, one study using a large national sample (n=49,327 adults) found that racial/ethnic linguistic minorities reported worse ratings of health care than did other racial/ethnic minorities or Whites (Weech-Maldonado, et al., 2003). Another study found that children of LEP parents have worse health and poorer health care (Flores, et al., 2005). These studies did not focus on Latinos, however, and in many cases they used different measures than those used in the present study. Having said that, these findings suggest that there are barriers to health care (outside of access to care) that drive self-rated health care among those of LEP (Weech-Maldonado, et al., 2003). It seems then, that English proficiency has independent effects on health status rating, and it is possible that in some cases these effects may be confounded with, or contrary to one's overall acculturation level. In other words, the present study suggests that language alone is not a good indicator of acculturation level in that it does not capture other measures of importance such as ethnic identities, school performance, level of parent-child generational conflict, and the extent to which peer relations extent beyond one's ethnic circle (Portes and Rumbaut, 2001). In fact, other studies have used validated, multi-item scales assessing difference dimensions of cultural adaptation (language, media preference, social interaction, ease of relationships) (Vaeth & Willett, 2005).

Another possibility for this study's findings is that the construct of self-rated health may not hold the same meaning for exclusive Spanish speakers as it does for other Latinos. Perhaps there are other unmeasured constructs influencing the rating of health among this group that were not captured in this study. It is possible that health status is changing among California Latinos so that there are new stressors associated with being lesser acculturated. Alternatively, the process of acculturation may be accelerated in some way for this group. For example, it is possible that the economic and social systems into which Latinos must assimilate are tougher to penetrate than they were for past immigrants. Perhaps, then, the benefits from social networks are not as long-lasting, and health behaviors and negative health consequences are surfacing earlier in the acculturation process.

Speaking Spanish and English at home, and having no English proficiency were not significant predictors for Latinos in the highest SEP (**Table 27**). This finding suggests that there are few Latinos of LEP at the highest SEP.

An additional objective of this study was to assess whether age at immigration to the U.S. had differential effects on health status among a relatively homogeneous population of Latinos who originated from Mexico (45% of the Latino CHIS 2001 respondents were Mexican-born and another 43% were U.S.-born). This was a unique opportunity in that heterogeneous groups of Latinos are often lumped together for research purposes. When controlling for the other sociodemographic, behavioral and medical factors in the model there were no differences between child immigrants, adult immigrants or U.S.-born Latinos on this particular measure of health (**Table 25: Model 8**). Differences on this dimension were found, however, when interaction effects were considered with SEP. Specifically, increasing SEP had a greater improvement on self-rated health status for adult immigrants when compared to those who immigrated as a child (younger than 15 years of age) and those who are US born (**Table 26**). Adult Latino immigrants come to the U.S. seeking economic opportunities. Therefore, even incremental increases in SEP may have a greater relative improvement on health and lifestyle among this group. Further, being a child immigrant was significantly associated with better health, but only among Latinos of higher SEP, which suggests that SEP softens some of the negative health effects of acculturation.

Contrary to expectations, neither citizenship status nor time spent in the U.S. was significant predictors for Latino self-rated health. These findings deserve further exploration to determine whether it is the meaning of health that differs between these groups, or whether there are other unmeasured aspects that comprise health which are different for Latinos of limited English proficiency.

Physical Functional Limitations. Increasing SEP among Latinos with no English proficiency (which is probably the group of lowest SEP) would have a larger effect on reducing odds for physical functional limitations, when compared to Latinos who are English proficient (Table 29). This finding seems to indicate that socioeconomic interventions aimed at improving health (such as increasing community capital by providing additional social services, which has been shown to improve SEP) among Latinos should target Latinos who are not English proficient, for whom even a slight increase in SEP may make tangible differences in this health outcome.

Whether one spoke Spanish only at home, or both English and Spanish, had particular relevance for low SEP Latinos, in that individuals in these groups were less likely to have physical functional limitations (**Table 30**). If language is a proxy for acculturation level, this finding supports other studies indicating that non-acculturated, or lesser acculturated Latinos have better health than acculturated Latinos, who seem to accumulate negative health impacts with increasing time spent in the U.S.

Emotional Functional Limitations. Interaction effects were tested between each acculturative proxy variable used in this study, SEP and discrimination. None of these tests were found to be significant for this outcome. Further, when examining the effects of acculturation factors by SEP level, none of the factors were found to be significant at any level. These findings are contrary to expectations in that negative mental health impacts related to higher acculturation level and increased exposure to discrimination have been noted in previous research. One possible explanation for this finding may be that although they may experience feelings of depression and anxiety, Latinos may not have the flexibility to abstain from regular responsibilities and activities.

Latinos are Negatively Affected by Discrimination Too

Self-Rated Health. Discrimination has been negatively associated with health, and Latinos who are more highly acculturated are more likely to experience discrimination (Finch & Vega, 2003; Finch et al., 2000). Indeed, this study found that Latinos who reported any type of discrimination in a health care setting had significantly worse health status compared to those who reported no discrimination (**Table 25: Model 8**). Further, the health impacts resulting from discrimination were worse for Latinos when compared to non-Latino Whites (**Table 16, note; Table 20**). There were no significant interactions between the acculturative proxy variables used in the study and the experience of discrimination.

It is notable that for Latinos, higher SEP did not attenuate the negative health effects from experiencing discrimination in a health care setting (Table 27). The relationship was only attenuated somewhat by being of mid-level SEP (b=-.271) compared to low SEP (b=-.360) and high SEP (b=-.312). This suggests that chronic forms of discrimination would be even more detrimental to Latinos' overall health status. One might postulate too whether discrimination is one of the aspects that comprises a large component of Latinos' overall health rating, resulting in typically lower self-rated health when compared to other racial/ethnic groups including non-Latino Whites.

Physical Functional Limitations. Discrimination remained a significant predictor of increased physical functional limitations for Latinos (Table 28). However, for this outcome higher SEP seemed to attenuate the negative health effects more than it did for self-rated health status (Table 30), whereas being of mid-level SEP made Latinos particularly susceptible to negative health effects from discrimination.

Emotional Functional Limitations. Experiencing discrimination of any type within a health care setting was significantly related to increased odds for emotional functional limitations across SEP groups, however, the odds were the greatest for Latinos of high SEP (OR=3.71) (Table 32). This suggests that Latinos of higher SEP are more integrated and more likely to encounter discrimination, or that being of higher SEP makes Latinos less tolerant of discrimination, and that this dissonance results in increased mental health repercussions.

CHAPTER 13: STUDY STRENGTHS AND LIMITATIONS

There are several strengths to this study. First, as described previously, CHIS 2001 was a random digit dial (RDD) telephone survey of California households and is the largest state health survey in the United States. The extremely large sample size and the racial/ethnic diversity, combined with complicated weighting techniques allowed for the generalization of findings to California's richly diverse population. Second, a methodical analytic approach was used whereby the focal relationships between race/ethnicity and three health outcomes were elaborated by stepwise addition of variables and testing multiple models. Using this technique, it was possible to evaluate changes to the focal relationship prior to selecting a final model. Further, an exhaustive list of potential mediator variables was examined to explain the relationship between racial/ethnic identity and health status. Additionally, interaction effects were considered and stratified analyses were conducted to specifically deepen the understanding of the SEP effect among racial/ethnic minorities. Finally, separate analyses of Latinos were conducted to further explore the unique effect that SEP has on Latinos' health, and additional acculturative proxy measures unique to this population were included in these analyses.

Conversely, there are a number of limitations to this study. First, the data are cross-sectional and therefore the impact of predictors cannot be estimated over time. Future studies, however, may compare these findings to subsequent versions of the CHIS survey. Second, some of the racial/ethnic groups were under sampled compared to California's population. Specifically, these groups included African-Americans, Latinos and Asian/Pacific-Islanders. Although complex weighting methods were used to adjust for this undersampling, it is possible that some of the estimates are biased as a result. Third, due to the nature of the RDD sample requiring land-line telephone numbers, the sample may be of higher SEP when compared to the California population overall in that those who had no telephone service, interrupted service, or exclusive cell phone use were excluded from the survey. If weighting techniques did not correct for this bias, estimates related to SEP differences and the relative influence of SEP by group may be understated. Fourth, the measures of SEP may not reflect an accurate, overall SEP in that they are static measures and do not account for the impact of SEP over the life course. For example, in addition to assessing current socioeconomic characteristics, asking about one's assets or experiences of poverty over the life course may provide a more accurate overall socioeconomic position. Another constraint is that some important personal health-risk behaviors (i.e. illicit drug use, and sexual risk behaviors) were not included in CHIS 2001. Therefore, the contribution of health behaviors in explaining SEP differences in health status is limited to a subset of behaviors. Further, these behaviors may not capture the risk associated with health behaviors over the life course.

Incomplete measures of acculturation were used in this study, which were focused on language, citizenship status, and age at immigration. CHIS 2001 did not incorporate questions designed to measure multiple dimensions of acculturation such as the level of social support, or cultural enclave integration, which may serve as important mediators and may be protective for health. As a result, validated multi-item scales assessing acculturation were not used in this study. Further, the inability to generalize the limited measures of acculturation in CHIS 2001 to all the racial/ethnic groups included in the study is also a limitation. For example, language spoken at home, and measures of English proficiency have been used in previous studies as proxy measures for acculturation within Latinos populations. It is not clear, however, whether these measures apply in the same way to Asian/ Pacific Islanders.

Finally, the measure of discrimination used in this survey is confined to an isolated experience and cannot be used to construe experiences of discrimination in other aspects of life. Improved measures of discrimination would include asking about several experiences and/or settings throughout one's lifetime during which they might have felt they experienced discrimination. Further, previous research indicates that asking individuals about their racial/ethnic group's experience as a whole, versus their experiences as an individual, might allow them some freedom from the shame and stigma associated with discrimination.

CHAPTER 14: CONCLUSIONS AND RECOMMENDATIONS

The current findings, based on a large, racially and ethnically diverse, RDD sample of California residents show that California racial/ethnic minorities had significantly poorer self-rated health status and higher rates of emotional functional limitations when compared to non-Latino Whites, after controlling for sociodemographic factors, health risk behaviors, factors related to medical care access and utilization, and chronic morbidities. Further, both women and men of all racial/ethnic groups had health disadvantages when compared to Non-Latino White women and men. Conversely, in most cases, racial/ethnic minorities reported fewer physical functional limitations; findings that are consistent with previous studies. In some cases, stratifying the sample by gender had varied effects, which points to the importance of stratifying results by race/ethnicity and gender.

A number of predictors were examined to explain the relationship between race/ethnicity and health. In summary, health risk behaviors accounted for only a small portion of racial/ethnic health differences among Californians. Former and current smoking behavior, increased BMI and obtaining regular exercise resurfaced throughout the study as important predictors of health for most racial/ethnic, gender and SEP groups. Experiencing racial/ethnic discrimination and any type of discrimination in a health care setting within the last 12 months was a significant predictor of poorer health for all health outcomes. Although many of the predictors in the model were highly significant indicators of self-rated health status, the overall

R^2 for the final model was about 30% indicating that other unmeasured constructs are contributing to self-rated health, and that additional constructs may be illuminated in future studies.

Recommendation #1: In order to eradicate racial/ethnic disparities in self-rated health, emphasis must be placed on understanding the underlying causes of these disparities in future studies. Emphasis should be placed on understanding differences between racial/ethnic groups and subgroups, with particular focus on racial/ethnic minority women.

The Role of SEP. Investigating the role of SEP in the relationship between racial/ethnic identity and health status, and determining whether the role varied by racial/ethnic group, gender or SEP level, was an important goal of this research.

This study found that increasing SEP would improve the overall health status rating for Californians in each of three SEP groupings, but that it would have the greatest benefit for those in the lowest SEP (b= .361) and mid-level SEP (b=.260) groups, when compared to the highest level SEP group (b=.144). This is not surprising and is evidence for the diminishing returns of SEP (Table 11). The same relationship was true with regard to physical functional limitations and individuals of low and mid-level SEP, but no relationship was detected between increasing SEP and better health at the highest level of SEP (Table 17). Therefore, SEP seems to matter more for improving overall health and functional limitations among individuals of low and mid-level SEP, than among those of higher SEP. This finding is consistent with other studies that indicate that individuals of higher SEP have better health outcomes (Duncan et al., 2002; Everson et al., 1997; Link & Phelan, 1995; Macintyre & Hunt, 1997; Williams, 1997). It also supports previous findings that show that relative SEP is an important health predictor (Kaplan et al., 1996; Kawachi and Kennedy, 1997; and Marmot, 1994).

One interesting finding is that increasing SEP would not reduce emotional functional limitations among individuals of low or mid-level SEP, but it would improve health for those of high SEP (Table 24). This finding is curious in that one would expect increasing SEP to improve mental health and emotional functional limitations among those of lower SEP. In fact, evidence suggests that individuals of higher SEP have reduced levels of depression (Everson et al., 1997). This finding could mean that even if SEP increased, individuals of low and mid-level SEP would not have the ability to refrain from going to work or performing other responsibilities. Alternatively, it may be interpreted to mean that something other than SEP is related to emotional functional limitations among these two groups, which is unique to their position in society.

Although SEP did not account for all of the observed racial/ethnic disparities, it proved to be a highly significant predictor of health for all racial/ethnic groups, especially Latinos. Stratifying the sample by low, medium, and high SEP revealed that race/ethnicity seemed to have an independent effect on health. Further, differences in health status were not simply the result of racial/ethnic minorities being of lower SEP. For example, in almost every case, racial/ethnic minorities had significantly worse self-rated health compared to whites within each of the same SEP stratum. Finally, higher SEP seems to attenuate the effects of some health predictors that are otherwise harmful.

California Latinos. For Latinos, SEP remained a significant predictor of health in each SEP stratum, however, the SEP effect for this group was attenuated considerably when controlling for acculturative proxy measures. Increasing SEP among Latinos of medium SEP would have a larger effect on health when compared to those in the low strata, for whom other factors may be more important. Further, SEP had diminishing returns for Latinos of high SEP, meaning that the increase on the health status scale was not as great when SEP was increased within this stratum. Even so, SEP remained a significant predictor of health among Latinos who are of the highest SEP. Therefore, community-based approaches that demonstrate an increase in community and individual capital are worth pursuing among this high risk group.

Other predictors of Latino health were dependent on SEP level. For example, past and current smoking behaviors were not significantly associated with self-rated health for those of high SEP. Those of lower SEP seem to benefit from heavy alcohol use, whereas those of upper SEP benefit from moderate alcohol use. This suggests that health behaviors may be used as coping mechanisms for life stressors that are directly influenced by SEP. Another example with regard to self-rated health status is that SEP is especially important for Latinos who immigrated to the U.S. as adults, and child immigrants of higher SEP reported better health. In summary, approaches to improving health within this ethnic group must consider differences within the group.

Additionally, important questions are raised when one considers current economic trends. Although absolute levels of SEP may increase among individuals of mid-level SEP, the gap between those at the low and high ends of the socioeconomic spectrum is projected to widen, resulting in a growing "middle class." Therefore, the evidence for relative deprivation among CHIS 2001 respondents indicates that ratings of health may also continue to deteriorate.

In summary, these findings point to the importance of examining the unique impacts that SEP may have on different racial/ethnic groups, and how these impacts change by level of SEP. Further, within groups, the impact of SEP varies by gender. These distinctions are important in that they assist in isolating the causal pathways involved in racial/ethnic disparities.

Recommendation #2: SEP does not account for racial/ethnic disparities in health, but there is a racial/ethnic SEP effect. Therefore, SEP is an important measure to include in future research on racial/ethnic health disparities.

Recommendation #3: Community-based programs and other social services that have been demonstrated to increase community capital (and therefore individual SEP), should be targeted toward Latinos of low and medium-level SEP who stand to gain the greatest health benefits.

Latinos of Limited English Proficiency. This study found that, in general, Latinos who had limited English proficiency had worse health. Presumably, exclusive Spanish-speaking Latinos are lesser acculturated, therefore, this finding is contrary to previous studies that have found that more acculturated Latinos have worse health. On the other hand, it is supportive of other studies that report that limited English proficiency is associated with worse health (Weech-Maldonado, 2003; Green et al., 2005). Therefore, language appears to have independent effects on self-rated health, and it may not be a good indicator of acculturation level as it does not capture other measures of importance such as ethnic identities, school performance, level of parent-child generational conflict, and the extent to which peer relations extent beyond one's ethnic circle (Portes and Rumbaut, 2001). An important goal of future research would be to isolate the independent effects of limited English proficiency, for example, and other factors that are related to acculturation among Latinos. In so doing, it may become clearer whether lower health ratings are largely a function of language barriers at different stages throughout the health care experience, which would require different levels of intervention when compared to dealing with health effects related to the acculturative process.

Other possible explanations for these findings are that the meaning of excellent, good or poor health is different for exclusive Spanish speakers, and that other measures of self-rated health should be explored. Or, finally, it is possible that health status is changing among Latinos and that there are new stressors associated with being lesser acculturated that were not captured in this study. It is important to further understand the migrant process and whether or not the process and resultant acculturative stressors are changing.

It was expected that other acculturative factors would also influence self-rated health for this group. Interestingly, however, neither citizenship status nor time spent in the U.S. was a significant predictor for Latino self-rated health. If the differences in health rating were primarily associated with level of acculturation, one might expect to see similar findings for the other acculturative proxy indicators. The fact that findings indicate a very strong relationship between limited English proficiency and negative self-rated health, suggests that it is language and not overall level of acculturation that matters for this group, at least for this measure of health. These findings deserve further exploration to determine whether it is the meaning of health that differs between these groups, or whether there are other unmeasured aspects that comprise health which are different for Latinos of limited English proficiency.

Recommendation #4: Latinos of limited English proficiency (LEP) rate their health worse than other Latinos. Further, other acculturative factors do not seem to influence health for this group. Therefore, LEP Latinos may have unique health needs, or measures used to assess health may have different meanings for this group. California Latinos are an important group to target for additional research regarding the health effects of language and other acculturative factors.

Detrimental Health Effects From Discrimination. In general, even an isolated experience of discrimination in a health care setting had strong negative effects on each of the three health outcomes examined in this study. Interestingly, individuals who experienced "other types" of discrimination fared worse on each of the three health measures. This highlights the importance of asking about discrimination that is not labeled as racial/ethnic discrimination in future research on racial/ethnic health disparities. Indeed, in many cases, there was a significant relationship between being a racial/ethnic minority and experiencing other types of discrimination. Further, it appears that in general, all discrimination has a significant negative health impact regardless of SEP. This has relevant implications for public health; again it appears that SEP's role in improving health status is limited, and that additional efforts must be directed toward continuing to uncover the ways in which health is impacted by discrimination and other unequal experiences of life stressors.

Possible explanations for the observed racial/ethnic health disparities that were not accounted for in this study include institutionalized and individual-level racism, resultant chronic discrimination, and other acculturative stressors. For example, in this study, self-rated health for African-Americans and those of "Other Races" did not improve compared to non-Latino Whites at the highest level of SEP. This suggests that these racial groups in particular suffer differentially from other stressors that were not measured in CHIS 2001, such as various forms and levels of discrimination.

Therefore, although the measure of discrimination used in this study was limited and cannot be used to approximate other experiences of discrimination, the findings indicate that even an isolated experience of discrimination has significant health impacts, suggesting that unmeasured negative health impacts from chronic experiences of discrimination must be more detrimental to one's health.

<u>Recommendation #5:</u> Measures of discrimination must be improved to include in-depth questions about experiences of discrimination within various settings and over the life course. In addition, more accurate reporting may be obtained by using survey questions that incorporate references to racial/ethnic groups, as opposed to personal experiences.

<u>Recommendation #6:</u> In spite of recent attention to racial/ethnic health disparities, African-Americans suffer differential health impacts due to discriminatory practices, even at the highest levels of SEP. This suggests that additional anti-discrimination policies, mandates and penalties must be instituted. The incidence of discrimination and the causal pathways leading to diminished health must be further delineated in order to formulate appropriate courses for action. Further, the impact of discrimination among other racial/ethnic groups, such as Latinos, deserves additional exploration.

<u>Reporting Race/Ethnicity.</u> Finally, although it was not the expressed intent of this study to influence the continuance of racial/ethnic reporting, findings support this practice. The complexity of the relationships between racial/ethnic identity, socioeconomic position and relative socioeconomic position, stressors related to acculturation, and discrimination, points to the importance of being able to report and study differences between racial/ethnic groups. Failing to do so would result in further travesties in accountability to social justice, the attainability of equitable life opportunities, and the provision of impartial health care in this country.

<u>Recommendation #7:</u> Reporting of racial/ethnic identity in health-related research must be a government- led priority.

APPENDICES

Table 1. Unweighted Distribution of Study Variables

Variables	Full Sample % Mean/SD	Latinos Only % Mean/SD
DEPENDENT VARIABLES		
Self-rated Health Status		
(5) Excellent	19.7	13.9
(4) Very Good	32.9	22.8
(3) Good	29.1	35.5
(2) Fair	13.9	23.2
(1) Poor	4.4	4.6
Physical Functional Limitations		
Yes	24.1	19.9
No	75.6	80.1
Emotional Functional Limitations		
Yes	15.8	20.8
No	83.9	79.2
INDEPENDENT VARIABLES		
Age	48.1/17.2	39.9/14.3
Gender		
Male	41.5	41.7
Female	58.5	58.3
Race/Ethnicity		
Non-Hispanic White	62.0	
African-American	4.5	
Latino	21.4	
Asian/Pacific Islander	7.2	
American Indian/Alaskan Native	<1	
Non-Latino Other	4.1	
Marital Status		
Married or living with partner	57.6	61.8
Never Married	17.0	19.7
Other (widowed, separated, divorced)	31.5	18.0
MEDIATING VARIABLES		
SEP Factor	.00/1	-.50/.84
Education		
< High School Diploma	13.3	38.0
= High School Diploma	25.9	28.0
Some College, AA , or Vocational Schooling	28.6	22.1
BA/BS Degree	19.3	8.4
Grad. School, MA/MS, PhD	12.9	3.5
Household Income-Midpoint		
Median	$45,000	$34,652
Mode	$25,000	$25,000

Table 1 Cont.		
Employment Status		
Employed	61.7	65.5
Not Employed	38.3	34.5
Smoking		
Current	17.2	14.0
Former	28.8	19.3
Never	54.0	66.7
Alcohol Drinking		
Heavy	<1	<1
Moderate	59.2	50.1
None	40.1	49.3
Physical Activity Levels Past 30 Days		
Some, but less than recommended	49.7	40.2
Recommended Level	26.4	20.2
Reported No Activity in Past 30 Days	32.0	44.4
BMI		
Underweight	1.9	1.1
Healthy weight	40.8	29.9
overweight	33.9	36.6
obese	23.3	32.4
Health Insurance Status Past 12 Months		
Insured all 12 months	83.0	65.8
Uninsured at some time	17.0	34.2
Usual Source of Medical Care		
Yes	88.7	81.7
No	11.1	18.2
Number of Chronic Conditions		
0	47.5	61.9
1	28.5	24.1
2	14.8	9.2
3	6.5	3.5
4	2.1	1.1
5	<1	<1
6	<1	<1
Discrimination in Health Care Setting		
Yes	5.0	6.0
No	95.0	93.9
Reasons for Discrimination		
No discrimination reported	95.0	93.9
Race/ethnic group/Language accent	<1	1.7
Some other reason	4.30	4.4
Acculturative Proxy Variables		
Birth Country		
United States		43.3

Table 1 Cont.		
Mexico		44.8
Central America		8.4
Other Latin American Country		2.7
Other Country		<1
Citizenship Status		
US Born Citizen		43.0
Naturalized Citizen		19.3
Not US Citizen		36.6
Language Spoken at Home		
Spanish		24.6
English & Spanish		50.9
English Only		21.6
Some Other Language		2.9
English Proficiency		
Not at all or Not Well		60.8
Well or Very Well		39.2
Years Lived in US		
US Born		43.1
<= 1 year		1.4
2-4 years		3.8
5-9 years		7.4
10-14 years		13.2
15+ years		30.8

Unweighted Full Sample N=55,428
Unweighted Latino Sample N=11,840

Table 2. Weighted Distribution of Study Variables

Variables	Full Sample % Mean/SD	Latinos Only % Mean/SD
<u>DEPENDENT VARIABLES</u>		
Self-rated Health Status		
(5) Excellent	19.6	13.9
(4) Very Good	32.9	21.9
(3) Good	29.1	37.2
(2) Fair	13.8	23.2
(1) Poor	4.4	3.7
Physical Functional Limitations		
Yes	17.6	17.7
No	82.3	82.1
Emotional Functional Limitations		
Yes	19.7	19.7
No	80.2	80.0
<u>INDEPENDENT VARIABLES</u>		
Age	48.1/17.2	*39.9/14.3*
Gender		
Male	49.7	49.7
Female	50.2	50.2
Race/Ethnicity		
Non-Hispanic White	52.3	
African-American	5.3	
Latino	21.4	
Asian/Pacific Islander	7.2	
American Indian/Alaskan Native	<1	
Non-Latino Other	3.2	
Marital Status		
Married or living with partner	62.8	63.1
Not Married or Never Married	37.1	36.5
<u>MEDIATING VARIABLES</u>		
SEP Factor	.00/1	*-.50/.84*
Low SEP	49.0	55.2
Medium SEP	26.7	31.0
High SEP	24.1	13.6
Education		
< High School Diploma	15.7	39.2
= High School Diploma	26.2	29.0
Some College, AA , or Vocational Schooling	27.1	21.1
BA/BS Degree	19.0	7.4
Grad. School, MA/MS, PhD	11.8	3.0

Table 2 Cont.		
Household Income-Midpoint		
Median	$45,000	$34,652
Mode	$25,000	$25,000
Employment Status		
Employed	65.3	68.4
Not Employed	34.6	31.5
Smoking		
Current	14.2	14.3
Former	17.6	17.6
Never	68.0	67.9
Alcohol Drinking		
Heavy	<1	3
Moderate	51.1	50.8
None	48.4	48.5
Physical Activity Levels Past 30 Days		
Some, but less than recommended	49.7	40.2
Recommended Level	26.8	21.2
Reported No Activity in Past 30 Days	32.3	28.5
BMI		
Underweight	2.1	1.1
Healthy weight	41.3	31.1
overweight	34.0	36.8
obese	22.4	30.8
Health Insurance Status Past 12 Months		
Insured all 12 months	61.2	60.8
Uninsured at some time	17.0	39.1
Usual Source of Medical Care		
Yes	77.7	77.5
No	22.2	22.4
Number of Chronic Conditions		
0	54.6	67.4
1	26.7	22.0
2	11.8	7.2
3	4.9	2.2
4	1.5	<1
5	<1	<1
6	<1	<1
Discrimination in Health Care Setting		
Yes	5.7	5.5
No	94.2	94.4
Reasons for Discrimination		
No discrimination reported	94.2	94.4
Race/ethnic group/Language accent	2.5	2.3
Some other reason	2.4	3.2

Table 2 Cont. **Acculturative Proxy Variables**		
Birth Country		
United States		38.5
Mexico		47.9
Central America		12.5
Other Latin American Country		<1
Other Country		<1
Citizenship Status		
US Born Citizen		41.9
Naturalized Citizen		18.4
Not US Citizen		36.6
Language Spoken at Home		
Spanish		26.2
English & Spanish		53.2
English Only		17.8
Some Other Language		2.9
English Proficiency		
Not at all or Not Well		59.3
Well or Very Well		40.7
Years Lived in US		
US Born		*43.1*
<= 1 year		*1.4*
2-4 years		*3.8*
5-9 years		*7.4*
10-14 years		*13.2*
15+ years		*30.8*
Age at Immigration		
Adult Immigrant		42.9
Child Immigrant		11.9
Not an immigrant		38.4

Weighted Full Sample N= 23,847,415
Weighted Latino Sample N= 6,743,864.9

Table 3
Self-Rated Health Status
Weighted Unstandardized Regression Coefficients (SE)
Adjusting for Independent and Intervening Predictors: Full Sample

Independent Variables	**Unst.Coeff. (Jackknife SE)**						
	Model 1	**Model 2**	**Model 3**	**Model 4**	**Model 5**	**Model 6**	**Model 7**
Race/Ethnicity[a]							
Asian/ Pacific Islander	-.187 (.020)*****	-.281 (.019)*****	-.241 (.018)*****	-.239 (.020)*****	-.240 (.020)*****	-.287 (.019)*****	-.290 (.019)*****
African-American	-.305 (.027)*****	-.317 (.024)*****	-.202 (.026)*****	-.106 (.024)*****	-.105 (.024)*****	-.079 (.023)*****	-.078 (.023)*****
Am. Indian/ Alaskan Native	-.400 (.075)*****	-.443 (.072)*****	-.231 (.066)*****	-.133 (.065)	-.131 (.065)	-.060 (.063)	-.050 (.062)
Latino	-.486 (.016)*****	-.634 (.016)*****	-.306 (.016)*****	-.234 (.015)*****	-.224 (.016)*****	-.283 (.015)*****	-.282 (.015)*****
Other Race(s)	-.171 (.042)*****	-.278 (.042)*****	-.210 (.039)*****	-.172 (.037)*****	-.170 (.036)*****	-.122 (.035)*****	-.113 (.035)****
SEP			.365 (.006)*****	.293 (.006)*****	.287 (.007)*****	.255 (.007)*****	.254 (.007)*****
Health Risk Factors							
Former Smoker[b]				-.074 (.012)*****	-.073 (.012)*****	-.039 (.011)*****	-.035 (.011)****
Current Smoker[b]				-.264 (.015)*****	-.260 (.016)*****	-.238 (.015)*****	-.228 (.015)*****
Alcohol Use[c] - Moderate				.126 (.012)*****	.125 (.011)*****	.104 (.011)*****	.102 (.011)*****
Alcohol Use[c]- Heavy				.090 (.107)	.097 (.109)	.090 (.107)	.102 (.107)
Physical Activity[d]— Some				.130 (.011)*****	.129 (.010)*****	.131 (.010)*****	.130 (.010)*****
Physical Activity[d]— Recommended Levels				.323 (.013)*****	.322 (.013)*****	.323 (.013)*****	.322 (.013)*****
Body Mass Index				-.191 (.006)*****	-.190 (.006)*****	-.139 (.006)*****	-.137 (.006)*****
Medical Care Factors							
# of Chronic Conditions						-.314 (.005)*****	-.308 (.005)*****
Health Insurance					.092 (.017)*****	.113 (.017)*****	.102 (.018)*****
Usual Place for Health Care					-.052 (.019)***	-.001 (.019)	-.001 (.019)
Discrimination							
Racial/ethnic Discrimination							-.298 (.061)*****
Other Discrimination							-.351 (.027)*****
Marital Status - Married[e]		-.148 (.011)*****	-.007 (.011)	.034 (.011)****	.033 (.011)****	.000 (.010)	.005 (.010)
Sex-Male		.046 (.011)*****	-.052 (.011)*****	-.035 (.011)****	-.036 (.011)****	-.044 (.011)*****	-.049 (.011)*****
Age		-.012 (.000)*****	-.008 (.000)*****	-.006 (.000)*****	-.006 (.000)*****	.001 (.000)*****	.001 (.000)*****
Constant	3.677 (.006) *****	4.174 (.019) *****	4.023 (.019)*****	4.224 (.029)*****	4.205 (.031)*****	3.92 (.032)	3.94 (.032)*****
R^2	**.039*****	**.080*****	**.175*****	**.228*****	**.229*****	**.287*****	**.291*****

Table 3 Cont.							
F-Test	186.00 (5, 75)	285.12***** (8, 72)	765.07***** (9, 71)	597.28 (16, 64)	512.85 (18, 62)	764.03 (19, 61)	660.97 (21, 59)

***p<=.05. ****p<= *.01.* *****p=<.001.

[a] Omitted reference category is white.
[b] Omitted reference category is never smoked.
[c] Omitted reference category is no alcohol use in past 30 days.
[d] Omitted reference category is no physical activity in past 30 days.
[e] Omitted reference category is not currently married, or never married.

Weighted N= 23,847,415

Table 4

Correlations Between SEP Predictors

		Household Income Midpoint	Employment Status2	Education Level
Household Income Midpoint	Pearson Correlation	1	.270**	.468**
	Sig. (2-tailed)	.	.000	.000
	N	55428	55428	55428
Employment Status2	Pearson Correlation	.270**	1	.181**
	Sig. (2-tailed)	.000	.	.000
	N	55428	55428	55428
Education Level	Pearson Correlation	.468**	.181**	1
	Sig. (2-tailed)	.000	.000	.
	N	55428	55428	55428

**. Correlation is significant at the 0.01 level (2-tailed).

Table 5

Factor Analysis

Communalities

	Initial	Extraction
household income midpoint	1.000	.685
Employment Status2	1.000	.335
education level	1.000	.610

Extraction Method: Principal Component Analysis.

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	1.630	54.336	54.336	1.630	54.336	54.336
2	.848	28.280	82.617			
3	.522	17.383	100.000			

Extraction Method: Principal Component Analysis.

Component Matrix[a]

	Component
	1
household income midpoint	.828
Employment Status2	.579
education level	.781

Extraction Method: Principal Component Analysis.

a. 1 components extracted.

Table 6
Self-Rated Health Status
Weighted Unstandardized Regression Coefficients (SE)
Comparing SEP Composite and Individual SEP Predictors

Independent Variables	SEP Composite Factor	Individual SEP Predictors
Race/Ethnicity		
Asian/Pacific Islander	-.287 (.019)*****	-.288 (.019)*****
African-American	-.079 (.023)*****	-.080 (.023)*****
American Indian/ Alaska Native	-.060 (.063)	-.053 (.063)
Latino	-.283 (.015)*****	-.273 (.015)*****
Other Races	-.122 (.035)*****	-.120 (.036)*****
SEP	.255 (.007)*****	
Highest Education Level		.113 (.006)*****
Household Income		.030 (.017)*****
Employed at time of Survey		.183 (.013)*****
Health Risk Factors		
Former Smoker[a]	-.039 (.011)*****	-.037 (.011)****
Current Smoker[a]	-.238 (.015)*****	-.234 (.015)*****
Alcohol Use - Moderate[b]	.104 (.011)*****	.102 (.011)*****
Alcohol Use[b]- Heavy	.090 (.107)	.091 (.105)
Physical Activity[c]— Some	.131 (.010)*****	.127 (.010)*****
Physical Activity[c]— Recommended Levels	.323 (.013)*****	.321 (.013)*****
Body Mass Index	-.139 (.006)*****	-.138 (.006)*****

Table 6 Cont. **Medical Care Factors**		
# of Chronic Conditions	-.314 (.005)*****	-.314 (.005)*****
Has Health Insurance	.113 (.017)*****	.113 (.017)*****
Has Place of Usual Health Care	-.001 (.019)	-.001 (.019)
Demographic Variables		
Marital Status - Married[i]	.000 (.010)	.006 (.011)
Gender-Male	-.044 (.011)*****	-.042 (.011)*****
Age	.001 (.000)*****	.001 (.000)*****
Constant	3.92 (.032)	3.31 (.037)*****
R^2	**.287********	**.288********
F-Test	764.03 (19, 61)	748.89 (21, 59)

***$p<= .05$. ****$p<= .01$. *****$p=<.001$. Weighted N= 23,847,415

[a] Omitted reference category is never smoked.
[b] Omitted reference category is no alcohol use in past 30 days.
[c] Omitted reference category is no physical activity in past 30 days.
[d] Omitted reference category is US born citizen.
[e] Omitted reference category is English only spoken at home.
[f] Omitted reference category is self-rated English proficiency.
[g] Omitted reference category is non-immigrant, or US born.
[h] Omitted reference category is no reported discrimination.
[I] Omitted reference category is not currently married, or never married.

Table 7
Self-Rated Health Status
Weighted Unstandardized Regression Coefficients (SE)
Adjusting for Interactions: Full Sample

Independent Variables		
	Model 7	**Model 8**
Race/Ethnicity[a]		
Asian/ Pacific Islander	-.290 (.019)*****	-.313 (020)*****
African-American	-.078 (.023)*****	-.094 (.022)*****
American Indian/ Alaska Native	-.050 (.062)	-.055 (.062)
Latino	-.282 (.015)*****	-.245 (.016)*****
Other Race(s)	-.113 (.035)****	-.113 (.035)****
SEP	.254 (.007)*****	.216 (.007)*****
Health Risk Factors		
Former Smoker[b]	-.035 (.011)****	-.041 (.011)
Current Smoker[b]	-.228 (.015)*****	-.239 (.015)*****
Alcohol Use[c] - Moderate	.102 (.011)*****	.099 (.011)*****
Alcohol Use[c]- Heavy	.102 (.107)	.094 (.107)
Physical Activity[d]—Some	.130 (.010)*****	.125 (.010)*****
Physical Activity[d]—Recommended Levels	.322 (.013)*****	.319 (.013)*****
Body Mass Index	-.137 (.006)*****	-.133 (.006)*****
Medical Care Factors		
# of Chronic Conditions	-.308 (.005)*****	-.311 (.005)*****
Has Health Insurance	.102 (.018)*****	.088 (.018)*****
Has Usual Place for Health Care	-.001 (.019)	-.009 (.018)
Discrimination		
Racial/ethnic Discrimination	-.298 (.061)*****	-.287 (.060)*****

Table 7 Cont.		
Other Discrimination	-.351 (.027)*****	-.361 (.027)*****
Marital Status - Married[e]	.005 (.010)	.012 (.010)
Gender-Male	-.049 (.011)*****	-.050 (.011)*****
Age	.001 (.000)*****	.001 (.000)*****
Race x SEP		
APIx SEP		.059 (.017)*****
AFAM x SEP		-.008 (.022)
AIAN x SEP		.055 (.083)
Latino x SEP		.148 (.015)*****
Other x SEP		-.040 (.028)
Constant	3.94 (.032)*****	3.97 (.032)*****
R^2	**.291*****	**.294*****
F-Test	660.97 (21, 59)	623.39 (26, 54)

***p<= .05. ****p<= *.01.* *****p=<.001 Weighted N= 23,847,415

[a] Omitted reference category is white.
[b] Omitted reference category is never smoked.
[c] Omitted reference category is no alcohol use in past 30 days.
[d] Omitted reference category is no physical activity in past 30 days.
[e] Omitted reference category is not currently married, or never married.

Note: Cross-product interactions were also tested between race/ethnicity and discrimination indicators. None of the interaction terms were found to be significant.

Table 8
Self-Rated Health Status
Weighted Unstandardized Regression Coefficients (SE)
Adjusting for Independent and Intervening Predictors: Differences by Gender

	Full Sample	**Women**	**Men**
	N=23,847,415	N=12,215,687	N=11,631,728
Race/Ethnicity[a]			
Asian/ Pacific Islander	-.290 (.019)*****	-.333 (.024)*****	-.236 (.030)*****
African-American	-.078 (.023)*****	-.128 (.033)*****	-.015 (.038)
American Indian/ Alaska Native	-.050 (.062)	-.168 (.094)	.074 (.081)
Latino	-.282 (.015)*****	-.291 (.020)*****	-.263 (.022)*****
Other Race(s)	-.113 (.035)****	-.122 (.047)***	-.098 (.048)***
SEP	.254 (.007)*****	.243 (.007)*****	.264 (.011)*****
Health Risk Factors			
Former Smoker[b]	-.035 (.011)****	.014 (.015)	-.081 (.017)*****
Current Smoker[b]	-.228 (.015)*****	-.194 (.025)*****	-.266 (.023)*****
Alcohol Use[c] - Moderate	.102 (.011)*****	.118 (.013)*****	.078 (.018)*****
Alcohol Use[c]-Heavy	.102 (.107)	-.121 (.227)	.110 (.112)
Physical Activity[d]— Some	.130 (.010)*****	.155 (.013)*****	.106 (.016)*****
Physical Activity[d]—Recommended Levels	.322 (.013)*****	.283 (.015)*****	.351 (.021)*****
Body Mass Index	-.137 (.006)*****	-.135 (.007)*****	-.138 (.011)*****
Medical Care Factors			
# of Chronic Conditions	-.308 (.005)*****	-.319 (.006)*****	-.295 (.009)*****
Has Health Insurance	.102 (.018)*****	.119 (.020)*****	.081 (.026)****
Has Usual Place for Health Care	-.001 (.019)	.029 (.023)	-.017 (.027)
Discrimination			
Racial/ethnic Discrimination	-.298 (.061)*****	-.410 (.066)*****	-.196 (.095)****
Other Discrimination	-.351 (.027)*****	-.412 (.040)*****	-.259 (.047)*****
Marital Status - Married[e]	.005 (.010)	.013 (.015)	.004 (.017)

Table 8 Cont.			
Sex-Male	-.049 (.011)*****		
Age	.001 (.000)*****	.002 (.000)*****	.000 (.000)
Constant	3.94 (.032)*****	3.85 (.041)*****	3.97 (.052)*****
R^2	**.291*****	**..308*****	**.275*****
F-Test	660.97 (21, 59)	505.78 (20, 60)	271.03 (20, 60)

***p<= .05. ****p<= *.01.* *****p=<.001.

[a] Omitted reference category is white.
[b] Omitted reference category is never smoked.
[c] Omitted reference category is no alcohol use in past 30 days.
[d] Omitted reference category is no physical activity in past 30 days.
[e] Omitted reference category is not currently married, or never married.

Table 9
Self-Rated Health Status
Weighted Unstandardized Regression Coefficients (SE)
Adjusting for Interactions: Differences by Gender for Full Sample

Independent Variables	**Full Sample**	**Women**	**Men**
	N= 23,847, 415	N=12,215,687	N=11,631,728
Race/Ethnicity[a]			
Asian/ Pacific Islander	-.313 (.020)*****	-.348 (.026)*****	-.260 (.036)*****
African-American	-.094 (.022)*****	-.150 (.033)*****	-.032 (.038)
American Indian/ Alaska Native	-.055 (.062)	-.166 (.093)	.059 (.086)
Latino	-.245 (.016)*****	-.241 (.021)*****	-.240 (.022)*****
Other Race(s)	-.113 (.035)****	-.127 (.047)****	-.082 (.051)
SEP	.216 (.007)*****	.205 (.010)*****	.231 (.012)*****
Health Risk Factors			
Former Smoker[b]	-.041 (.011)	.007 (.015)	-.083 (.017)*****
Current Smoker[b]	-.239 (.015)*****	-.207 (.025)*****	-.271 (.023)*****
Alcohol Use[c] - Moderate	.099 (.011)*****	.114 (.013)*****	.078 (.018)*****
Alcohol Use[c]-Heavy	.094 (.107)	-.151 (.232)	.105 (.113)
Physical Activity[d]—Some	.125 (.010)*****	.152 (.013)*****	.100 (.016)*****
Physical Activity[d]—Recommended Levels	.319 (.013)*****	.283 (.015)*****	.345 (.021)*****
Body Mass Index	-.133 (.006)*****	-.131 (.007)*****	-.136 (.011)*****
Medical Care Factors			
# of Chronic Conditions	-.311 (.005)*****	-.322 (.006)*****	-.298 (.009)*****
Has Health Insurance	.088 (.018)*****	.103 (.020)*****	.069 (.027)***
Has Usual Place for Health Care	-.009 (.018)	.021 (.023)	-.027 (.027)
Discrimination			
Racial/ethnic Discrimination	-.287 (.060)*****	-.398 (.065)*****	-.186 (.094)
Other Discrimination	-.361 (.027)*****	-.417 (.040)*****	-.275 (.047)*****
Marital Status - Married[e]	.012 (.010)	.024 (.015)	.014 (.017)

Table 9 Cont.			
Gender- Male	-.050 (.011)*****		
Age	.001 (.000)*****	.001 (.000)*****	.000 (.000)
Race x SEP			
APIx SEP	.059 (.017)*****	.061 (.025)***	.041 (.028)
AFAM x SEP	-.008 (.022)	-.048 (.029)	.019 (.038)
AIAN x SEP	.055 (.083)	.057 (.114)	.030 (.109)
Latino x SEP	.148 (.015)*****	.144 (.020)*****	.146 (.022)*****
Other x SEP	-.040 (.028)	-.002 (.045)	**-.089** (.041)***
Constant	3.97 (.032)*****	3.88 (.042)*****	4.00 (.052)*****
R^2	**.294*****	**.311*****	**.279*****
F-Test	623.39 (26, 54)	442.18 (25, 55)	239.09 (25, 55)

*** $p<=.05$. **** $p<=.01$. ***** $p=<.001$

[a] Omitted reference category is white.
[b] Omitted reference category is never smoked.
[c] Omitted reference category is no alcohol use in past 30 days.
[d] Omitted reference category is no physical activity in past 30 days.
[e] Omitted reference category is not currently married, or never married.

Table 10
Self-Rated Health Status
Weighted Unstandardized Regression Coefficients (SE)
Adjusting for Interactions: Differences by Gender for Full Sample

Independent Variables	**Women**	**Men**
	N=12,215,687	N=11,631,728
Race/Ethnicity[a]		
Asian/ Pacific Islander	-.330 (.025)*****	-.237 (.031)*****
African-American	-.135 (.033)*****	-.032 (.039)
American Indian/ Alaska Native	-.153 (.100)	.096 (.085)
Latino	-.292 (.021)*****	-.261 (.022)*****
Other Race(s)	-.124 (.052)***	-.112 (.049)
SEP	.243 (.007)*****	.265 (.011)*****
Health Risk Factors		
Former Smoker[b]	.014 (.015)	-.082 (.017)*****
Current Smoker[b]	-.194 (.025)*****	-.266 (.023)*****
Alcohol Use[c] - Moderate	.118 (.013)*****	.078 (.018)*****
Alcohol Use[c]-Heavy	-.119 (.226)	.111 (.114)
Physical Activity[d]—Some	.154 (.013)*****	.106 (.016)*****
Physical Activity[d]—Recommended Levels	.282 (.015)*****	.351 (.020)*****
Body Mass Index	-.135 (.007)*****	-.138 (.011)*****
Medical Care Factors		
# of Chronic Conditions	-.319 (.006)*****	-.295 (.009)*****
Has Health Insurance	.120 (.020)*****	.081 (.026)****
Has Usual Place for Health Care	.029 (.023)	-.017 (.027)
Discrimination		
Racial/ethnic Discrimination	-.293 (.175)	-.547 (.115)*****
Other Discrimination	-.428 (.053)*****	-.245 (.063)*****

Table 10 Cont.		
Marital Status - Married[e]	.013 (.015)	.003 (.017)
Age	.002 (.000)*****	.000 (.000)
Race x Racial/Ethnic Disc		
API x Disc	-.484 (.292)	.539 (.354)
AFAM x Disc	.055 (.237)	.633 (.353)
AIAN x Disc	.028 (.288)	-.620 (.386)
Latino x Disc	-.122 (.193)	.346 (.171)***
Other x Disc	-.089 (.292)	.804 (.372)***
Race x Other Disc		
API x Disc	.024 (.163)	-.205 (.188)
AFAM x Disc	.133 (.191)	.310 (.179)
AIAN x Disc	-.136 (.332)	-.112 (.358)
Latino x Disc	.025 (.084)	-.112 (.120)
Other x Disc	.026 (.184)	.116 (.185)
Constant	3.85 (.041)*****	3.97 (.051)*****
R^2	**.308*******	**.276*******
F-Test	317.85 (30, 50)	182.84 (30, 50)

***p<= .05. ****p<= *.01.* *****p=<.001

[a] Omitted reference category is white.
[b] Omitted reference category is never smoked.
[c] Omitted reference category is no alcohol use in past 30 days.
[d] Omitted reference category is no physical activity in past 30 days.
[e] Omitted reference category is not currently married, or never married.

Table 11
Self-Rated Health Status
Weighted Unstandardized Regression Coefficients (SE)
Stratified by Low, Med and High SEP: Full Sample

Independent Variables				
	Not Stratified	**Low SEP**	**Med SEP**	**High SEP**
Race/Ethnicity[a]				
Asian/ Pacific Islander	-.290 (.019)*****	-.368 (.039)*****	-.298 (.036)*****	-.229 (.027)*****
African-American	-.078 (.023)*****	-.102 (.042)***	-.067 (.039)	-.103 (.039)****
American Indian/ Alaska Native	-.050 (.062)	-.109 (.113)	-.015 (.094)	-.051 (.144)
Latino	-.282 (.015)*****	-.429 (.026)*****	-.210 (.027)*****	-.128 (.028)*****
Other Race(s)	-.113 (.035)****	-.065 (.066)	-.127 (.074)	-.134 (.055)***
SEP	.254 (.007)*****	.361 (.028)*****	.260 (.029)*****	.144 (.014)*****
Health Risk Factors				
Former Smoker[b]	-.035 (.011)****	-.062 (.027)***	-.073 (.022)****	-.017 (.017)
Current Smoker[b]	-.228 (.015)*****	-.261 (.024)*****	-.257 (.029)*****	-.210 (.025)*****
Alcohol Use[c] - Moderate	.102 (.011)*****	.118 (.019)*****	.080 (.018)*****	.089 (.022)*****
Alcohol Use[c]- Heavy	.102 (.107)	.036 (.139)	.311 (.166)	-.257 (.173)
Physical Activity[d]—Some	.130 (.010)*****	.131 (.022)*****	.137 (.020)*****	.105 (.016)*****
Physical Activity[d]—Recommended Levels	.322 (.013)*****	.298 (.032)*****	.315 (.020)*****	.330 (.019)*****
Body Mass Index	-.137 (.006)*****	-.092 (.012)*****	-.135 (.011)*****	-.192 (.011)*****
Medical Care Factors				
# of Chronic Conditions	-.308 (.005)*****	-.334 (.008)*****	-.302 (.009)*****	-.279 (.009)*****
Health Insurance	.102 (.018)*****	.077 (.026)****	.124 (.025)*****	.085 (.030)****

Table 11 Cont.				
Usual Place for Health Care	-.001 (.019)	-.027 (.027)	.006 (.033)	-.015 (.029)
Discrimination				
Racial/ethnic Discrimination	-.298 (.061)*****	-.286 (.084)****	-.267 (.108)***	-.332 (.190)
Other Discrimination	-.351 (.027)*****	-.450 (.051)*****	-.329 (.060)*****	-.260 (.048)*****
Marital Status - Married[e]	.005 (.010)	-.024 (.017)	.031 (.021)	.017 (.015)
Gender-Male	-.049 (.011)*****	-.079 (.026)****	-.062 (.018)****	-.003 (.016)
Age	.001 (.000)*****	.000 (.000)	.002 (.000)****	.003 (.000)*****
Constant	3.94 (.032)*****	4.08 (.061)*****	3.93 (.048)*****	4.06 (.065)*****
R^2	**.291**	**.211**	**.173**	**.186**
F-Test	660.97***** (21, 59)	217.30***** (21, 59)	94.41***** (21, 59)	125.07 (21, 59)

***$p<=.05$. ****$p<=.01$. *****$p=<.001$.

[a] Omitted reference category is white.
[b] Omitted reference category is never smoked.
[c] Omitted reference category is no alcohol use in past 30 days.
[d] Omitted reference category is no physical activity in past 30 days.
[e] Omitted reference category is not currently married, or never married.

Weighted N= 23,847,415

Table 12
Physical Functional Limitations
Logistic Regression Odds Ratios (SE)
Adjusting for Independent and Intervening Predictors: Full Sample

Independent Variables	**Odds Ratio (Jackknife SE)**						
	Model 1	**Model 2**	**Model 3**	**Model 4**	**Model 5**	**Model 6**	**Model 7**
Race/Ethnicity[a]							
Asian/Pacific Islander	.599 (.031)*****	.728 (.040)*****	.685 (.038)*****	.659 (.039)*****	.664 (.039)*****	.724 (.044)*****	.733 (.045)*****
African-American	1.09 (.062)	1.15 (.069)***	1.03 (.061)	.921 (.055)	.908 (.055)	.847 (.052)***	.847 (.052)****
Am Indian/Alaska Native	1.25 (.183)	1.40 (.205)***	1.16 (.167)	1.02 (.147)	1.02 (.147)	.883 (.132)	.846 (.125)
Latino	.733 (.025)*****	1.01 (.037)	.747 (.029)*****	.675 (.028)*****	.685 (.027)*****	.763 (.032)*****	.761 (.031)*****
Other Race(s)	1.10 (.084)	1.41 (.111)*****	1.32 (.105)****	1.25 (.097)****	1.24 (.096)****	1.13 (.090)	1.10 (.091)
SEP			.709 (.012)*****	.778 (.013)*****	.773 (.013)*****	.816 (.015)*****	.818 (.015)*****
Health Risk Factors							
Former Smoker[b]				1.17 (.040)*****	1.17 (.040)*****	1.08 (.040)***	1.07 (.040)
Current Smoker[b]				1.26 (.058)*****	1.27 (.058)*****	1.21 (.057)*****	1.17 (.056)****
Alcohol Use[c] - Moderate				.757 (.023)*****	.757 (.023)*****	.786 (.025)*****	.788 (.025)*****
Alcohol Use[c]- Heavy				.975 (.198)	.979 (.201)	1.01 (.214)	.982 (.207)
Physical Activity[d]—Some				.796 (.024)*****	.793 (.024)*****	.779 (.024)*****	.778 (.024)*****
Physical Activity[d]—Recommended Levels				.685 (.025)*****	.682 (.025)*****	.671 (.025)*****	.669 (.025)*****
Body Mass Index				1.18 (.019)*****	1.18 (.019)*****	1.06 (.017)*****	1.06 (.017)*****
Medical Care Factors							
# of Chronic Conditions						1.75 (.028)*****	1.73 (.028)*****
Has Health Insurance					.994 (.045)	.951 (.043)	.991 (.046)
Has Usual Place for Health Care					1.28 (.061)*****	1.14 (.056)****	1.14 (.058)****
Discrimination							
Racial/Ethnic Discrimination							2.23 (.343)*****
Other Discrimination							2.73 (.172)*****
Marital Status - Married[e]		.820 (.020)*****	.941 (.024)***	.905 (.024)*****	.896 (.024)*****	.933 (.026)***	.933 (.027)***
Gender-Male		.697 (.018)*****	.760 (.020)*****	.768 (.021)*****	.781 (.021)*****	.783 (.022)*****	.795 (.023)*****

Table 12 Cont.							
Age		1.02 (.001)*****	1.02 (.000)*****	1.01 (.000)*****	1.01 (.001)*****	1.00 (.001)***	1.00 (.001)****
F-Test	33.76***** (5, 75)	154.54***** (8, 72)	170.83***** (9, 71)	95.66***** (16, 64)	84.59***** (18, 62)	124.48***** (19, 61)	133.57***** (21, 59)

***$p<= .05$. ****$p<= .01$. *****$p=<.001$.

[a] Omitted reference category is white.
[b] Omitted reference category is never smoked.
[c] Omitted reference category is no alcohol use in past 30 days.
[d] Omitted reference category is no physical activity in past 30 days.
[e] Omitted reference category is not currently married, or never married.

Weighted N= 23,847,415

Table 13
Physical Functional Limitations
Weighted Logistic Regression Odds Ratios (SE)
Comparing SEP Composite and Individual SEP Predictors

Independent Variables	**SEP Composite Factor**	**Individual SEP Predictors**
Race/Ethnicity		
Asian/Pacific Islander	.724 (.044)*****	.710 (.043)*****
African-American	.847 (.052)***	.856 (.052)***
American Indian/Alaska Native	.883 (.132)	.915 (.138)
Latino	.763 (.032)*****	.832 (.035)*****
Other Races	1.13 (.090)	1.14 (.093)
SEP	.816 (.015)*****	
Highest Education Level		1.03 (.016)***
Household Income		.999 (.043)*****
Employed		.601 (.021)*****
Health Risk Factors		
Former Smoker[a]	1.08 (.040)***	1.10 (.040)****
Current Smoker[a]	1.21 (.057)*****	1.27 (.059)*****
Alcohol Use - Moderate[b]	.786 (.025)*****	.784 (.025)*****
Alcohol Use[b]-Heavy	1.01 (.214)	1.04 (.223)
Physical Activity[c]—Some	.779 (.024)*****	.769 (.024)*****
Physical Activity[c]—Recommended Levels	.671 (.025)*****	.652 (.024)*****
Body Mass Index	1.06 (.017)*****	1.08 (.017)*****
Medical Care Factors		
# of Chronic Conditions	1.75 (.028)*****	1.73 (.028)*****
Has Health Insurance	.951 (.043)	.947 (.043)

Table 13 Cont.		
Has Usual Place for Health Care	1.14 (.056)****	1.15 (.057)****
Demographic Variables		
Marital Status - Married[i]	.933 (.026)***	.935 (.027)***
Gender-Male	.783 (.022)*****	.812 (.024)*****
Age	1.00 (.001)***	.999 (.001)
F-Test	124.48***** (19, 61)	116***** (21, 59)

***$p<=.05$. ****$p<=.01$. *****$p=<.001$. Weighted N= 23,847,415

[a] Omitted reference category is never smoked.
[b] Omitted reference category is no alcohol use in past 30 days.
[c] Omitted reference category is no physical activity in past 30 days.
[d] Omitted reference category is US born citizen.
[e] Omitted reference category is English only spoken at home.
[f] Omitted reference category is self-rated English proficiency.
[g] Omitted reference category is non-immigrant, or US born.
[h] Omitted reference category is no reported discrimination.
[I] Omitted reference category is not currently married, or never married.

Table 14
Physical Functional Limitations
Weighted Logistic Regression Odds Ratios (SE)
Adjusting for Interactions: Full Sample

Independent Variables		
	Model 7	**Model 8**
Race/Ethnicity[a]		
Asian/ Pacific Islander	.733 (.045)*****	.732 (.045)*****
African-American	.847 (.052)****	.789 (.058)****
American Indian/ Alaska Native	.846 (.125)	.695 (.139)
Latino	.761 (.031)*****	.800 (.038)*****
Other Race(s)	1.10 (.091)	1.10 (.090)
SEP	.818 (.015)*****	.812 (.018)*****
Health Risk Factors		
Former Smoker[b]	1.07 (.040)	1.07 (.040)
Current Smoker[b]	1.17 (.056)****	1.16 (.055)****
Alcohol Use[c] - Moderate	.788 (.025)*****	.787 (.025)*****
Alcohol Use[c]-Heavy	.982 (.207)	.980 (.208)
Physical Activity[d]—Some	.778 (.024)*****	.777 (.024)*****
Physical Activity[d]—Recommended Levels	.669 (.025)*****	.667 (.025)*****
Body Mass Index	1.06 (.017)*****	1.06 (.017)*****
Medical Care Factors		
# of Chronic Conditions	1.73 (.028)*****	1.73 (.028)*****
Health Insurance	.991 (.046)	.982 (.046)
Usual Place for Health Care	1.14 (.058)****	1.14 (.057)****
Discrimination		
Racial/ethnic Discrimination	2.23 (.343)*****	2.24 (.341)*****
Other Discrimination	2.73 (.172)*****	2.71 (.170)*****

Table 14 Cont.		
Demographic Variables		
Marital Status - Married[e]	.933 (.027)***	.941 (.026)***
Gender-Male	.795 (.023)*****	.793 (.023)*****
Age	1.00 (.001)****	1.00 (.001)****
Race x SEP		
APIx SEP		1.00 (.064)
AFAM x SEP		.800 (.067)****
AIAN x SEP		.660 (.125)****
Latino x SEP		1.10 (.054)
Other x SEP		1.01 (.093)
F-Test	133.57 (21, 59)	102.87 (26, 54)

***$p<= .05$. ****$p<= .01$. *****$p=<.001$. Weighted N= 23,847,415

[a] Omitted reference category is white.
[b] Omitted reference category is never smoked.
[c] Omitted reference category is no alcohol use in past 30 days.
[d] Omitted reference category is no physical activity in past 30 days.
[e] Omitted reference category is not currently married, or never married.

Note: Cross-product interactions were also tested between race/ethnicity and discrimination indicators. None of the interaction terms were found to be significant.

Table 15
Physical Functional Limitations
Weighted Logistic Regression Odds Ratios (SE)
Adjusting for Independent and Intervening Predictors: Differences by Gender

Independent Variables	**Full Sample**	**Women**	**Men**
	N=23,847,415	N=12,215,687	N=11,631,728
Race/Ethnicity[a]			
Asian/Pacific Islander	.733 (.045)*****	.744 (.060)*****	.713 (.063)*****
African-American	.847 (.052)****	.913 (.075)	.735 (.078)****
American Indian/Alaska Native	.846 (.125)	1.10 (.172)	.562 (.140)***
Latino	.761 (.031)*****	.738 (.041)*****	.790 (.052)****
Other Race(s)	1.10 (.091)	1.24 (.126)***	.918 (.142)
SEP	.818 (.015)*****	.884 (.022)*****	.744 (.023)*****
Health Risk Factors			
Former Smoker[b]	1.07 (.040)	1.07 (.042)	1.03 (.068)
Current Smoker[b]	1.17 (.056)****	1.11 (.068)	1.19 (.084)***
Alcohol Use[c] - Moderate	.788 (.025)*****	.749 (.030)*****	.835 (.039)*****
Alcohol Use[c]-Heavy	.982 (.207)	1.61 (.856)	.967 (.226)
Physical Activity[d]—Some	.778 (.024)*****	.799 (.031)*****	.751 (.039)*****
Physical Activity[d]—Recommended Levels	.669 (.025)*****	.659 (.032)*****	.685 (.040)*****
Body Mass Index	1.06 (.017)*****	1.07 (.025)****	1.06 (.032)
Medical Care Factors			
# of Chronic Conditions	1.73 (.028)*****	1.76 (.037)*****	1.69 (.047)*****
Has Health Insurance	.991 (.046)	1.03 (.057)	.931 (.076)
Has Usual Place for Health Care	1.14 (.058)****	1.12 (.079)	1.17 (.102)
Discrimination			
Racial/Ethnic Discrimination	2.23 (.343)*****	1.78 (.325)****	2.71 (.621)*****
Other Discrimination	2.73 (.172)*****	2.93 (.247)*****	2.36 (.254)*****

Table 15 Cont. **Demographic Variables**			
Marital Status - Married[e]	.933 (.027)***	.973 (.039)	.844 (.044)****
Gender-Male	.795 (.023)*****		
Age	1.00 (.001)****	1.00 (.001)	1.00 (.001)*****
F-Test	133.57***** (21, 59)	78.97***** (20, 60)	53.32***** (20, 60)

***p<= .05. ****p<= *.01.* *****p=<.001.

[a] Omitted reference category is white.
[b] Omitted reference category is never smoked.
[c] Omitted reference category is no alcohol use in past 30 days.
[d] Omitted reference category is no physical activity in past 30 days.
[e] Omitted reference category is not currently married, or never married.

Table 16
Physical Functional Limitations
Weighted Logistic Regression Odds Ratios (SE)
Adjusting for Interactions: Differences by Gender for Full Sample

Independent Variables	Full Sample	Women	Men
	N=23,847,415	**N=12,215,687**	**N=11,631,728**
Race/Ethnicity[a]			
Asian/ Pacific Islander	.732 (.045)*****	.732 (.060)*****	.694 (.059)*****
African-American	.789 (.058)****	.867 (.079)	.659 (.087)****
American Indian/ Alaska Native	.695 (.139)	.935 (.193)	.431 (.168)***
Latino	.800 (.038)*****	.810 (.051)****	.776 (.059)*****
Other Race(s)	1.10 (.090)	1.24 (.127)***	.904 (.134)
SEP	.812 (.018)*****	.883 (.026)*****	.736 (.028)*****
Health Risk Factors			
Former Smoker[b]	1.07 (.040)	1.07 (.042)	1.03 (.067)
Current Smoker[b]	1.16 (.055)****	1.10 (.067)	1.19 (.083)***
Alcohol Use[c] - Moderate	.787 (.025)*****	.745 (.030)	.834 (.040)*****
Alcohol Use[c]-Heavy	.980 (.208)	1.59 (.850)	.966 (.225)
Physical Activity[d]—Some	.777 (.024)*****	.797 (.031)*****	.754 (.040)*****
Physical Activity[d]—Recommended Levels	.667 (.025)*****	.653 (.032)*****	.690 (.040)*****
Body Mass Index	1.06 (.017)*****	1.08 (.025)****	1.06 (.032)***
Medical Care Factors			
# of Chronic Conditions	1.73 (.028)*****	1.76 (.037)*****	1.69 (.048)*****
Health Insurance	.982 (.046)	1.02 (.057)	.938 (.076)
Usual Place for Health Care	1.14 (.057)****	1.12 (.080)	1.17 (.102)
Discrimination			
Racial/ethnic Discrimination	2.24 (.341)*****	1.80 (.329)****	2.73 (.626)*****
Other Discrimination	2.71 (.170)*****	2.92 (.246)*****	2.35 (.255)*****

Table 16 Cont. **Demographic Variables**			
Marital Status - Married[e]	.941 (.026)***	.984 (.038)	.847 (.044)****
Gender-Male	.793 (.023)*****		
Age	1.00 (.001)****	1.00 (.001)	1.00 (.001)*****
Race x SEP			
APIx SEP	1.00 (.064)	.856 (.068)	1.21 (.111)***
AFAM x SEP	.800 (.067)****	.854 (.082)	.704 (.108)***
AIAN x SEP	.660 (.125)****	.705 (.169)	.578 (.221)
Latino x SEP	1.10 (.054)	1.16 (.071)***	.979 (.074)
Other x SEP	1.01 (.093)	.917 (.104)	1.18 (.191)
F-Test	102.87 (26, 54)	64.53 (25, 55)	46.00 (25, 55)

***$p<=.05$. ****$p<=.01$. *****$p=<.001$.

[a] Omitted reference category is white.
[b] Omitted reference category is never smoked.
[c] Omitted reference category is no alcohol use in past 30 days.
[d] Omitted reference category is no physical activity in past 30 days.
[e] Omitted reference category is not currently married, or never married.

Note: Cross-product interactions were also tested between race/ethnicity and discrimination indicators. The only significant interaction effect was for Latina women and racial/ethnic discrimination (b=.371, p=<.05; net interaction effect= .905).

Table 17
Physical Functional Limitations
Logistic Regression Odds Ratios (SE)
Stratified by Low, Med, High SEP: Full Sample

Independent Variables				
	Not Stratified	**Low SEP**	**Med SEP**	**High SEP**
Race/Ethnicity[a]				
Asian/Pacific Islander	.733 (.045)*****	.743 (.090)***	.768 (.079)***	.636 (.072)*****
African-American	.847 (.052)****	.982 (.098)	.713 (.081)****	.688 (.106)***
Am Indian/ Alaska Native	.846 (.125)	.900 (.167)	.904 (.251)	.472 (.203)
Latino	.761 (.031)*****	.667 (.043)*****	.863 (.063)***	.860 (.093)
Other Race(s)	1.10 (.091)	1.03 (.141)	1.23 (.183)	1.01 (.170)
SEP	.818 (.015)*****	.606 (.041)*****	.819 (.070)***	.913 (.046)
Health Risk Factors				
Former Smoker[b]	1.07 (.040)	1.06 (.060)	1.07 (.067)	1.08 (.070)
Current Smoker[b]	1.17 (.056)****	1.39 (.092)*****	1.11 (.090)	.904 (.094)
Alcohol Use[c] - Moderate	.788 (.025)*****	.853 (.044)****	.770 (.042)*****	.722 (.043)*****
Alcohol Use[c]- Heavy	.982 (.207)	1.42 (.458)	.612 (.238)	1.15 (.510)
Physical Activity[d]—Some	.778 (.024)*****	.789 (.040)*****	.801 (.038)*****	.731 (.042)*****
Physical Activity[d]—Recommended Levels	.669 (.025)*****	.658 (.055)*****	.685 (.043)*****	.644 (.041)*****
Body Mass Index	1.06 (.017)*****	1.04 (.028)	1.05 (.037)	1.13 (.034)*****
Medical Care Factors				
# of Chronic Conditions	1.73 (.028)*****	1.83 (.039)*****	1.71 (.047)*****	1.60 (.050)*****
Has Health Insurance	.991 (.046)	.969 (.063)	1.02 (.085)	.872 (.090)
Has Usual Place for Health Care	1.14 (.058)****	1.14 (.088)	1.11 (.109)	1.24 (.125)***

Table 17 Cont. **Discrimination**				
Racial/Ethnic Discrimination	2.23 (.343)*****	2.28 (.493)*****	1.98 (.657)***	2.63 (.935)****
Other Discrimination	2.73 (.172)*****	2.97 (.327)*****	2.81 (.358)*****	2.27 (.241)*****
Demographic Variables				
Marital Status - Married[e]	.933 (.027)***	.886 (.044)***	.994 (.053)	.931 (.050)
Gender-Male	.795 (.023)*****	1.05 (.061)	.692 (.038)*****	.652 (.035)*****
Age	1.00 (.001)****	1.00 (.001)	1.00 (.001)***	1.00 (.002)
F-Test	133.57***** (21, 59)	59.61***** (21, 59)	35.45***** (21, 59)	44.45***** (21, 59)

***$p<=.05$. ****$p<=.01$. *****$p=<.001$. Weighted N= 23,847,415

[a] Omitted reference category is white.
[b] Omitted reference category is never smoked.
[c] Omitted reference category is no alcohol use in past 30 days.
[d] Omitted reference category is no physical activity in past 30 days.
[e] Omitted reference category is not currently married, or never married.

Table 18
Emotional Functional Limitations
Weighted Logistic Regression Odds Ratios (SE)
Adjusting for Independent and Intervening Predictors: Full Sample

Independent Variables	**Odds Ratio (Jackknife SE)**						
Race/Ethnicity[a]	**Model 1**	**Model 2**	**Model 3**	**Model 4**	**Model 5**	**Model 6**	**Model 7**
Asian/Pacific Islander	1.22 (.068)****	1.20 (.069)****	1.14 (.068)***	1.20 (.069)****	1.19 (.069)****	1.28 (.074)*****	1.28 (.076)*****
African-American	1.58 (.109)*****	1.40 (.100)*****	1.25 (.091)****	1.22 (.088)****	1.24 (.091)****	1.20 (.089)***	1.20 (.092)***
Am. Indian/ Alaska Native	1.61 (.255)****	1.61 (.247)****	1.32 (.199)	1.20 (.185)	1.20 (.183)	1.12 (.171)	1.08 (.159)
Latino	1.67 (.066)*****	1.59 (.067)*****	1.15 (.050)****	1.18 (.051)*****	1.14 (.048)****	1.21 (.053)*****	1.21 (.054)*****
Other Race(s)	1.65 (.186)*****	1.49 (.171)****	1.41 (.160)****	1.39 (.158)****	1.39 (.156)****	1.32 (.149)***	1.28 (.144)***
SEP			.680 (.011)*****	.704 (.012)****	.721 (.012)*****	.745 (.013)*****	.746 (.013)*****
Health Risk Factors							
Former Smoker[b]				1.09 (.040)***	1.09 (.040)***	1.05 (.039)	1.03 (.039)
Current Smoker[b]				1.54 (.062)*****	1.52 (.062)*****	1.48 (.061)*****	1.43 (.061)*****
Alcohol Use[c] - Moderate				.993 (.036)	.991 (.036)	1.01 (.037)	1.02 (.037)
Alcohol Use[c]- Heavy				1.20 (.258)	1.18 (.254)	1.20 (.258)	1.15 (.237)
Physical Activity[d]—Some				.990 (.033)	.999 (.034)	.994 (.034)	.994 (.034)
Physical Activity[d]—Recommended Levels				.849 (.036)*****	.856 (.036)*****	.852 (.036)*****	.854 (.036)*****
Body Mass Index				1.08 (.023)*****	1.08 (.024)*****	1.03 (.023)	1.02 (.022)
Medical Care Factors							
# of Chronic Conditions						1.35 (.019)*****	1.32 (.019)*****
Has Health Insurance					.795 (.042)*****	.774 (.041)*****	.803 (.043)*****
Has Usual Place for Health Care					.917 (.053)	.873 (.050)***	.872 (.051)***
Discrimination							
Racial/ethnic Discrimination							2.45 (.349)*****
Other Discrimination							2.77 (.166)*****
Demographic Variables							
Marital Status - Married[e]		.649 (.023)*****	.744 (.028)*****	.738 (.029)*****	.744 (.029)*****	.769 (.030)*****	.765 (.030)*****

Table 18 Cont.							
Gender-Male		.693 (.020)*****	.761 (.022)*****	.723 (.023)*****	.710 (.023)*****	.717 (.024)*****	.728 (.024)*****
Age		.994 (.000)*****	.991 (.000)	.990 (.000)*****	.992 (.001)*****	.984 (.001)*****	.984 (.001)*****
F-Test	37.34 (5, 75)	68.51 (8, 72)	115.61 (9, 71)	66.97***** (16, 64)	58.62***** (18, 62)	90.13***** (19, 61)	102.76 (21, 59)

***$p<=.05$. ****$p<=.01$. *****$p=<.001$. *Weighted N= 23,847,415*

[a] Omitted reference category is white.
[b] Omitted reference category is never smoked.
[c] Omitted reference category is no alcohol use in past 30 days.
[d] Omitted reference category is no physical activity in past 30 days.
[e] Omitted reference category is not currently married, or never married.

Table 19
Emotional Functional Limitations
Weighted Logistic Regression Odds Ratios (SE)
Comparing SEP Composite and Individual SEP Predictors

Independent Variables	**SEP Composite Factor**	**Individual SEP Predictors**
Race/Ethnicity		
Asian/Pacific Islander	1.26 (.074)*****	1.23 (.072)*****
African-American	1.20 (.089)***	1.21 (.090)***
American Indian/Alaska Native	1.12 (.171)	1.14 (.172)
Latino	1.21 (.053)*****	1.27 (.059)*****
Other Races	1.32 (.149)***	1.33 (.149)***
SEP	.745 (.013)*****	
Highest Education Level		.960 (.012)****
Household Income		.999 (.058)*****
Employed		.673 (.024)*****
Health Risk Factors		
Former Smoker[a]	1.05 (.039)	1.06 (.039)
Current Smoker[a]	1.48 (.061)*****	1.52 (.064)*****
Alcohol Use - Moderate[b]	1.01 (.037)	1.01 (.037)
Alcohol Use[b]-Heavy	1.20 (.258)	1.22 (.264)***
Physical Activity[c]—Some	.994 (.034)	.986 (.034)
Physical Activity[c]—Recommended Levels	.852 (.036)*****	.842 (.035)*****
Body Mass Index	1.03 (.023)	1.04 (.023)
Medical Care Factors		
# of Chronic Conditions	1.35 (.019)*****	1.33 (.020)*****
Has Health Insurance	.774 (.041)*****	.772 (.041)*****

Table 19 Cont.		
Has Usual Place for Health Care	.873 (.050)***	.877 (.050)***
Demographic Variables		
Marital Status - Married[I]	.769 (.030)*****	.773 (.031)*****
Gender-Male	.717 (.024)*****	.736 (.024)*****
Age	.984 (.001)*****	.982 (.001)*****
F-Test	90.13***** (19, 61)	85.10 (21, 59)

***$p<=.05$. ****$p<=.01$. *****$p=<.001$. Weighted N= 23,847,415

[a] Omitted reference category is never smoked.
[b] Omitted reference category is no alcohol use in past 30 days.
[c] Omitted reference category is no physical activity in past 30 days.
[d] Omitted reference category is US born citizen.
[e] Omitted reference category is English only spoken at home.
[f] Omitted reference category is self-rated English proficiency.
[g] Omitted reference category is non-immigrant, or US born.
[h] Omitted reference category is no reported discrimination.
[I] Omitted reference category is not currently married, or never married.

Table 20
Emotional Functional Limitations
Weighted Logistic Regression Odds Ratios (SE)
Adjusting for Interactions: Full Sample

Independent Variables				**Independent Variables**			
	Model 7	**Model 8**			**Model 9**	**Model 9 Cont.**	
Race/Ethnicity[a]				**Race/Ethnicity**[a]			
Asian/ Pacific Islander	1.28 (.076)*****	1.30 (.079)		Asian/ Pacific Islander	1.26 (.079)*****		
African-American	1.20 (.092)***	1.19 (.097)***		African-American	1.21 (.093)***		
Am. Indian/ Alaska Native	1.08 (.159)	1.01 (.195)		Am. Indian/ Alaska Native	.949 (.157)		
Latino	1.21 (.054)*****	1.09 (.061)		Latino	1.18 (.056)*****		
Other Race(s)	1.28 (.144)***	1.29 (.145)***		Other Race(s)	1.31 (.152)****		
SEP	.746 (.013)*****	.822 (.019)*****		**SEP**	.745 (.013)*****		
Health Risk Factors				**Health Risk Factors**			
Former Smoker[b]	1.03 (.039)	1.05 (.039)		Former Smoker[b]	1.03 (.039)		
Current Smoker[b]	1.43 (.061)*****	1.46 (.062)*****		Current Smoker[b]	1.43 (.061)*****		
Alcohol Use[c] - Moderate	1.02 (.037)	1.02 (.038)		Alcohol Use[c] - Moderate	1.02 (.037)		
Alcohol Use[c]- Heavy	1.15 (.237)	1.17 (.238)		Alcohol Use[c]- Heavy	1.15 (.238)		
Physical Activity[d]— Some	.994 (.034)	1.00 (.035)		Physical Activity[d]— Some	.992 (.034)		
Physical Activity[d]— Recommended Levels	.854 (.036)*****	.856 (.037)*****		Physical Activity[d]— Recommended Levels	.855 (.036)*****		
Body Mass Index	1.02 (.022)	1.02 (.022)		Body Mass Index	1.02 (.022)		
Medical Care Factors				**Medical Care Factors**			
# of Chronic Conditions	1.32 (.019)*****	1.33 (.019)*****		# of Chronic Conditions	1.32 (.019)*****		
Has Health Insurance	.803 (.043)*****	.821 (.044)*****		Has Health Insurance	.804 (.043)*****		
Has Usual Place for Health Care	.872 (.051)***	.882 (.051)***		Has Usual Place for Health Care	.867 (.051)***		
Discrimination				**Discrimination**			
Racial/Ethnic Discrimination	2.45 (.349)*****	2.43 (.346)*****		Racial/Ethnic Discrimination	3.02 (.894)*****		
Other Discrimination	2.77 (.166)*****	2.82 (.172)*****		Other Discrimination	2.50 (.197)*****		
Demographic Variables							
Marital Status - Married[e]	.765 (.030)*****	.750 (.030)*****		Marital Status - Married[e]	.763 (.030)*****		

Table 20 Cont.						Model 9 Cont.	
Gender-Male	.728 (.024)*****	.728 (.025)*****		Gender-Male	.727 (.024)*****		
Age	.984 (.001)*****	.984 (.001)*****		Age	.984 (.001)*****		
Race x SEP				**Race x Racial Discrimination**		**Race x Other Discrimination**	
APIx SEP		.844 (.049)****		API x Disc	1.53 (.804)	API x Disc	.862 (.292)
AFAM x SEP		.853 (.074)		AFAM x Disc	.551 (.302)	AFAM x Disc	.938 (.280)
AIAN x SEP		.786 (.173)		AIAN x Disc	12.38 (13.49)***	AIAN x Disc	2.21 (1.19)
Latino x SEP		.764 (.040)*****		Latino x Disc	.793 (.250)	Latino x Disc	1.44 (.216)***
Other x SEP		.968 (.101)		Other x Disc	.205 (.125)***	Other x Disc	1.07 (.439)
F-Test	102.76***** (21, 59)	74.30***** (26, 54)		F-Test			63.71***** (31, 49)

***$p<=.05$. ****$p<=.01$. *****$p=<.001$. *Weighted N= 23,847,415*

[a] Omitted reference category is white.
[b] Omitted reference category is never smoked.
[c] Omitted reference category is no alcohol use in past 30 days.
[d] Omitted reference category is no physical activity in past 30 days.
[e] Omitted reference category is not currently married, or never married.

Table 21
Emotional Functional Limitations
Logistic Regression Odds Ratios (SE)
Adjusting for Independent and Intervening Predictors: Differences by Gender

Independent Variables	**Full Sample**	**Women**	**Men**
	N=23,847,415	12,215,687	N=11,631,728
Race/Ethnicity[a]			
Asian/Pacific Islander	1.28 (.076)*****	1.27 (.107)****	1.33 (.138)****
African-American	1.20 (.092)***	1.19 (.098)***	1.20 (.174)
American Indian/Alaska Native	1.08 (.159)	1.22 (.235)	.918 (.232)
Latino	1.21 (.054)*****	1.22 (.071)*****	1.24 (.093)****
Other Race(s)	1.28 (.144)***	1.26 (.176)	1.33 (.261)***
SEP	.746 (.013)*****	.744 (.018)*****	.749 (.022)*****
Health Risk Factors			
Former Smoker	1.03 (.039)	1.04 (.048)	.979 (.062)
Current Smoker	1.43 (.061)*****	1.52 (.075)*****	1.32 (.096)*****
Alcohol Use - Moderate	1.02 (.037)	1.10 (.051)***	.917 (.053)
Alcohol Use-Heavy	1.15 (.237)	1.67 (.654)	1.06 (.242)
Physical Activity[b]—Some	.994 (.034)	1.03 (.048)	.941 (.056)
Physical Activity[b]—Recommended Levels	.854 (.036)*****	.894 (.048)***	.814 (.053)****
Body Mass Index	1.02 (.022)	1.06 (.029)***	.979 (.040)
Medical Care Factors			
# of Chronic Conditions	1.32 (.019)*****	1.29 (.026)*****	1.37 (.041)*****
Has Health Insurance	.803 (.043)*****	.831 (.051)****	.765 (.066)****
Has Usual Place for Health Care	.872 (.051)***	.885 (.064)	.851 (.071)
Discrimination			
Racial/Ethnic Discrimination	2.45 (.349)*****	2.34 (.419)*****	2.58 (.505)*****
Other Discrimination	2.77 (.166)*****	2.70 (.193)*****	2.88 (.305)*****

Table 21 Cont. **Demographic Variables**			
Marital Status - Married[c]	.765 (.030)*****	.799 (.040)*****	.688 (.042)*****
Gender-Male	.728 (.024)*****		
Age	.984 (.001)*****	.982 (.001)*****	.988 (.002)*****
F-Test	102.76 (21, 59)	54.21 (20, 60)	31.38 (20, 60)

***$p<=.05$. ****$p<=.01$. *****$p=<.001$.

[a] Omitted reference category is white.
[b] Omitted reference category is never smoked.
[c] Omitted reference category is no alcohol use in past 30 days.
[d] Omitted reference category is no physical activity in past 30 days.
[e] Omitted reference category is not currently married, or never married.

Table 22
Emotional Functional Limitations
Weighted Logistic Regression Odds Ratios (SE)
Adjusting for Interactions: Differences by Gender for Full Sample

Independent Variables	**Full Sample**	**Women**	**Men**
	N=23,847,415	**N=12,215,687**	**N=11,631,728**
Race/Ethnicity[a]			
Asian/ Pacific Islander	1.30 (.079)	1.26 (.107)****	1.36 (.142)****
African-American	1.19 (.097)***	1.12 (.107)	1.23 (.180)****
American Indian/ Alaska Native	1.01 (.195)	1.15 (.283)	.848 (.281)
Latino	1.09 (.061)	1.12 (.078)	1.08 (.101)
Other Race(s)	1.29 (.145)***	1.23 (.184)	1.30 (.246)
SEP	.822 (.019)*****	.842 (.026)*****	.798 (.032)*****
Health Risk Factors			
Former Smoker[b]	1.05 (.039)	1.05 (.049)	.987 (.061)
Current Smoker[b]	1.46 (.062)*****	1.55 (.077)*****	1.34 (.097)*****
Alcohol Use[c] - Moderate	1.02 (.038)	1.10 (.052)***	.917 (.054)
Alcohol Use[c]- Heavy	1.17 (.238)	1.77 (.688)	1.07 (.246)
Physical Activity[d]—Some	1.00 (.035)	1.03 (.048)	.953 (.057)
Physical Activity[d]—Recommended Levels	.856 (.037)*****	.888 (.048)***	.825 (.054)****
Body Mass Index	1.02 (.022)	1.06 (.029)****	.976 (.040)
Medical Care Factors			
# of Chronic Conditions	1.33 (.019)*****	1.29 (.026)*****	1.38 (.041)*****
Has Health Insurance	.821 (.044)*****	.847 (.052)****	.784 (.069)****
Has Usual Place for Health Care	.882 (.051)***	.895 (.066)	.863 (.072)
Discrimination			
Racial/Ethnic Discrimination	2.43 (.346)*****	2.30 (.417)*****	2.59 (.504)*****
Other Discrimination	2.82 (.172)*****	2.72 (.196)*****	2.97 (.320)*****

Table 22 Cont. **Demographic Variables**			
Marital Status - Married[e]	.750 (.030)*****	.788 (.040)*****	.674 (.041)*****
Gender-Male	.728 (.025)*****		
Age	.984 (.001)*****	.983 (.001)*****	.988 (.002)*****
Race x SEP			
APIx SEP	.844 (.049)****	.756 (.057)*****	.951 (.086)
AFAM x SEP	.853 (.074)	.766 (.076)****	.983 (.146)
AIAN x SEP	.786 (.173)	.799 (.225)	.774 (.271)
Latino x SEP	.764 (.040)*****	.784 (.051)*****	.727 (.066)****
Other x SEP	.968 (.101)	.740 (.110)	1.35 (.202)***
F-Test	74.30 (26, 54)	45.40 (25, 55)	27.01 (25, 55)

***$p<=.05$. ****$p<=.01$. *****$p=<.001$.

[a] Omitted reference category is white.
[b] Omitted reference category is never smoked.
[c] Omitted reference category is no alcohol use in past 30 days.
[d] Omitted reference category is no physical activity in past 30 days.
[e] Omitted reference category is not currently married, or never married.

Table 23
Emotional Functional Limitations
Weighted Logistic Regression Odds Ratios (SE)
Adjusting for Interactions: Differences by Gender

Independent Variables	**Full Sample**	**Women**	**Men**
	N=23,847,415	**N=12,215,687**	**N=11,631,728**
Race/Ethnicity[a]			
Asian/ Pacific Islander	1.26 (.079)*****	1.24 (.108)***	1.33 (.144)****
African-American	1.21 (.093)***	1.18 (.102)***	1.24 (.180)
American Indian/ Alaska Native	.949 (.157)	1.18 (.238)	.681 (.212)
Latino	1.18 (.056)*****	1.19 (.071)****	1.21 (.097)***
Other Race(s)	1.31 (.152)****	1.32 (.197)	1.33 (.259)
SEP	.745 (.013)*****	.743 (.018)*****	.749 (.022)*****
Health Risk Factors			
Former Smoker[b]	1.03 (.039)	1.04 (.049)	.975 (.061)
Current Smoker[b]	1.43 (.061)*****	1.52 (.075)*****	1.32 (.096)*****
Alcohol Use[c] - Moderate	1.02 (.037)	1.10 (.050)***	.915 (.053)
Alcohol Use[c]- Heavy	1.15 (.238)	1.68 (.654)	1.06 (.245)
Physical Activity[d]—Some	.992 (.034)	1.03 (.048)	.938 (.056)
Physical Activity[d]—Recommended Levels	.855 (.036)*****	.896 (.048)***	.813 (.053)****
Body Mass Index	1.02 (.022)	1.07 (.029)***	.981 (.040)
Medical Care Factors			
# of Chronic Conditions	1.32 (.019)*****	1.29 (.025)*****	1.37 (.040)*****
Has Health Insurance	.804 (.043)*****	.830 (.052)****	.765 (.066)****
Has Usual Place for Health Care	.867 (.051)***	.881 (.065)	.847 (.071)
Discrimination			
Racial/Ethnic Discrimination	3.02 (.894)*****	2.52 (1.21)	3.63 (1.45)****
Other Discrimination	2.50 (.197)*****	2.45 (.234)*****	2.53 (.366)*****

Table 23 Cont. **Demographic Variables**			
Marital Status - Married[e]	.763 (.030)*****	.796 (.040)*****	.685 (.041)*****
Gender-Male	.727 (.024)*****		
Age	.984 (.001)*****	.982 (.001)*****	.988 (.002)*****
Race x Discrimination			
APIx Race/Ethnic Disc.	1.53 (.804)	3.11 (2.19)	.853 (.597)
AFAM x Race/Ethnic Dis.	.551 (.302)	.642 (.441)	.476 (.408)
AIAN x Race/Ethnic Dis.	12.38 (13.49)***	No est.	No est.
Latino x Race/Ethnic Dis.	.793 (.250)	.911 (.488)	.706 (.336)
Other x Race/Ethnic Dis.	.205 (.125)***	.296 (.247)	.124 (.161)
APIx Other Disc.	.862 (.292)	.994 (.406)	.708 (.417)
AFAM x Other Disc.	.938 (.280)	1.10 (.418)	.761 (.400)
AIAN x Other Disc.	2.21 (1.19)	1.33 (1.00)	5.43 (3.66)***
Latino x Other Disc.	1.44 (.216)***	1.42 (.237)***	1.53 (.465)
Other x Other Disc.	1.07 (.439)	.816 (.388)	1.71 (1.17)
F-Test	63.71 (31, 49)	34.56 (29, 51)	20.81 (29, 51)

***$p<=.05$. ****$p<=.01$. *****$p=<.001$.

[a] Omitted reference category is white.
[b] Omitted reference category is never smoked.
[c] Omitted reference category is no alcohol use in past 30 days.
[d] Omitted reference category is no physical activity in past 30 days.
[e] Omitted reference category is not currently married, or never married.

Table 24
Emotional Functional Limitations
Logistic Regression Odds Ratios (SE)
Stratified by Low, Med High SEP: Full Sample

Independent Variables				
	Not Stratified	**Low SEP**	**Med SEP**	**High SEP**
Race/Ethnicity[a]				
Asian/Pacific Islander	1.28 (.076)*****	1.57 (.177)*****	1.19 (.131)	1.02 (.098)
African-American	1.20 (.092)***	1.43 (.163)****	1.05 (.138)	1.08 (.158)
Am Indian/Alaska Native	1.08 (.159)	1.36 (.294)	.836 (.209)	.905 (.396)
Latino	1.21 (.054)*****	1.41 (.087)*****	1.15 (.079)***	.976 (.124)
Other Race(s)	1.28 (.144)***	1.38 (.223)***	1.29 (.248)	1.13 (.254)
SEP	.746 (.013)*****	.479 (.036)	.842 (.078)	.870 (.055)***
Health Risk Factors				
Former Smoker	1.03 (.039)	1.11 (.072)	.995 (.061)	1.05 (.079)
Current Smoker	1.43 (.061)*****	1.59 (.122)*****	1.38 (.100)*****	1.41 (.143)*****
Alcohol Use - Moderate	1.02 (.037)	1.11 (.050)****	.890 (.064)	1.07 (.083)
Alcohol Use-Heavy	1.15 (.237)	1.65 (.492)	.788 (.287)	1.50 (.877)
Physical Activity[b]—Some	.994 (.034)	1.04 (.058)	.958 (.054)	.977 (.062)
Physical Activity[b]—Recommended Levels	.854 (.036)*****	.977 (.067)	.811 (.053)****	.777 (.058)*****
Body Mass Index	1.02 (.022)	1.04 (.027)	.982 (.046)	1.06 (.043)
Medical Care Factors				
# of Chronic Conditions	1.32 (.019)*****	1.35 (.030)*****	1.30 (.043)*****	1.28 (.042)*****
Has Health Insurance	.803 (.043)*****	.880 (.057)	.683 (.060)*****	.803 (.085)***

Table 24 Cont.				
Has Usual Place for Health Care	.872 (.051)***	.911 (.063)	.847 (.080)	.887 (.100)
Discrimination				
Racial/Ethnic Discrimination	2.45 (.349)*****	2.59 (.496)*****	1.75 (.503)	3.85 (1.23)*****
Other Discrimination	2.77 (.166)*****	3.16 (.379)*****	2.76 (.292)*****	2.31 (.326)*****
Demographic Variables				
Marital Status - Married[c]	.765 (.030)*****	.817 (.045)****	.752 (.052)*****	.662 (.040)*****
Gender-Male	.728 (.024)*****	834 (.043)****	.645 (.038)*****	.715 (.046)*****
Age	.984 (.001)*****	.983 (.001)*****	.986 (.002)*****	.977 (.002)*****
F-Test	102.76***** (21, 59)	28.74 (21, 59)*****	25.05 (21, 59)*****	20.36 (21, 59)*****

$^{***}p<=.05$. $^{****}p<=.01$. $^{*****}p=<.001$. Weighted N= 23,847,415

[a] Omitted reference category is white.
[b] Omitted reference category is never smoked.
[c] Omitted reference category is no alcohol use in past 30 days.
[d] Omitted reference category is no physical activity in past 30 days.
[e] Omitted reference category is not currently married, or never married.

Table 25
Self-Rated Health Status
Weighted Unstandardized Regression Coefficients (SE)
Adjusting for Independent and Intervening Predictors: Latinos Only

Independent Variables	**Model 5**	**Model 6**	**Model 7**	**Model 8**
SEP	.368 (.016)*****	.273 (.017)*****	.272 (.017)*****	.269 (.017)*****
Health Risk Factors				
Former Smoker[a]	-.076 (.027)****	-.099 (.027)****	-.098 (.027)****	-.091 (.027)*****
Current Smoker[a]	-.181 (.033)*****	-.206 (.034)*****	-.204 (.034)*****	-.198 (.034)*****
Alcohol Use - Moderate[b]	.067 (.021)****	.039 (.021)	.038 (.021)	.036 (.021)
Alcohol Use[b]- Heavy	.524 (.277)	.451 (.255)	.452 (.256)	.478 (.255)
Physical Activity[c]— Some	.056 (.025)***	.015 (.024)	.016 (.024)	.015 (.024)
Physical Activity[c]— Recommended Levels	.316 (.027)*****	.258 (.029)*****	.255 (.028)*****	.252 (.029)*****
Body Mass Index	-.131 (.012)*****	-.114 (.012)*****	-.113 (.012)*****	-.116 (.013)*****
Medical Care Factors				
# of Chronic Conditions	-.301 (.014)*****	-.327 (.014)*****	-.330 (.014)*****	-.321 (.014)*****
Has Health Insurance	.154 (.031)*****	.092 (.030)****	.091 (.030)****	.084 (.030)****
Has Usual Place for Health Care	.004 (.034)	-.026 (.034)	-.025 (.034)	-.028 (.033)
Acculturative Factors				
No Citizenship[d]		-.065 (.039)	-.089 (.055)	-.079 (.055)
Naturalized Citizen[d]		-.038 (.031)	-.073 (.053)	-.060 (.053)
Language— Spanish Only[e]		-.401 (.043)*****	-.377 (.044)*****	-.383 (.046)*****
Language—Eng + Spanish[e]		-.292 (.037)*****	-.274 (.037)*****	-.284 (.038)*****
No English Proficiency[f]		-.279 (.032)*****	-.257 (.030)*****	-.267 (.030)*****
Immigrated as Adult[g]			-.011 (.045)	-.011 (.045)

Table 25 Cont.				
Immigrated as Child[g]			.093 (.065)	.087 (.065)
Discrimination in Health Care Setting				-.338 (.047)*****
Demographic Variables				
Marital Status - Married[i]	.000 (.023)	.050 (.023)***	.054 (.023)***	.056 (.023)***
Gender-Male	-.046 (.027)	-.021 (.026)	-.018 (.026)	-.020 (.026)
Age	-.000 (.000)	-.000 (.000)	.000 (.000)	.000 (.000)
Constant	**3.77***** **	**4.19***** **	**4.15***** **	**4.18***** **
R^2	.238*****	.263	.263	.267
F-Test	220.64 (14, 66)	206.71 (19, 61)	183.76 (21, 59)	160.15 (22, 58)

***p<= .05. ****p<= *.01.* *****p=<.001. *Weighted N= 6,743,864.9*

[a] Omitted reference category is never smoked.
[b] Omitted reference category is no alcohol use in past 30 days.
[c] Omitted reference category is no physical activity in past 30 days.
[d] Omitted reference category is US born citizen.
[e] Omitted reference category is English only spoken at home.
[f] Omitted reference category is self-rated English proficiency.
[g] Omitted reference category is non-immigrant, or US born.
[h] Omitted reference category is no reported discrimination.
[i] Omitted reference category is not currently married, or never married.

Table 26
Self-Rated Health Status
Weighted Unstandardized Regression Coefficients (SE)
Adjusting for Interactions—Latinos Only

Independent Variables	Model 8	Model 11
SEP	.269 (.017)*****	.249 (.020)*****
Health Risk Factors		
Former Smoker[a]	-.091 (.027)*****	-.095 (.027)*****
Current Smoker[a]	-.198 (.034)*****	-.203 (.034)*****
Alcohol Use - Moderate[b]	.036 (.021)	.037 (.021)
Alcohol Use[b]- Heavy	.478 (.255)	.478 (.254)
Physical Activity[c]—Some	.015 (.024)	.015 (.024)
Physical Activity[c]—Recommended Levels	.252 (.029)*****	.252 (.029)*****
Body Mass Index	-.116 (.013)*****	-.115 (.012)*****
Medical Care Factors		
# of Chronic Conditions	-.321 (.014)*****	-.321 (.014)*****
Insured	.084 (.030)****	.083 (.030)****
Has Place of Regular Care	-.028 (.033)	-.028 (.033)
Acculturative Factors		
No Citizenship[d]	-.079 (.055)	-.093 (.055)
Naturalized Citizen[d]	-.060 (.053)	-.076 (.054)
Language—Spanish Only[e]	-.383 (.046)*****	-.376 (.046)*****
Language—Eng + Spanish[e]	-.284 (.038)*****	-.282 (.038)*****
No English Proficiency[f]	-.267 (.030)*****	-.259 (.031)*****
Immigrated as Adult[g]	-.011 (.045)	.032 (.051)

Table 26 Cont.		
Immigrated as Child[g]	.087 (.065)	.102 (.067)
Discrimination in Health Care Setting	-.338 (.047)*****	-.338 (.047)*****
Demographic Variables		
Marital Status - Married[i]	.056 (.023)***	.057 (.023)***
Gender-Male	-.020 (.026)	-.023 (.026)
Age	.000 (.000)	.000 (.000)
Immigration Status x SEP		
Adult Immigrant x SEP		.062 (.031)***
Child Immigrant x SEP		.015 (.046)
Constant	**4.18*****	**4.17*****
R^2	.267	.267
F-Test	160.15***** (22, 58)	143.11***** (24, 56)

***p<=.05. ****p<= *.01.* *****p=<.001. *Weighted N= 6,743,864.9*

[a] Omitted reference category is never smoked.
[b] Omitted reference category is no alcohol use in past 30 days.
[c] Omitted reference category is no physical activity in past 30 days.
[d] Omitted reference category is US born citizen.
[e] Omitted reference category is English only spoken at home.
[f] Omitted reference category is self-rated English proficiency.
[g] Omitted reference category is non-immigrant, or US born.
[h] Omitted reference category is no reported discrimination.
[I] Omitted reference category is not currently married, or never married.

Note: Interactions were tested between all acculturative factors and SEP and all acculturative factors and discrimination. The above noted was the only interaction found to be significant.

Table 27
Self-Rated Health Status
Weighted Unstandardized Regression Coefficients (SE)
Stratified by Low, Med and High SEP: Latinos Only

Independent Variables	Not Stratified	Low SEP	Med SEP	High SEP
SEP	.269 (.017)*****	.275 (.047)*****	.317 (.064)*****	.177 (.056)****
Health Risk Factors				
Former Smoker[a]	-.091 (.027)*****	-.055 (.042)	-.168 (.055)****	-.113 (.066)
Current Smoker[a]	-.198 (.034)*****	-.209 (.045)*****	-.236 (.060)*****	-.050 (.085)
Alcohol Use - Moderate[b]	.036 (.021)	.038 (.032)	-.000 (.042)	.124 (.053)***
Alcohol Use[b]-Heavy	.478 (.255)	.453 (.203)***	.730 (.350)***	-.816 (.490)
Physical Activity[c]—Some	.015 (.024)	-.004 (.034)	.038 (.041)	.023 (.047)
Physical Activity[c]—Recommended Levels	.252 (.029)*****	.197 (.057)*****	.249 (.040)*****	.350 (.058)*****
Body Mass Index	-.116 (.013)*****	-.092 (.018)*****	-.136 (.024)*****	-.197 (.034)*****
Medical Care Factors				
# of Chronic Conditions	-.321 (.014)*****	-.319 (.018)*****	-.313 (.030)*****	-.294 (.039)*****
Has Health Insurance	.084 (.030)****	.036 (.036)	.158 (.051)****	.145 (.095)
Has Usual Place for Health Care	-.028 (.033)	-.041 (.039)	-.049 (.060)	.096 (.105)
Acculturative Factors				
No Citizenship[d]	-.079 (.055)	-.113 (.068)	.008 (.101)	-.099 (.142)
Naturalized Citizen[d]	-.060 (.053)	-.068 (.070)	-.001 (.099)	-.265 (.134)
Language—Spanish Only[e]	-.383 (.046)*****	-.288 (.064)*****	-.486 (.100)*****	-.329 (.114)****
Language—Eng + Spanish[e]	-.284 (.038)*****	-.200 (.061)****	-.363 (.080)*****	-.189 (.097)
No English Proficiency[f]	-.267 (.030)*****	-.241 (.045)*****	-.328 (.067)*****	-.117 (.095)
Immigrated as Adult[g]	-.011 (.045)	-.065 (.052)	-.022 (.088)	.216 (.131)
Immigrated as Child[g]	.087 (.065)	.047 (.079)	.014 (.109)	.345 (.146)***
Discrimination in Health Care Setting	-.338 (.047)*****	-.360 (.061)*****	-.271 (.107)***	-.312 (.119)***

Table 27 Cont.				
Demographic Variables				
Marital Status - Married[i]	.056 (.023)***	.035 (.027)	.080 (.044)	.016 (.057)
Sex-Male	-.020 (.026)	-.053 (.037)	.041 (.044)	-.025 (.054)
Age	.000 (.000)	-.001 (.001)	.004 (.001)****	.004 (.002)
Constant	**4.18*******	**4.20*******	**4.14*******	**3.94*******
R^2	.267	.189	.159	.185
F-Test	160.15***** (22, 58)	57.04***** (22, 58)	20.80***** (22, 58)	15.61***** (22, 58

***p<= .05. ****p<= *.01.* *****p=<.001. *Weighted N= 6,743,864.9*

[a] Omitted reference category is never smoked.
[b] Omitted reference category is no alcohol use in past 30 days.
[c] Omitted reference category is no physical activity in past 30 days.
[d] Omitted reference category is US born citizen.
[e] Omitted reference category is English only spoken at home.
[f] Omitted reference category is self-rated English proficiency.
[g] Omitted reference category is non-immigrant, or US born.
[h] Omitted reference category is no reported discrimination.
[I] Omitted reference category is not currently married, or never married.

Table 28
Physical Functional Limitations
Weighted Logistic Regression Odds Ratios (SE)
Adjusting for Independent and Intervening Predictors: Latinos Only

Independent Variables	**Model 5**	**Model 6-**	**Model 7**	**Model 8**
SEP	.824 (.040)*****	.782 (.042)*****	.782 (.042)*****	.783 (.043)*****
Health Risk Factors				
Former Smoker[a]	1.13 (.106)	1.12 (.104)	1.11 (.103)	1.09 (.101)
Current Smoker[a]	1.17 (.124)	1.15 (.121)	1.15 (.122)	1.12 (.120)
Alcohol Use--Moderate[b]	.918 (.067)	.903 (.065)	.903 (.065)	.915 (.066)
Alcohol Use[b]-Heavy	.874 (.426)	.831 (.411)	.830 (.411)	.764 (.356)
Physical Activity[c]—Some	.898 (.061)	.876 (.060)	.875 (.060)	.869 (.061)***
Physical Activity[c]—Recommended Levels	.719 (.073)****	.695 (.072)*****	.696 (.072)*****	.699 (.071)*****
Body Mass Index	.987 (.037)	.997 (.039)	.997 (.039)	.999 (.040)
Medical Care Factors				
# of Chronic Conditions	1.86 (.073)*****	1.84 (.071)*****	1.84 (.071)	1.81 (.071)*****
Has Health Insurance	.947 (.084)	.911 (.084)	.911 (.084)	.934 (.086)
Has Place of Usual Health Care	1.08 (.098)	1.06 (.096)	1.06 (.096)	1.07 (.098)
Acculturative Factors				
No Citizenship[d]		.904 (.091)	.941 (.108)	.920 (.104)
Naturalized Citizen[d]		.890 (.091)	.933 (.140)	.897 (.134)
Language—Spanish Only[e]		.851 (.107)	.836 (.108)	.835 (.111)
Language—Eng + Spanish[e]		.926 (.100)	.913 (.097)	.923 (.100)
No English Proficiency[f]		.889 (.083)	.873 (.079)	.897 (.083)

Table 28 Cont.				
Immigrated as Adult[g]			.983 (.106)	.981 (.106)
Immigrated as Child[g]			.898 (.143)	.907 (.148)
Discrimination in Health Care Setting				2.65 (.307)*****
Demographic Variables				
Marital Status - Married[i]	.899 (.065)	.929 (.069)	.927 (.070)	.914 (.070)
Gender-Male	.851 (.065)***	.863 (.066)	.860 (.065)	.871 (.067)
Age	1.00 (.002)	1.00 (.002)	1.00 (.002)	1.00 (.002)
F-Test	33.07 (14, 66)	26.24 (19, 61)	23.81 (21, 59)	23.05 (22, 58)

***$p<=.05$. ****$p<=.01$. *****$p=<.001$. *Weighted N= 6,743,864.9*

[a] Omitted reference category is never smoked.
[b] Omitted reference category is no alcohol use in past 30 days.
[c] Omitted reference category is no physical activity in past 30 days.
[d] Omitted reference category is US born citizen.
[e] Omitted reference category is English only spoken at home.
[f] Omitted reference category is self-rated English proficiency.
[g] Omitted reference category is non-immigrant, or US born.
[h] Omitted reference category is no reported discrimination.
[I] Omitted reference category is not currently married, or never married.

Table 29
Physical Functional Limitations
Weighted Logistic Regression Odds Ratios (SE)
Adjusting for Interactions—Latinos Only

Independent Variables	**Model 8**	**Model 10**
SEP	.783 (.043)*****	.847 (.065)***
Health Risk Factors		
Former Smoker[a]	1.09 (.101)	1.09 (.102)
Current Smoker[a]	1.12 (.120)	1.13 (.120)
Alcohol Use - Moderate[b]	.915 (.066)	.914 (.067)
Alcohol Use[b]-Heavy	.764 (.356)	.770 (.357)
Physical Activity[c]— Some	.869 (.061)***	.870 (.060)
Physical Activity[c]—Recommended Levels	.699 (.071)*****	.696 (.071)*****
Body Mass Index	.999 (.040)	.998 (.040)
Medical Care Factors		
# of Chronic Conditions	1.81 (.071)*****	1.81 (.070)*****
Has Health Insurance	.934 (.086)	.931 (.087)
Has Place for Usual Health Care	1.07 (.098)	1.07 (.099)
Acculturative Factors		
No Citizenship[d]	.920 (.104)	.908 (.103)
Naturalized Citizen[d]	.897 (.134)	.885 (.133)
Language—Spanish Only[e]	.835 (.111)	.792 (.105)
Language—Eng + Spanish[e]	.923 (.100)	.893 (.096)
No English Proficiency[f]	.897 (.083)	.826 (.080)
Immigrated as Adult[g]	.981 (.106)	.982 (.106)
Immigrated as Child[g]	.907 (.148)	.917 (.149)
Discrimination in Health Care Setting	2.65 (.307)*****	2.66 (.309)*****

Table 29 Cont. Demographic Variables		
Marital Status - Married[I]	.914 (.070)	.912 (.070)
Gender-Male	.871 (.067)	.878 (.068)
Age	1.00 (.002)	1.00 (.002)
Acculturative Factors x SEP		
No English Proficiency x SEP		.856 (.066)***
F-Test	23.05 (22, 58)	22.51 (23, 57)

***$p<=.05$. ****$p<=.01$. *****$p=<.001$. *Weighted N= 6,743,864.9*

[a] Omitted reference category is never smoked.
[b] Omitted reference category is no alcohol use in past 30 days.
[c] Omitted reference category is no physical activity in past 30 days.
[d] Omitted reference category is US born citizen.
[e] Omitted reference category is English only spoken at home.
[f] Omitted reference category is self-rated English proficiency.
[g] Omitted reference category is non-immigrant, or US born.
[h] Omitted reference category is no reported discrimination.
[I] Omitted reference category is not currently married, or never married.

Note: Interactions were tested between all acculturative factors and SEP, and all acculturative factors and discrimination. The above noted was the only interaction found to be significant for this outcome.

Table 30
Physical Functional Limitations
Weighted Logistic Regression Odds Ratios (SE)
Stratified by Low, Med, High SEP: Latinos Only

Independent Variables	**Not Stratified**	**Low SEP**	**Med SEP**	**High SEP**
SEP	.783 (.043)*****	.556 (.068)*****	1.10 (.211)	.743 (.138)
Health Risk Factors				
Former Smoker[a]	1.09 (.101)	.984 (.107)	1.36 (.229)	1.17 (.260)
Current Smoker[a]	1.12 (.120)	1.11 (.153)	1.32 (.254)	.902 (.261)
Alcohol Use--Moderate[b]	.915 (.066)	.929 (.088)	.902 (.106)	.736 (.146)
Alcohol Use[b]-Heavy	.764 (.356)	2.38 (1.46)	.123 (.083)****	No OR
Physical Activity[c]—Some	.869 (.061)***	.863 (.085)	.738 (.096)***	1.22 (.213)
Physical Activity[c]—Recommended Levels	.699 (.071)*****	.786 (.114)	.715 (.125)	.507 (.109)****
Body Mass Index	.999 (.040)	1.01 (.049)	1.02 (.077)	.943 (.111)
Medical Care Factors				
# of Chronic Conditions	1.81 (.071)*****	1.82 (.086)*****	1.85 (.120)*****	1.64 (.181)*****
Has Health Insurance	.934 (.086)	.947 (.096)	.906 (.164)	.758 (.274)
Has Place of Usual Health Care	1.07 (.098)	1.04 (.110)	1.11 (.251)	1.75 (.673)
Acculturative Factors				
No Citizenship[d]	.920 (.104)	1.07 (.153)	.708 (.205)	1.35 (.613)
Naturalized Citizen[d]	.897 (.134)	1.02 (.184)	.742 (.238)	1.27 (.566)
Language—Spanish Only[e]	.835 (.111)	.624 (.105)****	.807 (.261)	1.98 (.897)
Language—Eng + Spanish[e]	.923 (.100)	.683 (.106)***	1.27 (.259)	1.04 (.272)
No English Proficiency[f]	.897 (.083)	.817 (.101)	1.20 (.214)	.667 (.174)
Immigrated as Adult[g]	.981 (.106)	1.08 (.134)	1.03 (.328)	.487 (.237)
Immigrated as Child[g]	.907 (.148)	1.08 (.191)	.941 (.324)	.426 (.207)
Discrimination in Health Care Setting	2.65 (.307)*****	2.72 (.421)*****	2.85 (.696)*****	2.08 (.646)***

Table 30 Cont.				
Demographic Variables				
Marital Status - Married[I]	.914 (.070)	.817 (.069)***	1.09 (.172)	1.23 (.293)
Gender-Male	.871 (.067)	1.17 (.123)	.636 (.086)*****	.620 (.132)***
Age	1.00 (.002)	1.00 (.003)***	.990 (.007)	.991 (.009)
F-Test	23.05***** (22, 58)	17.73***** (22, 58)	11.07***** (22, 58)	3.51***** (21, 59)

***$p<= .05$. ****$p<= .01$. *****$p=<.001$. *Weighted N= 6,743,864.9*

[a] Omitted reference category is never smoked.
[b] Omitted reference category is no alcohol use in past 30 days.
[c] Omitted reference category is no physical activity in past 30 days.
[d] Omitted reference category is US born citizen.
[e] Omitted reference category is English only spoken at home.
[f] Omitted reference category is self-rated English proficiency.
[g] Omitted reference category is non-immigrant, or US born.
[h] Omitted reference category is no reported discrimination.
[I] Omitted reference category is not currently married, or never married.

Table 31
Emotional Functional Limitations
Weighted Logistic Regression Odds Ratios (SE)
Adjusting for Independent and Intervening Predictors: Latinos Only

Independent Variables	**Model 5**	**Model 6**	**Model 7**	**Model 8**
SEP	.629 (.032)*****	.667 (.038)*****	.668 (.038)*****	.663 (.039)*****
Health Risk Factors				
Former Smoker[a]	1.05 (.098)	1.07 (.100)	1.07 (.100)	1.05 (.098)
Current Smoker[a]	1.38 (.131)*****	1.41 (.135)*****	1.40 (.134)*****	1.36 (.130)*****
Alcohol Use - Moderate[b]	1.02 (.067)	1.05 (.068)	1.05 (.067)	1.05 (.066)
Alcohol Use[b]-Heavy	.970 (.488)	1.06 (.519)	1.06 (.519)	.956 (.494)
Physical Activity[c]—Some	1.06 (.069)	1.09 (.071)	1.09 (.070)	1.08 (.073)
Physical Activity[c]—Recommended Levels	1.01 (.093)	1.05 (.098)	1.05 (.099)	1.06 (.099)
Body Mass Index	1.01 (.039)	1.00 (.038)	1.00 (.038)	1.00 (.039)
Medical Care Factors				
# of Chronic Conditions	1.52 (.046)*****	1.56 (.050)*****	1.57 (.051)*****	1.53 (.053)*****
Insured	.807 (.058)****	.848 (.062)***	.851 (.063)***	.876 (.065)
Has Place of Regular Care	.787 (.060)****	.797 (.060)****	.796 (.060)	.799 (.062)****
Acculturative Factors				
No Citizenship[d]		1.30 (.129)****	1.24 (.164)	1.21 (.160)
Naturalized Citizen[d]		1.11 (.113)	1.08 (.157)	1.03 (.149)
Language—Spanish Only[e]		1.04 (.133)	.996 (.127)	.996 (.127)
Language—Eng + Spanish[e]		1.13 (.144)	1.09 (.141)	1.11 (.141)
No English Proficiency[f]		1.11 (.095)	1.06 (.095)	1.08 (.096)
Immigrated as Adult[g]			1.13 (.121)	1.13 (.120)

Table 31 Cont.				
Immigrated as Child[g]			.937 (.132)	.967 (.139)
Discrimination in Health Care Setting				2.84 (.341)*****
Demographic Variables				
Marital Status - Married[i]	.769 (.045)*****	.734 (.044)*****	.728 (.044)*****	.715 (.045)*****
Gender-Male	.736 (.054)*****	.713 (.054)*****	.709 (.054)*****	.718 (.056)*****
Age	.987 (.002)*****	.987 (.002)*****	.987 (.002)*****	.987 (.002)*****
F-Test	36.84 (14, 66)	29.41 (19, 61)	25.52 (21, 59)	25.11 (22, 58)

***$p <= .05$. ****$p <= .01$. *****$p =< .001$. *Weighted N= 6,743,864.9*

[a] Omitted reference category is never smoked.
[b] Omitted reference category is no alcohol use in past 30 days.
[c] Omitted reference category is no physical activity in past 30 days.
[d] Omitted reference category is US born citizen.
[e] Omitted reference category is English only spoken at home.
[f] Omitted reference category is self-rated English proficiency.
[g] Omitted reference category is non-immigrant, or US born.
[h] Omitted reference category is no reported discrimination.
[I] Omitted reference category is not currently married, or never married.

Note: Interactions were tested between all acculturative factors and SEP, and all acculturative factors and discrimination. These interaction terms were found to be not significant.

Table 32
Emotional Functional Limitations
Weighted Logistic Regression Odds Ratios (SE)
Stratified by Low, Med, High SEP: Latinos Only

Independent Variables	**Not Stratified**	**Low SEP**	**Med SEP**	**High SEP**
SEP	.663 (.039)*****	.468 (.055)*****	.892 (.190)	.665 (.145)
Health Risk Factors				
Former Smoker[a]	1.05 (.098)	1.08 (.122)	.890 (.148)	1.40 (.328)
Current Smoker[a]	1.36 (.130)*****	1.38 (.173)****	1.52 (.325)	.852 (.285)
Alcohol Use - Moderate[b]	1.05 (.066)	1.13 (.080)	.928 (.136)	.842 (.149)
Alcohol Use[b]-Heavy	.956 (.494)	1.31 (.978)	.562 (.490)	2.40 (1.73)
Physical Activity[c]—Some	1.08 (.073)	1.15 (.098)	1.06 (.148)	.807 (.154)
Physical Activity[c]—Recommended Levels	1.06 (.099)	1.13 (.128)	.950 (.146)	.977 (.239)
Body Mass Index	1.00 (.039)	1.02 (.046)	.966 (.084)	1.00 (.151)
Medical Care Factors				
# of Chronic Conditions	1.53 (.053)*****	1.53 (.071)*****	1.48 (.119)*****	1.48 (.180)****
Insured	.876 (.065)	.885 (.075)	.785 (.111)	1.21 (.427)
Has Place of Regular Care	.799 (.062)****	.809 (.072)***	.826 (.126)	.617 (.245)
Acculturative Factors				
No Citizenship[d]	1.21 (.160)	1.24 (.191)	1.41 (.443)	.573 (.417)
Naturalized Citizen[d]	1.03 (.149)	1.00 (.176)	1.23 (.402)	.548 (.276)
Language—Spanish Only[e]	.996 (.127)	.805 (.154)	1.15 (.315)	1.33 (.650)
Language—Eng + Spanish[e]	1.11 (.141)	.932 (.171)	1.33 (.322)	1.03 (.346)
No English Proficiency[f]	1.08 (.096)	1.07 (.131)	1.22 (.231)	.814 (.250)
Immigrated as Adult[g]	1.13 (.120)	1.14 (.133)	1.07 (.297)	2.01 (1.19)
Immigrated as Child[g]	.967 (.139)	.864 (.164)	1.17 (.384)	1.51 (.868)
Discrimination in Health Care Setting	2.84 (.341)*****	2.82 (.438)*****	2.66 (.554)*****	3.71 (1.32)*****

Table 32 Cont. **Demographic Variables**				
Marital Status - Married[I]	.715 (.045)*****	.821 (.063)***	.566 (.066)*****	.581 (.115)****
Gender-Male	.718 (.056)*****	.849 (.083)	.572 (.081)*****	.659 (.153)
Age	.987 (.002)*****	.990 (.003)****	.978 (.006)*****	.973 (.010)***
F-Test	25.11***** (22, 58)	13.05***** (22, 58)	6.16***** (22, 58)	3.49***** (22, 58)

***$p<=.05$. ****$p<=.01$. *****$p=<.001$. *Weighted N= 6,743,864.*

[a] Omitted reference category is never smoked.
[b] Omitted reference category is no alcohol use in past 30 days.
[c] Omitted reference category is no physical activity in past 30 days.
[d] Omitted reference category is US born citizen.
[e] Omitted reference category is English only spoken at home.
[f] Omitted reference category is self-rated English proficiency.
[g] Omitted reference category is non-immigrant, or US born.
[h] Omitted reference category is no reported discrimination.
[I] Omitted reference category is not currently married, or never married.

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