DISENTANGLING THE COMPLEX RACIAL DISPARITIES IN HEALTH AMONG ADULT BENEFICIARIES UNDER MEDICAID MANAGED CARE: A STRUCTURAL EQUATION MODELING APPROACH

by

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ABSTRACT

CHENGXIU SUN. Disentangling the complex racial disparities in health among adult beneficiaries under Medicaid managed care: a structural equation modeling approach. (Under the direction of DR. WILLIAM P. BRANDON)

There are few studies of the important issue of racial and ethnic disparities in Medicaid managed care settings. This study addresses this deficiency using data collected by telephone interviews from a randomly stratified sample of adults who were continuously enrolled in North Carolina Medicaid managed care for at least six months prior to sampling in 2006. It uses univariate statistics to describe health status and conducts a Pearson chi-square test to examine health status between non-Hispanic black adults and non-Hispanic white adults. Because chronic conditions were significantly related to health status, the study also computes three separate structural equation models to investigate the complex relationships between race, health status, and a number of other independent variables that theory suggests.

The Medicaid managed care adult population had bad health: 50.02% reported "poor" or "fair" health, and 63.60% suffered from a chronic condition. Yet, contrary to most of the literature on race and health, the health status of non-Hispanic black adults in this study was significantly superior to that reported by non-Hispanic white adults. This surprising finding held for both the model of overall sample of adults, which fitted adequately with the sample data (CFI=0.921; RMSEA=.035) and explained 31% of the variance in health, and the model of adults with chronic conditions, which also fitted adequately with the sample data (CFI=0.93; RMSEA=.036) and explained 22% of the variance in health.

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CHAPTER 1: INTRODUCTION

"Despite the unprecedented explosion in scientific knowledge and the phenomenal capacity of medicine to diagnose, treat and cure disease, Blacks, Hispanics, Native Americans and those of Asian/Pacific Islander heritage have not benefited fully or equitably from the fruits of science or from those systems responsible for translating and using health sciences technology."

------- *Secretary's Task Force Report on Black and Minority Health* (DHHS, 1985)

Public health issues always evoke wide-spread concern in the United States. In recent decades, the nation has made great efforts to improve the overall health condition of its citizens and has achieved progress. For instance, the U.S. annual age-adjusted death rate per 1,000 population has decreased from 8.69 percent in 2000 to 7.77 percent in 2006, and the average life expectancy of its population at birth has increased from 76.8 years old in 2000 to 77.7 years old in 2006 (U.S. National Center for Health Statistics, 2009). However, compelling evidence has shown that the substantial gains in health are not equally distributed among different racial and ethnic groups residing in this nation (Agency for Healthcare Research and Quality, 2009; Hall et al., 2009; Halle et al., 2008; Smedley et al., 2003).

Definition of Health Disparities

Health is a multidimensional concept (Wolinsky, 1988). Unlike differences in health that refer to the simple unadjusted differences in means or rates between racial and ethnic groups, disparities in health are generally described as differences in health services or health status between members of different racial and ethnic groups that are not justified by the underlying health conditions or treatment preferences of patients (Institute of Medicine, 2002). Having a rigorous definition of health disparities is necessary and important, because it will help initiatives and organizations to monitor progress in reducing and ultimately eliminating disparities in health and health services (McGuire et al., 2006).

To date, no universally accepted definition of health disparities or health inequalities exists. Prominent examples of commonly referenced definitions of health disparities created by governmental and advisory groups include the following:

- Health disparities refer to significant differences in the overall rates of disease incidence, prevalence, morbidity, mortality, and other adverse health conditions that exist among specific population groups (National Institutes of Health, 2002);
- In *Unequal Treatment: Confronting Racial and Ethnic Disparities in Health Care*, the Institute of Medicine of the National Academies (2002) focuses specifically on health care and defines health disparities as significant differences in the quality of health care between population groups that are not attributed to access-related factors or clinical needs,

preferences, appropriateness of intervention, and the differences in health status;

- The American Public Health Association (2009) defines health disparities as differences in health status between people that are related to social or demographic factors such as race, gender, income or geographic region;
- Disparities in health are differences or gaps in care experienced by one population compared to another population (U.S. Department of Health and Human Services; 2010).

The above perspectives on health disparities distinguish between disparities in *health*, and disparities in *health care*. In general, disparities in *health* emphasize differences in health profiles across major subgroups of the population, and they include a broad spectrum of physical and mental health outcomes that range from self-rated health to mortality, from psychological well-being to major mental disorders (Smedley et al., 2003). In contrast, disparities in health care focus more on differences in clinical treatments or patient preferences, such as access to health care services and quality of received health care services. Disparities in health and health care take many different forms but can be generally organized into racial and ethnic disparities, socioeconomic health disparities, gender health disparities, and rural-urban health disparities. The distinction between the two perspectives on health disparities is relevant to policy opportunities and interventions. This dissertation combines both disparities in health and disparities in health care. Specifically, this study examines racial and ethnic disparities in self-reported health status among Medicaid managed care populations basing on their experiences and perceptions in accessing and utilizing health care.

Evidence of Racial and Ethnic Disparities

The problem of disparities in health and health care between racial and ethnic groups in the United States has been well documented (Agency for Healthcare Research and Quality, 2009; Hall, et al., 2009; Halle, et al., 2008; Smedley et al., 2003). The general finding is that minority populations experienced greater difficulty in accessing and utilizing health care, received lower quality of health services, and reported worse health status. To make things worse, such racial and ethnic disparities in health and health care typically persist after controlling for age, gender, education, income, and a host of other socioeconomic and demographic variables. For instance, Staveteig and Wigton (2000), using data from the national survey of American families (NSAF), found that incomes did not fully explain the inequalities in well-being across racial and ethnic groups in the United States, because at higher incomes whites and Asians repeatedly fared better than blacks, Hispanics, and Native Americans.

In terms of disparities in health care, low-income Americans and racial and ethnic minority populations generally experienced reduced access to care, had fewer treatment options, and encountered greater difficulty in utilizing regular health services (Agency for Healthcare Research and Quality, 2009; Hall et al., 2009; Halle et al., 2008; Smedley et al., 2003). For instance, African Americans and Hispanics from the 2000-2001 Medical Expenditure Panel Survey (MEPS) were found to be less likely than whites to have a usual source of care (Kirby et al., 2006). African Americans and Hispanics from the 2000 National Health Interview Survey were less likely than whites to receive the influenza vaccine (Lees, Wortley & Coughlin, 2005). Data from the National Registry of Myocardial Infarction (NRMI) showed that African Americans and Hispanics with acute

coronary syndrome or myocardial infarction were less likely than whites to receive acute reperfusion, invasive procedures and coronary artery bypass surgery; in addition, the average time between hospitalization and acute reperfusion was longer for blacks and Hispanics than for whites (Bradley, Herrin & Wang, 2004). African Americans were more likely than whites to go to an emergency room to get care (Agency for Healthcare Research and Quality, 2008). Hispanics in general were less likely to be counseled on obesity than were whites (Agency for Healthcare Research and Quality, 2008).

Regarding disparities in health, minority populations disproportionately experienced higher rates of disease and were more likely to report worse health relative to their comparable white population (Ferraro, Farmer & Wybranie, 1997; Hughes & Tomas, 1998; Reichmann et al., 2009). For example, minority groups from the national health survey were more likely than whites to report their health status as fair or poor (National Center for Health Statistics, 2005). Black adults from the health care quality survey were more likely than white adults to have a chronic illness or disease, with almost half reporting such a condition; in addition, the disparity in chronic illness between black adults and white adults persisted after adjusting for age and income levels (Mead et al., 2008). African American adults were more likely to suffer from functional disability than adults from other racial and ethnic groups (Kelly & Ferraro, 2004). Regarding death rate and life expectancy, the age-adjusted death rate per 100,000 populations for black Americans was 29 percent higher than that for white Americans; regarding life expectancy, African American males were six years lower than white males and black females were more than four years lower than white counterparts (U.S. National Center for Health Statistics, 2009).

Significance of Addressing Racial and Ethnic Disparities

Reducing and eliminating racial and ethnic disparities has long been a goal for policymakers in the United States. This significant goal is justified in many ways. First, the issue of racial and ethnic disparities is concerned with social justice and equity. Ensuring that individuals with similar health care needs will be similarly treated in the health system is a basic matter of equity, and this notion of equity has been highly appreciated by people living in the United States. Recognition of the value of access to health care and the heightened importance of monitoring this form of health care equity is signaled by the enactment of P.L. 111-148, the Patient Protection and Affordable Care Act in March, 2010. This Act marks the culmination of almost a century of efforts by health care progressives to move health care from an individual, self-regarding good (Harris, 2003) towards their goal of a publically guaranteed social right. The continued existence of racial and ethnic disparities in health and heath care may reflect general societal problems in that they reveal either structural or individual discrimination or racial bias that violate the spirit and sometimes the letter of state and federal laws.

Secondly, the increasingly diverse population in the United States makes it imperative to address racial and ethnic disparities in health and health care. According to National Center for Health Statistics (2003), nearly 50 percent of the U.S. population will self-identify as members of a racial or ethnic minority group by 2050, with Latinos totaling 24 percent, African Americans 15 percent, and Asian Americans 8 percent. In light of such demographic changes, policymakers need to pay more attention to racial and ethnic disparities, because failing to address this issue may result in consequential social injustice. In addition, an often overlooked point of failing to address racial and ethnic

disparities is the unnecessary health cost burdens that will be imposed on the U.S. health care system and society at large. Two recent studies provided important insights into how much of a financial burden those racial and ethnic disparities are generating. Using data from the Medical Expenditure Panel Survey (MEPS) for the years 2002-2006, LaVeist, Gaskin, and Richard (2009) estimated the economic burden of health disparities in the United States using three measures: direct medical costs of health inequalities, indirect costs of health inequalities, and costs of premature death. The authors found that eliminating health disparities for minorities would have reduced the direct medical care expenditure by more than $230 billion. In addition, the indirect cost associated with illness, lost productivity, lost wages, absenteeism, family leave, and premature death, would be $1.24 trillion dollars for the years 2002-2006. Also using data from the Medical Expenditure Panel Survey (MEPS), Waidmann (2009) estimated cost burdens of racial and ethnic health disparities in a select set of preventable diseases that include diabetes, hypertension and stroke. It was calculated that excess rates of these diseases among African Americans and Latinos relative to whites would cost the heath care system approximately $337 billion over the next decade from 2009 through 2018. In addition, without taking into any account projected growth in per capita spending, the annual costs of racial and ethnic disparities for the nation would more than double by 2050, since the representation of Latinos and African Americans among the elderly continues to increase.

Thirdly, addressing racial and ethnic disparities in health and health care is concerned with achieving steady economic development in the United States. Economic development for a country depends largely on a healthy and productive workforce (Bound et al., 1996; Sullivan, 2001). Since health is an important determinant of early

labor force exit, failing to address racial and ethnic disparities in health and health care may result in increased worker absenteeism, decreased productivity and limitations on educational opportunities, particularly for minority populations. In the long run, such changes in labor market and education would slow down the economic development for the United States.

Rationale for Studying Racial and Ethnic Disparities in Medicaid Managed Care

Medicaid is a federal entitlement program that is jointly funded by the federal and state governments to pay for medical assistance to individuals and families with low incomes and low resources (Kongstvedt, 2009). In the broad context, Medicaid is considered to have the most heterogeneous population of any health insurance program in the nation, and is the largest single insurer for low-income populations in the country (Mann &Westmoreland, 2004). Faced with diminishing budgetary resources in the 1990s, many states began transitioning Medicaid programs away from a traditional fee-for-service (FFS) structure to Medicaid managed care programs as a strategy to promote accountability for cost and quality through utilization measurement and management of health resources. In arranging Medicaid managed care, states used two basic forms: risk-based plans and primary care case management (PPCM) programs. For risk-based managed care organizations, health care organizations assume the financial risk for delivering a set of services, and they are paid a fixed monthly fee per enrollee (Kongstvedt, 2009). By 2008, about 49% of Medicaid beneficiaries were enrolled in 307 full-risk plans in 34 states and the District of Columbia (Centers for Medicare & Medicaid Services, 2008). In contrast, states in the PPCM model contract with a provider, usually the Medicaid beneficiary's primary care physician, to manage the care of

Medicaid members. Thus, the primary care physician coordinates and authorizes any needed specialty care or other services furnished by other physicians or managed care plans. PPCM is the predominant form of Medicaid managed care in rural areas, because the low population density and limited availability of primary care provides in these areas makes risk-based plans less likely to operate (Kongstvedt, 2009). By 2008, 29 states operated 35 PCCM programs with a total enrollment of 6.7 million beneficiaries (Centers for Medicare & Medicaid Services, 2008).

Medicaid managed care has proven to be a useful approach to organizing and delivering health services to Medicaid beneficiaries (Kongstvedt, 2009). Today, managed care has been widely adopted by states to address the challenges of increasing numbers of Medicaid enrollees, expanding benefits and services, and constrained public budgets. Since its inception in 1965 the Medicaid program has provided health and long-term care coverage to nearly 60 million low-income individuals, despite facing difficulty of constrained public budgets, conflicting values, and shifting public priorities (Kaiser Commission on Medicaid and the Uninsured, 2010). The recent data show that approximately 70% of Medicaid enrollees received some or all of their services through managed care (Centers for Medicare and Medicaid Services, 2008). In light of its large enrollment and popularity among states, exploring and understanding racial and ethnic disparities in Medicaid managed care population is necessary in order to provide the basis for effort to reduce and ultimately eliminate the existing racial and ethnic disparities in health and health care in the United States.

Weaknesses of the Previous Research

Although racial and ethnic disparities in health and health care have been well documented, an extensive database search revealed that this issue was much understudied in the context of Medicaid managed care. In addition, among the few studies that focused on disparities in Medicaid managed care population, the majority of them examined disparities in health care rather than in health status. Among the five articles that were found to examine racial and ethnic disparities in health among Medicaid managed care populations, three focused on adult beneficiaries (Coeytaux et al., 2004; Brandon, Schoeps, Sun & Smith, 2008; Guwani & Weech-Maldonado, 2005), and two focused on child beneficiaries (Lieu et al., 2002; Brandon, Schoeps, Sun & Smith, 2008). Thus, our understanding of racial and ethnic disparities in health and health care among Medicaid managed care populations is limited. In addition, our understanding about racial and ethnic disparities in Medicaid managed care might be elusive, because the above five studies used either descriptive statistics or standard multivariate regression analyses, which are not sufficient to address the question of whether the relationship between race and ethnicity and health among Medicaid managed care populations was mediated by other variables, such as income, education, and other sociodemographic variables.

Study Objectives and Research Questions

This study is designed to address these weaknesses in the literature by examining disparities in self-reported health status between non-Hispanic black adults and non-Hispanic white adults enrolled in North Carolina Medicaid managed care program. Methodologically, this study culminates in the advanced regression method of structural equation modeling (SEM) that is better suited to untangle the nuanced relationships

between race, health, and the intermediating variables than more commonly used regression techniques. The inspiration for conducting this study originally came from two studies (Brandon, Schoeps, Sun & Smith, 2008; Sun, Narine, Brandon & Schoeps, 2009), in which black adults in North Carolina Medicaid managed care program were found to report better health status than white adults. The literature in the field suggests that this finding of significantly better self-reported health status is anomalous, so the author has designed the present study to explore the factor or factors that contributed to this counterintuitive finding.

The objectives of this study are fourfold: obtaining an understanding of the general health status of Medicaid managed care populations, examining the relationship between race and health status, identifying the factor or factors that relate to heath status of Medicaid managed care enrollees, and investigating the relationships between race, health status, and the factor or factors that are related to health care experiences associated with health status.

To frame these objectives and guide this study, the following four research questions are developed:

1. What is the general situation of health status among Medicaid managed care populations?
2. Is race of Medicaid managed care enrollees significantly related to their health status?
3. What factor or factors related to Medicaid services contributed to health status among Medicaid managed care populations?

4. What are the relationships between race, health status, and the contributing factor or factors of health status?

Study Significance

The significance of this research can be linked to the *Healthy People 2010* initiative launched by the U.S. Department of Health and Human Services. The two overarching goals of *Healthy People 2010* are to increase the quality and years of healthy life and eliminate health disparities. First, the dissertation enriches the current literature about racial disparities and deepens our understanding about racial disparities among Medicaid managed care populations. Second, this study provides insights and policy implications for public organizations to address the issue of racial disparities. As we know, the current Administration in the United States has secured legislation that will reform the U.S. health system in order to achieve close to universal financial coverage and "essential health benefits" (P.L.: 111-148, sec. 1302). This context is important, because findings from the study will allow the Administration to target public health programs in ways that narrow the gaps in care for racial minorities and poor populations, thereby helping to reduce and eliminate the persistent and unjust issue of health disparities.

Facing with rising costs or health care and variation in quality of care, many states are considering coverage reform in tandem with improved mechanism for providing and paying for health care (Napel et al., 2009). This study uses data collected from North Carolina. Since its inception in 1998, the North Carolina Medicaid managed program of CCNC (Community Care of North Carolina) has achieved success in improving quality and reducing cost in providing health care to its Medicaid managed care populations. For

example, the CCNC networks have saved the State of North Carolina at least $160 million annually (Steiner et al., 2008). Beyond saving money, the CCNC networks have also realized significant quality improvements for Medicaid recipients, as is best illustrated by the improvements in care for asthma control, as well as gaining increasing support from physicians and leaders in health care (Steiner et al., 2008). There are three reasons that accounted for the success of North Carolina's Medicaid managed care program: first, it led efforts in promoting buy-in from a critical group of health care system participants; second, the regional networks in this program reported quality information back to providers so that they can adjust to meet the best practice standards of care; and third, the regional networks provided care coordination and case management services either in a provider's office or in a community setting that is shared by several providers (Napel et al., 2009). Because of the success with its Medicaid managed care program, North Carolina is working on developing a demonstration project to apply its Medicaid's model of primary care case management to its Medicare beneficiaries (CCPM, 2010). Thus, using data collected from a state that leads Medicaid pilot projects and innovative programs, findings from this study can inform future federal and state reforms that seek to implement effective systems of care for reducing costs and improving quality for Medicaid populations.

Format of the Dissertation

This dissertation has six chapters. Chapter 1 introduces the research questions. Chapter 2 reviews the literature about racial and ethnic disparities in health and health care, paying special attention to factors that are correlated with health status. Chapter 3 represents the hypothesized framework and specifies the study hypotheses. Chapter 4

describes the survey data, research design, and methodology. Chapter 5 analyzes and reports the findings. Chapter 6 concludes this dissertation by summarizing the principal findings, discussing policy implications, addressing study limitations, and suggesting directions for future research.

CHAPTER 2: REVIEW OF THE LITERATURE

Evidence of Racial and Ethnic Disparities in Health and Health Care

Upon the request by Congress in 1999, the Institute of Medicine (IMO) undertook a thorough review of scientific literature to address the issue of racial and ethnic disparities in care. In 2003, the IOM published a report entitled *Unequal Treatment: Confronting Racial and Ethnic Disparities in Healthcare* (Smedley et al., 2003). This report thoroughly examined the quality of medical care provided to different racial and ethnic groups. The consistent finding in this report is that minorities in the United States are less likely than whites to receive needed services, and such disparities still exist after controlling for factors such as socioeconomic status, access to health insurance, coexisting illnesses, age, gender, and other demographic characteristics. The following section reviews literature that documented racial and ethnic disparities in terms of access to health care, disease treatment, utilization of health care, and health outcomes.

Racial and Ethnic Disparities in Access to Health Care

Access to health care is commonly examined by four measures: having a usual source of care, having a regular health provider, the probability of having a physician visit, and the level of emergency room use. Studies have consistently found that minority populations were more likely than whites to report difficulty in accessing health care. For

example, blacks and Hispanics were more likely than whites to report not having a usual source of care and less likely to have an ambulatory visit during the year (Kirby et al., 2006). African Americans were more likely than whites to go to an emergency room to get care (Agency for Healthcare Research and Quality, 2008). Access to health care is not only an issue of ability to pay, because disparities in access to health care were also evident in a Medicaid managed care setting, which provides comprehensive health services without erecting financial barriers.

Using data from the 1996 Medical Expenditure Panel Survey (MEPS), Phillips, Mayer, and Aday (2000) examined barriers to care among racial and ethnic groups under managed care. They found in comparison to non-managed care enrollees, managed care enrollees reported greater difficulty in obtaining care and less satisfaction with their care, although they were more likely to report having a usual source of care and greater continuity of care. Using data collected from a nationally representative sample of nonelderly persons with public or private health insurance, Hargraves, Cunningham, and Hughes (2001) examined the access differences between racial and ethnic minorities and whites enrolled in managed care plans and those from other types of health plans. They found that the extent of disparities between racial and ethnic minorities and whites in managed care is similar to disparities in other types of health plans, although African Americans and Hispanics in managed care plans did have greater access to primary care. Racial and ethnic disparities in Medicaid managed care population were observed in another study. Using data from the National Consumer Assessment of Health Plans (CAHPS) Benchmarking Database 3.0 that consisted of more than 4 million adults enrolled in Medicaid managed care plans across 14 states in 2000, Weech-Maldonado

and colleagues (2003) examined racial and ethnic disparities in accessing health care. Despite Medicaid-enabled financial access, the authors found that racial and ethnic minorities tended to report worse care than did the white population.

To summarize, racial and ethnic disparities in access both in a Medicaid managed care setting and other settings are evident. In the past decades many studies have undertaken to examine the factor or factors that affected access to medical care for different racial and ethnic groups. Although factors such as difference in socioeconomic status, the availability of health insurance, health care system capacity, and characteristics of the individuals that do not directly pertain to socioeconomic status (such as age, gender, family size, employment status, neighborhood racial and ethnic composition, racial and ethnic differences in preferences, and trust in health systems) are found to account for a certain portion of the variations in accessing health care between racial and ethnic groups (Kirby et al., 2006; Zuvekas & Taliaferro, 2003), much of the racial and ethnic disparities in access remain unexplained.

Racial and Ethnic Disparities in Disease Treatment

The United States is a society in which racial discrimination is prohibited. So, we would like to assume that all individuals residing in this country, regardless of race and ethnicity, receive the same treatment if they have the same medical problem, have the same type of health insurance, and are treated by the same doctor in the same hospital. However, some studies have consistently shown systematic differences in the quality of care that was received by African American patients relative to white patients. For example, hospitals that were frequently used by blacks had less advanced technology than hospitals that were more often used by white patients (Groneveld et al., 2005). In

addition, physicians who treated a disproportionate share of black patients often had less training and less access to important clinical resources than physicians who more often treated white patients (Bach et al., 2004).

In terms of disease treatment, blacks were at a greater risk of receiving less than optimal services for a number of diseases. For example, blacks and Hispanics were less likely than whites to receive the influenza vaccine (Lees, Wortley & Coughlin, 2005). African-Americans with serious mood disorders were under-diagnosed and under-treated relative to whites (Ray, Hall & Meador, 2007). Hispanic and African American beneficiaries with mental illness were much less likely to be treated in community-based settings (Samnaliev, McGovern & Clark, 2009). The average time between hospitalization and acute reperfusion was longer for blacks and Hispanics than for whites (Bradley et al., 2004). Blacks and Latino Medicaid adults with schizophrenia from the Florida Medicaid program experienced health care disparities in treatment (Horvitz-Lennon et al., 2009). African Americans diagnosed with depression were less likely to receive antidepressant treatment and, if they did receive such treatment, they were more likely to receive older drugs, controlling for other characteristics (Sambamoorthi et al., 2006). Regarding the treatment for heart disease, Vaccarino and colleagues (2005) found that white women had higher rates for reperfusion therapy and coronary angiography relative to black women. In the United States lung cancer has been a major cause of death, particularly for those with lower socioeconomic status. Lathan and colleagues (2005) found that the overall survival of blacks with lung cancer was less than that of whites, and the rates of both invasive testing and surgery were lower in blacks than in whites. They further explored the reasons for the lower rates of surgery among blacks and

found the cause to be that doctors were less likely to recommend surgery in black patients than in comparable white patients, rather than a preference by blacks for less invasive treatment. Regarding treatments for chronic medical conditions, Epstein and colleagues (2000) examined the process by which kidney failure patients were selected for transplantation. They found that blacks who were medically appropriate for transplantation were less likely than whites to undergo the processes.

In sum, African American patients were consistently found to be more likely than white patients receive less than optimal treatment for a number of diseases, even when they had the same medical problem, have the same type of health insurance, and were treated by the same doctor in the same hospital. Unfortunately, this dissertation is unable to measure racial and ethnic disparities in disease treatment in Medicaid managed care due to data limitation.

Racial and Ethnic Disparities in Health Care Utilization

Racial and ethnic disparities in the use of health care services have been widely documented, with members of minority racial and ethnic groups being more likely to have lower use of many health services (Agency for Healthcare Research and Quality, 2009; Smedley et al., 2003). To some extent, disparities in utilization of health services reflect differences in income, education, and other socioeconomic factors between racial and ethnic groups. Although socioeconomic status is associated with health care utilization, it explains some but not all racial disparities in health care utilization (Gornick, 2003). A study by Buescher and colleagues (2003) compared differences in use of health care services between white children and African American children enrolled in Medicaid. The authors found that African American children enrolled in Medicaid used

health services much less than white children, even after controlling for their socioeconomic status and other factors that affect service use. Samnaliev, McGovern, and Clark (2009) examined the association between race and ethnicity and the utilization of mental health care and found that Hispanic and African American beneficiaries with mental illness were much less likely to be treated in community-based settings. People who did not have access to a usual source of primary preventive health care were more likely to end up in the emergency department of hospitals (Agency for Healthcare Research and Quality, 2008).

Racial and Ethnic Disparities in Health Outcomes

Racial and ethnic disparities are evident in health outcomes. The consistent finding is that minority populations were more likely to have higher rates of certain diseases (Mead et al., 2008; Reichmann et al., 2009; Smedley et al., 2003; U.S. National Center for Health Statistics, 2009). For example, minority groups were more likely than whites to report their health status as fair or poor (National Center for Health Statistics, 2005). Black adults were more likely than white adults to have a chronic illness or disease, with almost half reporting such a condition, and the disparity in chronic illness between black adults and white adults persisted after adjusting for age and income levels (Mead et al., 2008). African American adults were more likely to suffer from functional disability than adults from other racial and ethnic groups (Kelly & Ferraro, 2004). In terms of new HIV infections, the incidence of African Americans is seven times the rate of whites (Center for Disease Control and Prevention, 2007). The age-adjusted death rate per 100,000 populations for black Americans was 29 percent higher than that for white Americans, the life expectancy of African American males was six years lower than that

of white males, and black females were more than four years lower than their white counterparts in life expectancy (U.S. National Center for Health Statistics, 2009).

Studies Documenting Racial and Ethnic Disparities in Medicaid Managed Care

Although disparities in health and health care between racial and ethnic groups are well documented in the United States, an extensive database search revealed that this issue was understudied and was less known in the context of Medicaid managed care. Since this study examines racial disparities in health status between non-Hispanic black adults and non-Hispanic white adults from North Carolina Medicaid managed care program, the following section reviews the several recent articles that focused on racial and ethnic disparities that were observed among adult populations in Medicaid managed care.

There are three articles examining the impact of the implementation of Medicaid managed care upon access to, utilization of, and quality of health care services for adult minorities. The first article was conducted by Greenburg, Brandon, Schoeps, Tingle, and Shull (2003). Using both cross-sectional and longitudinal data between 1996 and 1999 from two counties in North Carolina, they investigated whether differences among racial groups, both adults and children, in access to health care and satisfaction with health care change with the introduction of managed care. The proportion of Hispanics in the survey sample was too small to constitute a viable comparison group, so the authors did not include Hispanics in this study. This study found that managed care had no effect on African Americans' access to health care services in either absolute terms or relative to whites. In addition, race was not associated with health care satisfaction in this study. Using data from the 1991-1995 National Health Interview Surveys and a 1998 Urban

Institute survey on state Medicaid managed care programs, Garrett, Davidoff, and Yemane (2003) estimated the effect of living in a county with a Medicaid managed care program on several access and use measures for nonelderly women who received Medicaid through Aid to Families with Dependent Children (AFDC) and child Medicaid recipients. They found that mandatory primary care case management (PCCM) and health maintenance organization (HMO) programs improved access and utilization relative to traditional fee-for-service (FFS) Medicaid, primarily for children. In addition, mandatory HMO programs caused some access problems for women. Using secondary data from the Adult Samples of the 1997-2001 National Health Interview Survey, MSA-level Medicaid Health Maintenance Organization (MHMO) market share from the 1997 to 2001 Inter-Study MSA Trend Dataset and MSA characteristics from the 1997 to 2001 Area Resource, Cook (2007) compared Medicaid enrollees in managed care, both adults and children, from traditional fee-for-service plans by estimating racial disparities in accessing care as measured by doctor visits, emergency room (ER) use, and the availability of a usual source of care. The author found that Medicaid managed care plans benefited minority enrollees, with managed care enrollment being associated with lowered disparities in having any doctor visits in the last year for blacks.

There are three studies that examined racial and ethnic disparities in health status among Medicaid managed care adult populations, two of which used data that were collected from the state of North Carolina. Data that were collected from adult patients from a representative sample of family practice offices in North Carolina identified differences in self-reported health status and prevalence of chronic disease between African American and white patients (Coeytaux et al., 2004), with African Americans

reporting poorer general health status than whites. In addition, the authors also observed that chronic diseases, such as obesity, insufficient exercise, high blood pressure, and diabetes were more prevalent among African American than white family practice patients, even after adjusting for age, gender, and educational attainment. Using data collected throughout North Carolina from adult enrollees who had been continuously enrolled for at least six months in the network programs of Community Care of North Carolina CCNC), Brandon, Schoeps, Sun, and Smith (2008) examined the association between self-reported health status and race and ethnicity. Surprisingly, they found that black adults reported better health than white adults and adults from other racial and ethnic groups. Using data from a nationally representative probability sample of HIV-infected adults receiving care in the contiguous United States, Guwani and Weech-Maldonado (2005) compared racial differences in accessing highly active antiretroviral therapy (HAART) for HIV patients under Medicaid managed care and Medicaid fee-for-service between black and white Medicaid enrollees, suggesting that black enrollees still face more barriers in accessing care even after Medicaid has assured financial access.

There is a study that examined whether consumer reports and ratings of care in Medicaid managed care varied by race and ethnicity and language. Using data that were collected from the National Consumer Assessment of Health Plans Benchmarking Database 3.0 that consisted of 49, 327 adults enrolled in Medicaid managed care plans in 14 states in 2000, Weech-Maldonado and colleagues (2003) found that racial and ethnic minorities and linguistic adult minorities tended to report worse care than did white respondents. Additionally, linguistic minorities reported worse care than did racial and ethnic minorities. This study suggests that racial and ethnic minorities and persons with

limited English proficiency faced more barriers to care, despite Medicaid-enabled financial access.

Correlates of Disparities in Health and Health Care

Racial and ethnic disparities in health and health care have been well documented in *Unequal Treatment: Confronting Racial and Ethnic Disparities in Health Care* (Institute of Medicine, 2002) and the latest *National Healthcare Disparities Report* issued by the U.S. Department of Health and Human Services in 2010. Over the past decades a considerable amount of literature has been published, resulting in various and complex explanations for racial and ethnic disparities. However, simply documenting disparities is not enough. To achieve the goal of eliminating health disparities that was enunciated in *Healthy People 2010* (U.S. Department of Health and Human Services, 2000), policymakers and researchers need to put more effort into identifying the underlying factors that create racial and ethnic disparities in health and healthcare. One major reason for doing so is that understanding the factors that influence health disparities in a given population or setting will help policymakers determine which solution or solutions should be primarily emphasized to address the issue of racial and ethnic disparities. In addition, understanding the underlying causes for disparities is central to the development of any systematic approach to alleviating them. The following section reviews literature that identifies correlates of disparities in health and health care. Reviewing these factors will enable the author to develop a solid conceptual framework that explains racial and ethnic disparities in a Medicaid managed care setting.

Race and Health Status

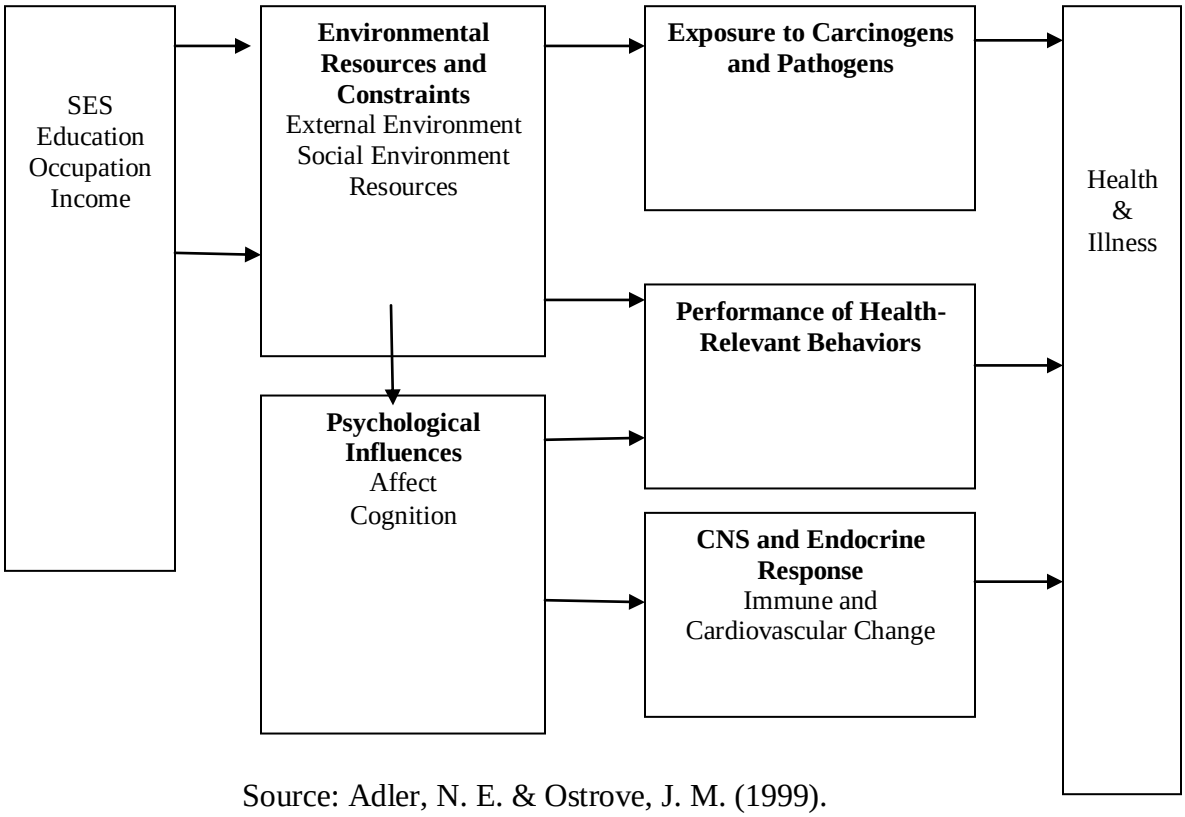
The variable of race has been described as proxies for environmental, cultural, and some genetic differences (Barr, 2008; Schoenbaum &Waidmann, 1997; Shi & Stevens, 2005; Thomas & Hughes, 1986). Naturally then, race has been considered as an important variable in disparity research. For much of the history of the United States, a consistent association between race and ethnicity and health has been observed. For example, the age-adjusted death rate per 100,000 populations for black Americans was 982 in 2007, a number that is 29 percent greater than that (764) for white Americans (U.S. National Center for Health Statistics, 2009). For life expectancy at birth in 2006, African American males (69.7) were six years lower than that (75.7) of white males, while black females (76.5) were more than four years lower than that (80.6) of their white counterparts, (U.S. National Center for Health Statistics, 2009). In addition, the 2006 infant mortality for babies born to black mothers (13.3) were more than twice that (5.6) of babies born to white mothers. Additionally, black people generally reported higher levels of morbidity, such as diabetes and hypertension, having higher mortality rate for heart disease, stroke, and many types of cancer, and suffered from more functional disability, and were more likely to rate their health negatively (Ferraro, Farmer & Wybraniec, 1997; Kelley-Moore & Ferraro, 2004).

Socioeconomic Status and Health Status

Socioeconomic status is usually measured by one or more variables reflecting education, employment status, or income. Over the past decades, a rich body of literature has focused on examining the impact of socioeconomic status on health. The general finding is that socioeconomic status is related to care-seeking behaviors and other

behavioral factors that might affect one's well-being (Mayberry, Mili & Ofili, 2000). In addition, people with lower income or lower educational attainment tended to have worse health status than those who have higher income or higher educational attainment (Donald, 2008).

Figure 1: Adler and Ostrove's Model of SES Influencing Health

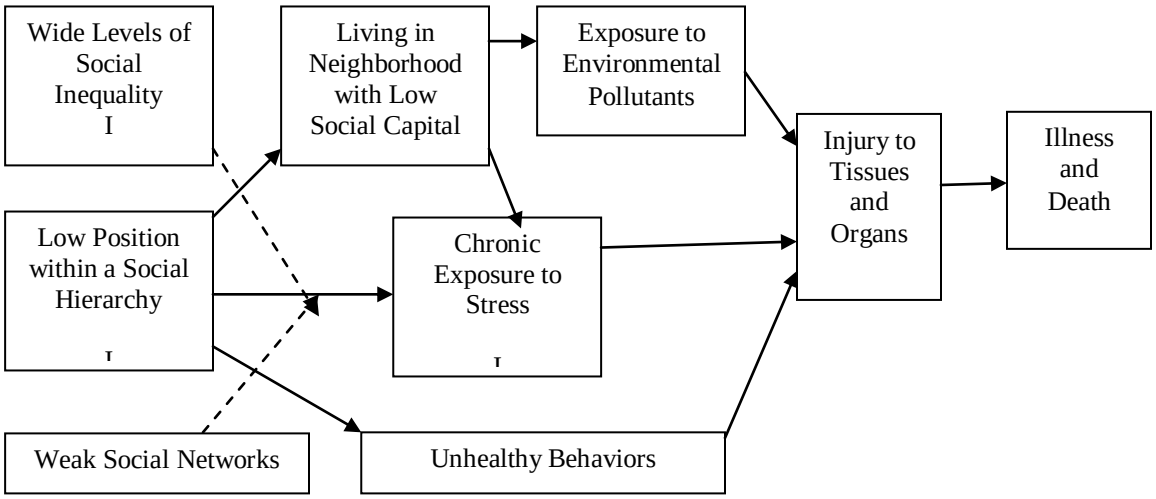


Source: Adler, N. E. & Ostrove, J. M. (1999).

To help understand how socioeconomic status leads to poor health, Adler and Ostrove (1999) developed a model that is shown in Figure 1. In this model, one pathway from socioeconomic status to health is through exposure to different environments and adaptations to these environments. In addition, the environment also shapes health behaviors. The combination of individual characteristics and the environmental demands and constraints will affect the likelihood of changing health-related behaviors, such as

fostering tobacco use, excessive alcohol use, encouraging physical exercise, and having healthy diets. Meanwhile, the combination of environmental and individual factors will determine the extent to which individual experiences repeated stress responses. Finally, according to Adler and Ostrove (1999), one's well-being is a function of exposure to carcinogens and pathogens, performance of health-relevant behaviors, and central nervous system (CNS) and endocrine response.

Figure 2: Barr's Model of Social Inequality Affecting Health Status



Source: Barr, D. A. (2008).

To look at ways in which social inequality affects health status, Barr (2008) developed another model. As shown in Figure 2, the direction of the arrows in this model suggests the direction of the causal relationship. First, the low-status person is more likely to engage in individual behaviors that, over the long term, are more likely to result in adverse health consequences. Second, the low-status person is likely to live in a neighborhood or community with low levels of social capital. The lack of social cohesion and exposure to underlying hostility or violence within that community will result in

harmful health outcomes. Third, experiencing a position of low social status will lead to experiencing a variety of psychological stressors on a chronic basis, and eventually will lead to illness and death. In addition to the three-fold effect of behavior, neighborhood environment, and stress on social status, there are two other forces that appear to act on the general level of stress experienced by either increasing or decreasing the stress response. The first force is the level of economic inequality, and the second force is the individual's social networks and levels of social support from friends, colleagues, and family. In this model, the arrows have been drawn in one direction to suggest the pathways by which socioeconomic factors can play out in various ways to influence onset and progression of disease. In reality, there are likely to be feedback loops and interaction effects.

Race, Socioeconomic Status, and Health Status

The relationships between race, socioeconomic status, and health status are complex. On the one hand, as previously described, socioeconomic status is significantly related to health status. On the other hand, socioeconomic status is significantly related to race. For example, African Americans as a group are consistently reported to have a lower education attainment than whites (Newburger & Curry 2000), are more likely to be unemployed than white adults (Thomas & Hughes, 1986), and have higher poverty rates at all ages (McKinnon, 2003). In recent years, the research on racial and ethnic disparities has moved beyond focusing on just socioeconomic status but recognized that the impact of race and socioeconomic status on health is conditional or interactive.

A related question regarding the relationships between race, socioeconomic status, and health status is whether the association between socioeconomic status and

health status holds after taking into account differences in socioeconomic status. Or, more simply, we want to know whether the health status of blacks and Hispanics, the two groups with clear disadvantages in educational attainment and income, is worse than that of whites and Asian Americans, the two groups with an advantage both in education and income, if adjusted to nullify the effects of education and income characteristics. Using longitudinal data from the nationally representative sample of the National Health and Nutrition Examination Survey, Farmer and Ferraro (2005) tested the conditional relationship between race and socioeconomic status on health with an interaction approach. They found that significant interactions existed between race and education, as well as race and employment status for health outcomes. Using nationally representative data for the period of 1986-1994 in the United States, Wong and colleagues (2002) also addressed this question by comparing death rates for the 30 most frequent causes of death in the black population with those in the white population. To accurately measure the death rates, the authors used statistical modeling to take into account the educational differences between blacks and whites. The most important finding is that a racial disparity in death rates and life expectancy would continue to exist even when the educational attainment of black population and white population were equalized. This finding indicates that being a member of a disadvantaged racial and ethnic group is directly associated with worse health status that is independent of educational attainment. Barr (2008) argued that the association between race and health status involves two steps. First, being in a socially disadvantaged racial group is associated with having a lower level of educational attainment. Second, since educational attainment is a principal measure of socioeconomic status and is strongly associated with other measures of

socioeconomic status, such as income and employment status, having a lower level of educational attainment is associated with worse health status.

The next related questions about the relationships between race, socioeconomic status, and health status are to what extent are the observed disparities in health status between blacks and whites due to differences in socioeconomic status and to what extent are they due to an independent effect of race. Using data gathered from interviews of a nationally representative sample of about 6,000 white subjects and 1,000 black subjects who were all 70 years of age or older, Schoenbaum and Waidmann (1997) addressed this question. Health status in this study was measured in the presence of chronic medical conditions and the extent to which respondents experienced functional limitations in activities, and socioeconomic status in this study was measured in educational attainment, combined household income, and estimated total value of the respondent's assets, with an aim to account as thoroughly as possible for the effects of socioeconomic status that are independent of race. The authors found that blacks continued to report worse health than whites even after taking socioeconomic status differences into account. This finding indicates that socioeconomic status characteristics did not explain all of the black-white differences in health status. Farmer and Ferraro (2005) explored the magnitude of association between race and health status after controlling for all levels of socioeconomic status and found that that black subjects reported a higher prevalence of chronic medical conditions than white subjects at all levels of socioeconomic status. However, as socioeconomic status of the respondents increased, the self-reported health status of white subjects increased while that of black subjects remained fairly constant, an

effect that was described by the authors as the "diminishing returns" hypothesis (Farmer & Ferraro, 2005: 191).

Gender and Health Status

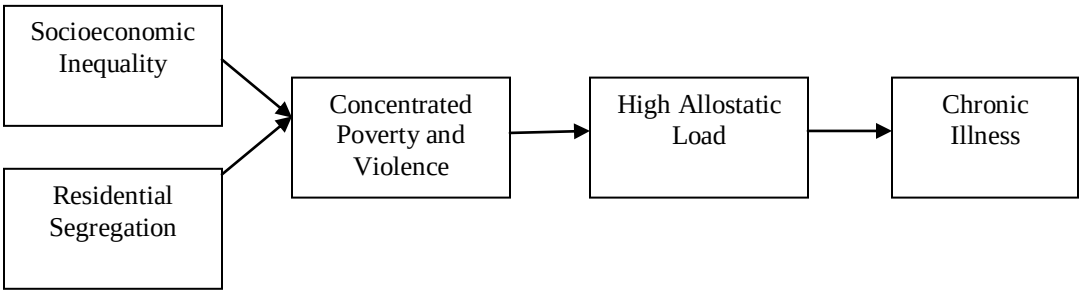
Several studies have suggested a significant relationship between gender and health status. For example, using data that were collected from older people living in the Piedmont region of North Carolina, Guralnick and colleagues (1993) found that gender has a larger influence on life expectancy than race or education. In addition, gender is considered as a critical determinant of mental health and mental illness, particularly for common mental disorders of depression, anxiety, and somatic complains (World Health Organization, 2000). Using data from the 1987 National Medical Expenditures Survey (NMES), Simoni-Wastila (2000) examined gender differences in the use of prescription drugs with abuse potential and assessed how use varied by gender. The author found that women were 48% more likely than men to use those prescription drugs, controlling for demographics, health status, socioeconomic status, and diagnosis. Another study by Kuehner (1999) examined gender differences in the short-term course of depression. The author found that gender was a significant predictor of relapse, with women being more likely than men to have high risk for early relapses. In addition, the presentation and course of bipolar disorder differs significantly between women and men, with the onset of bipolar disorder tending to occur later in women than in men and women being more often than men to have a seasonal pattern of the mood disturbance (Hendrick, 2000). Under a Medicaid managed care setting, female adult enrollees were found to vary significantly from male adult enrollees in terms of rating their overall health status, visiting emergency room, visiting primary care providers, experiencing chronic

condition, and the level of educational attainment (Brandon, Schoeps, Sun & Smith, 2008).

Racial Segregation and Health Status

The United States still remains, more or less, as a residentially segregated society in which blacks and whites reside in different neighborhoods of various qualities, so it is important to examine whether segregation is significantly related to health. In studies of populations in states that had Jim Crow laws until recently, it is particularly important to understand how these authors are using the term "segregation." They mean observed residential concentrations of the same racial or ethnic group rather than legally enforced segregation or even the historical effects of past legal segregation. The distinction is important from a policy perspective, because such housing patterns can be ascribed to some combination of market forces and individual preferences. Several studies have confirmed the significant relationship between racial segregation and health status. For example, Williams and Collins (2001) observed a negative relationship between racial segregation and health, and they regarded racial segregation as a fundamental cause of racial disparities in health.

Figure 3: Massey's Model of Biosocial Model of Racial Stratification



Source: Massey, D.S. (2004).

Massey (2004), using the dissimilarity index of several large metropolitan areas in Midwest and Northeast, developed a model, as shown in Figure 3, to measure the effect of racial segregation upon health status. In this model, socioeconomic inequality and residential segregation by race within SES categories combined to create concentrations of poverty and violence that exerted a greater impact on blacks than on whites. The stress of living in areas with concentrated poverty and violence also resulted in a variety of poor health outcomes that range from chronic illnesses to inflammatory conditions.

Access to Health Care and Health Status

Andersen and Aday (1978) divided access to medical care into potential access and realized access. For simplicity, this study terms potential access to medical care as access to health care, and it refers more about reported difficulty or problem in accessing health care. In contrast, realized access to health care in this study is named as utilization of health care services. The commonly used measures on access in the literature include availability of a usual source of care, type of usual source, and difficulty in accessing care services. Independent of socioeconomic status, access to health care services has been found to be directly related to health status (Shin, Jones & Rosenbaum, 2003). For instance, a recent study by Sherkat, Kilbourne, Cain, Hull, Levine, and Husaini (2007) observed that racial differences in the number of physical visits explained the largest proportion of mortality differentials between African Americans and whites. Beside the direct impact of income and other measures of socioeconomic status on health, Barr (2008) argued that socioeconomic status also indirectly impacts health status through access to health care, although the strength between access and health might not be as powerful as the one that is observed between socioeconomic status and health. Blacks

and other minority populations have been consistently reported to have less access to health care than whites, and receive lower-quality health care when the care is available (Agency for Healthcare Research and Quality, 2008; Smedley et al., 2003). Since access is significantly related to heath status, policymakers in the United States have considered improved access to care, particularly among minority and low-income populations that usually experienced the greatest health risks, as key in reducing health disparities (Shin, Jones & Rosenbaum, 2003).

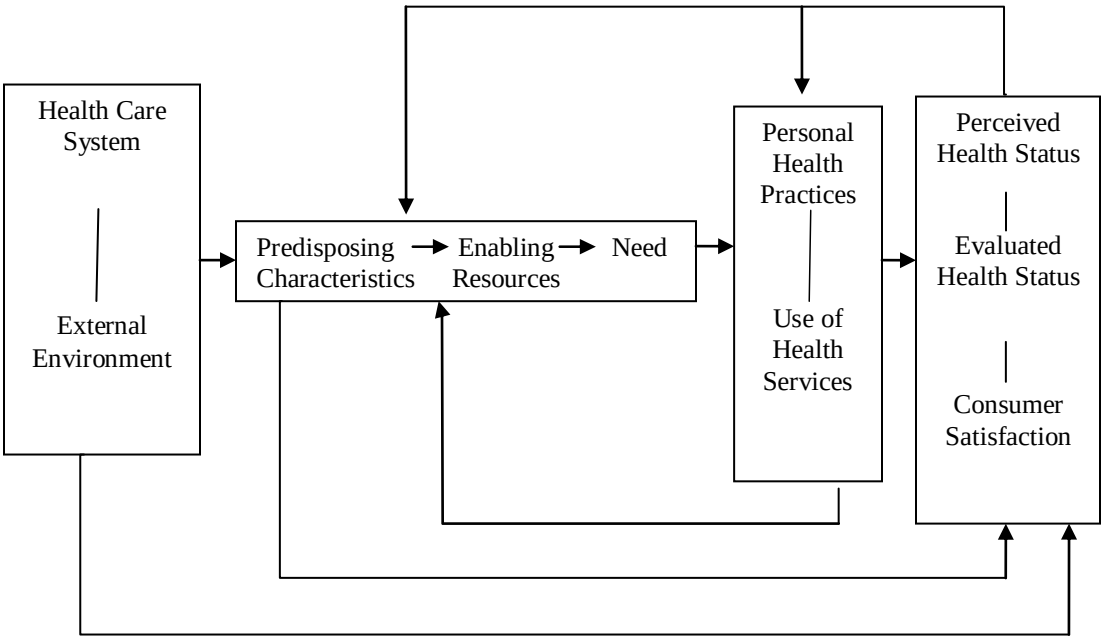
Utilization of Health Care Services and Health Status

As stated previously, utilization of health care services in this study refers to realized access to health care services. In the health literature, utilization of health care services is often measured by primary care visits, emergency room visits, specialty visits, or days of hospitalization. The manner that health care services are utilized has been found to be significantly related to race. In general, blacks were less likely than whites to have an ambulatory visit, and such differences still existed after adjusting for insurance status, income, and other factors (Brandon, Schoeps, Sun & Smith, 2008; Shi & Stevens, 2005).

The most representative model that has been developed to examine the impact of health service utilization upon health status is the Andersen-Aday's behavioral model of health services utilization (1968, 1995). This model integrates a range of individual, environmental, and system characteristics that might affect the use of health services and health status. Originally Andersen and Aday (1975) focused on health service utilization: they conceptualized health care utilization as a function of predisposing characteristics, need for care, and enabling resources, along with the external health system and

environmental factors. Andersen (1995), as shown in Figure 4, revised the initial model by incorporating the variable of perceived health status. In this revised behavioral model, self-evaluated health status is dependent upon various individual, environmental, and programmatic characteristics. The individual, environmental, and provider-level characteristics are further divided into predisposing factors, enabling factors, and need. The predisposing factors are represented by six main variables of gender, age, education, employment status, trust in provider, and perceptions in efficacy of treatment; enabling resources include variables that provide the means to access care; need refers to health status or pre-existing conditions. This revised model also includes feedback loops to indicate that health outcomes would in turn affect subsequent predisposing factors, enabling resources, perceived need for services, and health behaviors.

Figure 4: Andersen's Behavioral Model of Health Service Utilization (Phase 4)



Source: Andersen, R.M. (1995).

During the past decades, the Andersen-Aday behavioral model of health service utilization has proven to be very helpful in better understanding health behavior and informing important health policy. However, we need to be aware that the Andersen-Aday behavioral model is only a framework for analysis rather than a mathematical model (Phillips et al., 1998), so the inclusion and categorization of specific elements in the Andersen-Aday behavioral model in practice may vary depending on the research questions, study objectives, and data availability.

Physician Prejudice and Health Status

It has been well documented that racial and ethnic groups in the United States, primarily blacks, have received a different level of treatment for a wide range of illnesses and conditions (Smedley et al., 2003). Such racial and ethnic disparities in treatment might contribute to the fact that physicians tended to attach certain stereotypic characteristics to members of certain racial and ethnic groups. Van Ryn and Burke (2000) examined whether physicians held certain stereotypic views toward patients who were black. They found that as compared to their white patients, physicians perceived their black patients as less intelligent, less well educated, and less likely to possess personal characteristics that were conductive for a successful rehabilitation from a cardiac procedure, even when the age, gender, actual levels of education, income, and personal desire to participate in rehabilitation of a black patient were identical to these of a white patient. Ryn and colleagues (2006) examined variations in the likelihood of recommended surgery between racial and ethnic groups and found that physicians recommended surgery less often in black men than in white men. However, a racial difference in the likelihood of recommending surgery disappeared after taking into

account physicians' perceptions of the patient's level of education and the patient's desire for a physically active lifestyle. This finding suggests that, independent of the patient's race, physicians were less likely to recommend surgery in patients whom they perceived to be less educated and less likely to desire a physically active lifestyle. Greene, Blustein, and Weitzman (2006) in another study found that race influenced physicians' choice of accepting Medicaid patients, with physicians being significantly less likely to participate in Medicaid in areas where the poor were largely nonwhite and in areas that were racially segregated; in turn the physicians' decisions to accept Medicaid patients may have contributed to racial disparities in access to health care.

The way that physicians treated patients influences patients' rating of their health status. For example, Boardman (2004) investigated the relationship between an individual's self-reported health and his or her actual level of illness. The author found that individual who perceived themselves to experience maltreatment more frequently by physicians were more likely to rate their health status lower than those who reported less maltreatment, even though they suffered comparable levels of actual illness and had comparable age, gender, and SES.

Trust in Health Care Providers and Health Status

Trust in primary care providers is a multi-dimension construct (Hall, Dugan, Zheng & Mishra, 2001). The first dimension of fidelity means that doctors will do whatever it takes to get all the care that patients need; the second dimension of competence refers to doctors' medical skills; the third dimension of honesty suggests that doctors are totally honest in telling patients about all of the different treatment options available for patients' condition; the fourth dimension of confidentiality relates to the

protection and proper use of sensitive or private information; and the fifth dimension of global trust means that patients trust their doctors' decisions about which treatments are best for them. Research has shown that trust in health care providers plays an important role in developing the doctor-patient relationship (Trachtenberg, Dugan & Hall, 2005). In addition, trust in the medical profession is significantly related to many health behaviors, including patient help-seeking behaviors and patient's dependence on their health care provider (Trachtenberg, Dugan & Hall, 2005). For example, patients with higher levels of trust were more likely to request and receive prescriptions for new medication; while patients with low trust reported that the services they requested were not received (Thom et al., 2002).

There are many factors such as age, gender, race concordance, income, and education that are related to patient's trust in health care providers (Cunningham, 2008; Hall, Dugan, Zheng & Mishra, 2001; LaVeist, Nickerson & Bowie, 2000; Napoles et al., 2009). For this literature review race is most relevant, with African American patients being typically less likely than white patients to trust health care providers (Benkert, Peters, Clark & Keves-Foster, 2006). The lower level of trust in health care providers by blacks relates to their experiences of maltreatment or racial discrimination in the health care setting. A study by Ryn and Burke (2000) examined whether physicians' perceptions and beliefs about patients were affected by patient's race or socioeconomic status, controlling for patient's age, sex, race, sickness, depression, mastery, social assertiveness, and physician characteristics. They found that physicians' perceptions of patients were influenced by patients' socio-demographic characteristics, with physicians tending to perceive African Americans and members of low and middle socioeconomic status

groups more negatively on a number of dimensions than they did with whites and upper socioeconomic status patients. Specifically, black patients were assessed by physicians as less intelligent, less educated, less likely to follow or comply with medical advice, and less likely to live a physically active life, although they did not differ from comparable white patients. In the context of Medicaid managed care, Chaudry, Brandon, and Schoeps (1999) found that black Medicaid recipients in North Carolina experienced disrespectful treatment by healthcare personnel, although such disrespect did decline somewhat under managed care.

A danger inherent in such racial misperceptions and maltreatment in health care settings, whether real or only perceived, is that black patients might distrust their physicians. Accordingly, such distrust that patients have in their primary care providers might influence their relationship with physicians, their health-seeking behaviors, their motivation or incentives to utilize health services, and their compliance with treatments, all of which would negatively affect their health status. For example, Musa and colleagues (2009) examined the impact of trust in the health care system on preventive health services between black and white older adults and found that trust in one's own physician is significantly, associated with utilization of preventive health services. Specifically, relative to white older adults, black older adults showed higher distrust of their physicians, which likely contributed to health disparities by causing reduced utilization of preventive services.

Satisfaction with Health Care Services and Health Status

Patient satisfaction has become a focal concern of health quality in the United States (Agency for Healthcare Research and Quality, 2008). Conceptually distinct from

trust, patient satisfaction provides a valuable additional measure for assessment of the quality of the patient-physician relationship (Hall, Dugan, Zheng & Mishra, 2001). Patient satisfaction with health care is related to health utilization and compliance with treatment regimens (LaVeist & Nuru-Jeter, 2002; Myburgh et al., 2005). In addition, patients in better health tended to report greater satisfaction with their health care than patients in poor health (Hall et al., 1990). However, the relationship between race and patient satisfaction is unclear. A study by Haviland, Morales, Dial, and Pincus (2005) evaluated the effects of race and ethnicity on consumer health care satisfaction ratings and found that Hispanics generally reported lower ratings of health satisfaction compared to whites. However, a study by Greenberg, Brandon, Tingle, and Shull (2003) did not find an association between race and satisfaction among Medicaid managed care populations in North Carolina. Milgrom, Spiekerman, and Grembowski (2008) examined satisfaction with dental care among mothers of Medicaid-enrolled children and also did not find evidence of racial and ethnic differences in satisfaction ratings.

Community Characteristics and Health Status

Racial segregation exists in the United States, so it is necessary to investigate whether the characteristics of communities in which individuals live relate to their access to health care, utilization of health care services, and health status. Andersen and colleagues (2002) argued that individuals' access to health care is basically a result of who they are and where they live. A study by Kirby, Taliaferro, and Zuvekas (2006) confirmed this statement by finding that racial and ethnic composition of community accounted for a significant and sizable proportion of disparities in access to care. Another study by McLafferty and Grady (2005) also found that immigrant mothers in New York

City experienced substantial differences in geographical access to prenatal clinics by country of origin. Skinner and colleagues (2003) also examined the effect of community characteristics upon access to health care services by focusing on the racial variations in the receipt of knee arthroplasty among black people, Hispanic people, and non-Hispanic white people. They found that region of residence could partially explain the racial and ethnic disparities in receiving knee treatment. Additionally, neighborhood-level characteristics, such as place of residence situated within a particular social milieu and urbanicity could also have substantial impact on health outcomes through exposure to more pollutants.

Studies also show a link between urbanicity and health. Relative to individuals living in rural areas, individuals residing in urban areas facing different situations, such as higher population density and crowded, inadequate, or unaffordable housing, that could negatively impact health status (Copeland, 2005; Prentice, 2006; Williams & Collins, 1995). In addition, neighborhood social and economic resources might help explain the self-reported health differential between different racial and ethnic groups. Using multilevel modeling techniques to examine the impact of neighborhood structure and social organization on self-related health for a sample of Chicago residents aged 55 or older, Cagney, Browning, and Wen (2005) found that neighborhood affluence contributed positively to self-rated health status and attenuated the association between race and self-rated health status. Last but not least, region might relate to urbanicity, both affect access to health care services and health status. For instance, the state of North Carolina has four different geographical regions. It is very likely that people living in western North Carolina of the Appalachian mountain have different experiences in

accessing health care services relative to people living in central North Carolina of the Piedmont plateau or the eastern North Carolina of the tidewater region.

Other Correlates with Health Status

To have a clear understanding of disparities in health and health care is important, because it will help policymakers determine which solution or solutions should be primarily emphasized to address the persistent issue of racial and ethnic disparities in the United States. However, it is acknowledged that disparities in health and health care are very complex. Beside the above-mentioned correlates, there are many other behavioral, social, economic, cultural, biological, or environmental factors that might correlate with disparities in health and health care in a given population. For example, health behaviors and practices, such as better nutrition and eating habits, diminishing tobacco and alcohol use, and more exercise can dramatically improve the health (Williams & Collins, 1995). In addition, a number of personality variables, such as self-esteem, perceptions of mastery or control, anger or hostility, marital status, and feeling of helplessness have been found to be major risk factors for health status or to be buffers or moderators of the impact of stressful experiences on health (Kessler et al., 1995). Cultural beliefs about health care and family support also play a role in influencing one's health-seeking behaviors and health status (Boulware et al., 2002; Warren-Findlow & Prohaska, 2008).

Summary of Literature on Racial and Ethnic Disparities

The literature reviewed above demonstrates that health disparities are complex. In general, the root causes of health disparities can be separated into three categories: individual-level factors, community-level factors, and system-level factors. Individual-level factors include, but are not limited to, age, gender, race, socioeconomic status,

mistrust in health care providers, personal preferences for treatment, satisfaction with health care services, attitudes toward risk, and health-seeking behaviors. The major community-level factors include the urbanicity level of communities, racial and ethnic composition of communities, neighborhood environment, and place of residence. The system-level factors relate to how public health programs manage, finance, and provide health care services to their enrollees.

The literature review also indicates that the issue of racial and ethnic disparities was understudied in Medicaid managed care settings, with only three studies examining racial and ethnic disparities in health among Medicaid managed care adult populations. Methodically, these three studies used either descriptive statistics or standard multivariate regression analysis. However, these statistical techniques are not sufficient to disentangle the complexity of racial and ethnic disparities in health among Medicaid Managed care populations, because the relationship between race and ethnicity and health status might be mediated by some unobserved variables that are related to health status. It is necessary, therefore, for this study to turn to more sophisticated analytic techniques to bring greater clarity to the public health policy issue of racial and ethnic disparities in health. Specifically, using data collected from North Carolina Medicaid managed care program, this study applies the structural equation modeling technique to examine disparities in health between non-Hispanic white adults and non-Hispanic black adults. The next chapter describes the conceptual framework and hypotheses for this study.

CHAPTER 3: CONCEPTUAL FRAMEWORK AND HYPOTHESES

As stated previously, this study aims to examine the racial disparities in health status among Medicaid managed care adult population using data that were collected from the state of North Carolina in 2006. The four research questions that guide this study are:

1. What is the general situation of health status among Medicaid managed care populations?
2. Is race of Medicaid managed care enrollees significantly related to their health status?
3. What factor or factors related to Medicaid services contributed to health status among Medicaid managed care populations?
4. What are the relationships between race, health status, and the contributing factor or factors of health status?

This study has four objectives: gaining an understanding about the general health situation of Medicaid managed care adult population; determining whether race of Medicaid managed care adult population is significantly related to their self-reported health status; identifying the factor or factors that correlate with self-reported health of Medicaid managed care adult population; and investigating the relationships between race, self-reported health status, and the factor or factors that are related to health status.

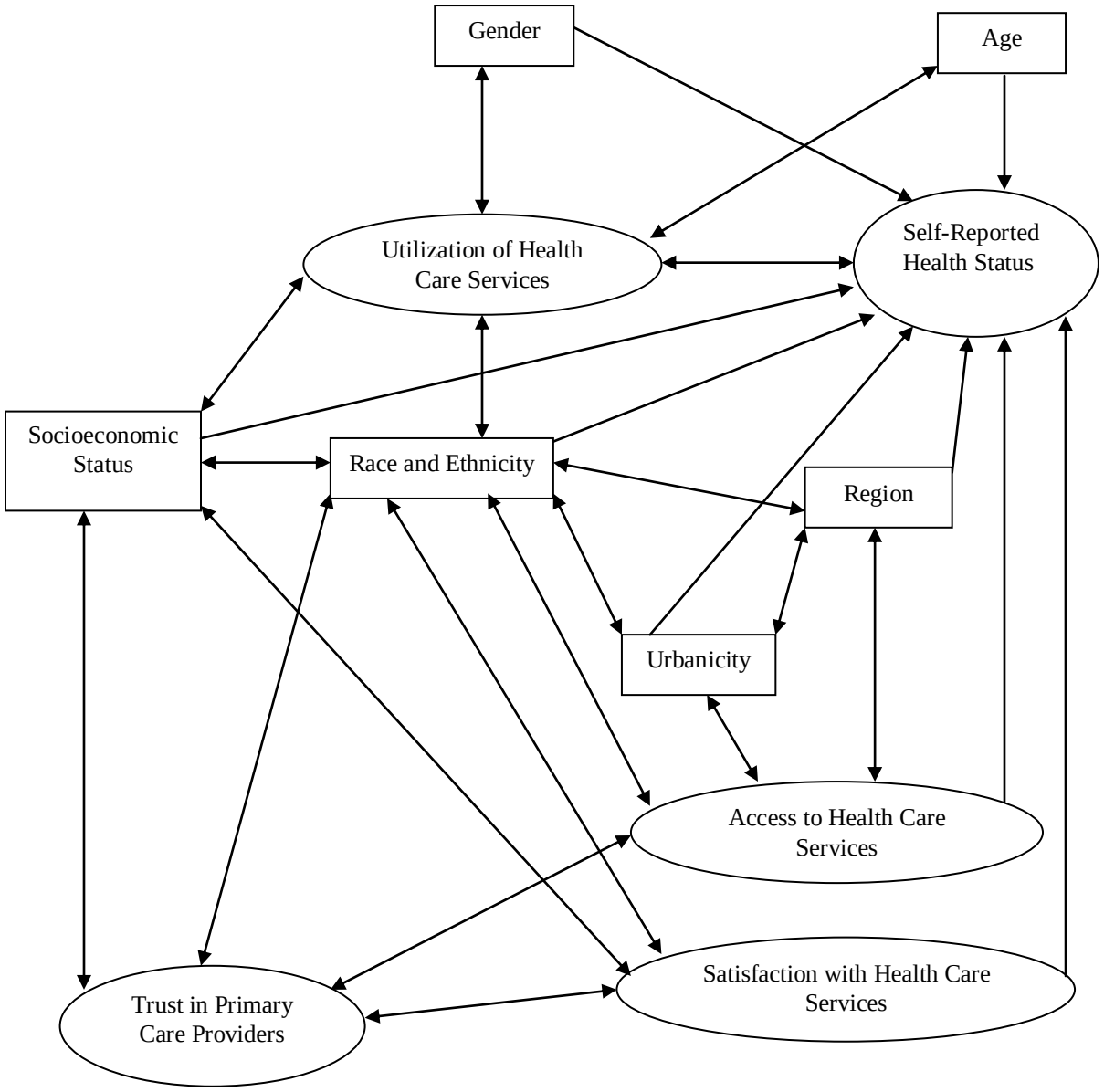
Conceptual Framework for the Present Study

To achieve the four research objectives, the author hypothesizes a conceptual framework (see Figure 5) based on the previous research on disparities in health and health care. The dependent variable in this study is health status, which is measured subjectively by asking respondents in this study to rate their overall health with five choices that range from poor health to excellent health. Race is the primary independent variable for this study. Variables of age, gender, socioeconomic status, region, and urbanicity are included in this study as the independent or control variables. In addition, four latent variables of access to health care services, utilization of health care services, satisfaction with heath care services, and trust in primary care providers are included in this study as independent variables. These four latent variables are measured by conducting exploratory factor analysis.

Data from this study show that 63.5% of the adult respondents reported having chronic conditions, and the presence of chronic conditions is negatively related to self-reported health status of respondents, with the correlation coefficient equaling to a value of -.452. Although chronic conditions are important to the formation of subjective health perceptions, people with chronic conditions might report good health. A study focusing on Canadians with chronic disease and disability supported this assumption by finding that the determinants of self-rated health among respondents with chronic conditions or diseases were significantly different from those with no reported chronic conditions or diseases (Cott, Gignac & Badley, 1999). The data in this study also confirmed this assumption by finding that 33.5% of adult respondents with chronic disorders rated their health as good, very good, or excellent. To adjust for the effect of chronic conditions on

self-reported health status, this study performs three structural equation models to test the validity of the hypothesized framework, with the first model focusing on the overall sample of Medicaid managed care adult enrollees, the second analysis on adult respondents with chronic conditions, and the third model on adult respondents without chronic conditions.

Figure 5: Hypothesized Model Predicting Health Status Reported by North Carolina Medicaid Managed Care Adult Beneficiaries



Study Hypotheses

The hypothesized model above shows the expected relationships among all study variables. Each of the three models in this study will specifically test the following 28 hypotheses that are organized into four categories:

Hypotheses Related to Health Status

$H_{1.1:}$ Race is related to health status;

$H_{1.2:}$ Age is negatively related to health status, with older adult respondents reporting worse health status;

$H_{1.3:}$ Gender is related to health status;

$H_{1.4:}$ Socioeconomic status is positively related to health status, with adult respondents having higher socioeconomic status reporting better health status;

$H_{1.5:}$ Satisfaction with health care services is positively related to health status, with adult enrollees who are more satisfied with health care services reporting better health status;

$H_{1.6:}$ Access to health care services is positively related to health status, with adult respondents reporting less difficulty in accessing health care services reporting better health status;

$H_{1.7:}$ Region is related to health status;

$H_{1.8:}$ Urbanicity is negatively related to health status, with adult respondents living in urban areas reporting worse health status;

$H_{1.9:}$ Utilization of health care services is positively related to health status, with adult respondents utilizing more of heath care services reporting better health status;

Hypotheses Related to Race

$H_{2.1:}$ Race is related to socioeconomic status, with non-Hispanic black adults reporting lower socioeconomic status relative to non-Hispanic white adults;

$H_{2.2:}$ Race is related to access to health care, with non-Hispanic black adults reporting greater difficulty in accessing heath care services relative to non-Hispanic white adults;

$H_{2.3:}$ Race is related to satisfaction with health care services, with non-Hispanic black adults being less satisfied with health care services relative to non-Hispanic white adults;

$H_{2.4:}$ Race is related to trust in primary health providers, with non-Hispanic black adults reporting a higher level of mistrust in their primary care providers relative to non-Hispanic white adults;

$H_{2.5:}$ Race is related to urbanicity, with non-Hispanic black adults being more likely than non-Hispanic white adults to reside in urban areas;

$H_{2.6:}$ Race is related to region;

$H_{2.7:}$ Race is related to utilization of health care services, with non-Hispanic black adults being less often than non-Hispanic white adults to utilize health care services;

Hypotheses Related to Socioeconomic Status

$H_{3.1:}$ Socioeconomic status is negatively related to access to health care, with adult respondents having higher socioeconomic status reporting less difficulty in accessing health care services;

$H_{3.2:}$ Socioeconomic status is positively related to trust in primary care providers, with adult respondents having higher socioeconomic status reporting a higher level of trust in their primary care providers;

$H_{3.3:}$ Socioeconomic status is negatively related to utilization of health care services, with adult respondents having higher socioeconomic status being less often to utilize health care services;

$H_{3.4:}$ Socioeconomic status is related to age;

Hypotheses Related to Other Variables

$H_{4.1:}$ Trust in primary care providers is positively related to access to health care services, with adults having a higher level of trust in their primary care providers reporting less difficulty in accessing health care services;

$H_{4.2:}$ Trust in primary care providers is positively related to satisfaction with health care services, with adult respondents having a higher level of trust in their primary care providers being more satisfied with health care services;

$H_{4.3:}$ Region is related to access to health care services;

$H_{4.4:}$ Urbanicity is negatively related to access to health care services, with adults living in urban areas reporting greater difficulty in accessing health care services relative to adults living in non-urban areas;

$H_{4.5:}$ Region is related to urbanicity;

$H_{4.6:}$ Gender is related to utilization of health care services;

$H_{4.7:}$ Access to health care services is positively related to satisfaction with health care services, with adults reporting less difficulty in accessing health care services being more satisfied with health care services;

$H_{4.8:}$ Age is related to utilization of health care services, with older adults being more often to utilize health care services.

CHAPTER 4: RESEARCH DESIGN AND METHODOLOGY

This chapter presents the research design and methodology for this study. Specifically, it introduces the study population, describes the sample strategy, states the survey instrument, reports the data collection procedure, details the measurement of variables, and explains the analytic strategy for this study.

Study Population

The study population for this investigation consists of adults who resided in the state of North Carolina and were continuously enrolled in selected Medicaid managed care programs for at least six months prior to the drawing of the adult sample in 2006. North Carolina Department of Health and Human Services provided the sampling frame that included all eligible persons. Excluded from this study were adults who were receiving aid from Community Alternatives Program (CAP), Medicaid for Pregnant Women (MPW), individuals receiving both Medicaid and Medicare benefits, the disabled and those suffering from development disabilities, Medicaid for the aged, and individuals receiving long term care (Brandon, Schoeps, Sun & Smith, 2008). These exclusion criteria resulted in a study population of 100,014. Among them, 51.1% claimed as African American adults, 40.3% were white adults, and the remaining 8.6% were adults from other racial and ethnic groups.

Sampling Strategy and Survey Instrument

There are 14 networks in the program of Community Care of North Carolina (CCNC) and Carolina ACCESS that functioned in the State of North Carolina at the time the adult survey sample was drawn (see Table 1). To ensure that sufficient numbers of observations from each network were drawn to allow cross-network comparisons, a random sampling technique stratified by CCNC network affiliation was adopted. The Consumer Assessment of Health Plans Survey (CAHPS) instrument was applied to collect data from the study population. Developed and validated by the Agency for Healthcare Research and Quality (AHRQ) in 1995, CAHPS is considered as a good measure of the quality of patient services. Including information about patient's access to health care services, utilization of needed care, and satisfaction with health care services, CAHPS has been widely used by health plans as a benchmark to measure performance and collect information on consumers' experiences and perceptions of health services within different types of health plans (AHRQ, 2007).

Table 1: Community Care of North Carolina Networks

Access Care Network Sites and Counties	Community Care Plan of Eastern North Carolina
Access II Care of Western North Carolina	Community Health Partners
Access III of Lower Cape Fear	Northern Piedmont Community Care
Carolina Collaborative Community Care	Northwest Community Care Network
Carolina Community Health Partnership	Partnership for Health Management
Community Care of Wake/Johnston Counties	Sandhills Community Care Network
Community Care Partners of Greater Mecklenburg	Southern Piedmont Community Care Plans

Source: Brandon, W. P., Schoeps, N., Sun, C. X. & Smith, G. H. (2008).

Data Collection

Following the principles and guidelines of the CAHPS instrument, the North Carolina Medicaid CAHPS® 3.0 Adult survey was used to collect data for this study. In

response to requests by Medicaid officials in North Carolina for information on specific issues, a few questions were added to the CAHPS survey instrument, among which were eight trust questions[1] that are relevant to this study. The data for this investigation were collected by UNC Charlotte's Urban Institute using the computer-assisted telephone interviews (CATI) approach between October 2006 and May 2007. A total of 2815 adults were interviewed to obtain information about the care that they received from the North Carolina Medicaid managed care networks. Telephone surveys present a number of challenges in securing higher response rates (Brown et al., 1999). Moreover, Medicaid insured patients are notoriously difficult to survey (Epstein, 1997). In locating and contacting Medicaid enrollees, interviewers for this study encountered great difficulty in reaching them, primarily because phone numbers in the State enrollment files were missing or incorrect. Some of the enrollees had given the state their cell phone numbers, but the federal law and current "best practices" in survey research prohibit calls to cell phones even if the numbers are correct. In addition, some eligible contacts declined to be interviewed, and this outcome was particularly common in this survey. Not surprisingly, in accordance with the survey research standards established by the American Association for Public Opinion Research[2] (2006), the response rate calculated for this study was only 27.1%.

[1] Question 10, 11, 12, 13, 14, 15, 16 and 17

[2] The standards require that phone calls that could not be completed must be counted in the denominator in calculating response rates.

Measurement of Variables

Dependent Variable

This study is designed to examine the racial disparities in health status among Medicaid managed care beneficiaries from North Carolina, so the dependent variable is health status. Health status is a multidimensional construct that comprises of biological, physical, and emotional functioning (Cott, Gignac & Badley, 1999). Objectively, health status can be assessed by looking at the existence of chronic medical conditions or the functional limitations that individuals experienced in daily activities. Subjectively, health status can be evaluated by asking people to perceive their health. Health in this study is measured subjectively by asking respondents to rate their overall health as excellent, very good, good, fair, or poor.

The subjective measure of self-reported health has proven to be a valid and reliable indicator of individual health in various populations (Finch, Hummer, Reindl & Vega, 2002; George, 2001; Idler & Benyamini, 1997). Today, self-reported health status has been commonly used to measure health outcomes in national surveys for comparable groups of Whites, African Americans, and Hispanics (Manor, Matthews & Power, 2000; Ransfield & Palis, 1996). Moreover, the subjective measure of self-reported health status might be superior to objective measures of health status, because it takes into account many different dimensions of health, such as physical health and functioning, chronic conditions, general feelings, and psychological, spiritual and emotional well-being (Idler, Hudson & Leventhal, 1999; Ross & Mirowsky, 1995).

There are usually three ways to analyze the dependent variable of self-reported health status: collapsing it into a dichotomous variable of good versus bad health and

using the statistical technique of logistic regression; considering it as an ordered categorical variable and using ordinal logistic regression; or transforming it as a continuous variable and using linear regression. Although there are some issues involved in analyzing categorical data as continuous data (West, Finch & Curran, 1995), it is generally agreed that when a variable has four or more categories and the data approximate a normal distribution, continuous methods can be used to analyze the ordinal order of the data (Bentler & Chou, 1987; Green et al., 1997; West, Finch & Curran, 1995). The dependent variable of self-reported heath in this study has five categories and is normally distributed, so the author transformed this variable as a continuous variable by assigning each possible response a rating, with higher value on self-reported health indicating better health. This transformation allows using the advanced multivariate technique of structural equation modeling to examine the complexity of racial disparities in health among Medicaid managed care adult population from North Carolina. In transforming ordinal variables into a rating scale using equal-length intervals, Diehr and colleagues (2001) recommended coding the 5 categories of self-rated health status as values of 0.95 (excellent health), 0.90 (very good health), 0.80 (good health), 0.30 (fair health), and 0.15 (poor health). This study adopted this suggested rating scale for transforming the dependent variable of self-rated health.

Predictor Variables

Race and Ethnicity

This study is to examine the racial disparities in health among Medicaid managed care adult population from North Carolina, so race naturally becomes the primary independent variable of interest. To accurately measure race, a question in the survey

asked respondents to indicate whether they had Hispanic or Latino origin or not. A follow-up question asked them to indicate their race. Based on their responses, a crosstab between the two questions were conducted, resulting in three categories of race and ethnicity: non-Hispanic African Americans, non-Hispanic whites, and others. If respondents claimed not having Hispanic or Latino origin and reported as being black, they were coded as non-Hispanic African Americans; if respondents claimed not having Hispanic or Latino origin and reported as being white, they were considered as non-Hispanic whites; respondents did not fall into the categories of non-Hispanic whites or non-Hispanic African Americans were grouped into the third category of "others". Of the 2815 adult respondents in the survey, 52% (1465) reported to be non-Hispanic whites, 39.3% (1106) were non-Hispanic African Americans, and the remaining 8.7% (244) were others.[3] Because respondents from the "others" category represented so diverse racial and ethnic groups and the number that they registered was not large enough to produce statistically significant and meaningful comparisons, respondents from this category were not included in this study, reducing the study sample size to a number of 2571.

Four Latent Independent Variables

The hypothesized framework for this study includes four independent variables (access to health care services, satisfaction with health care services, trust in primary care providers, and utilization of heath care services) that are difficult to measure, because they have multiple dimensions or complex constructs. These variables are also called latent or unobserved variables. Factor analysis (FA) and principal component analysis (PCA) are the two commonly used methods to uncover the underlying dimensions or

[3] Others mainly include Hispanics, Asian, Native Hawaiian or other Pacific Islander, and American Indian or Alaska Native.

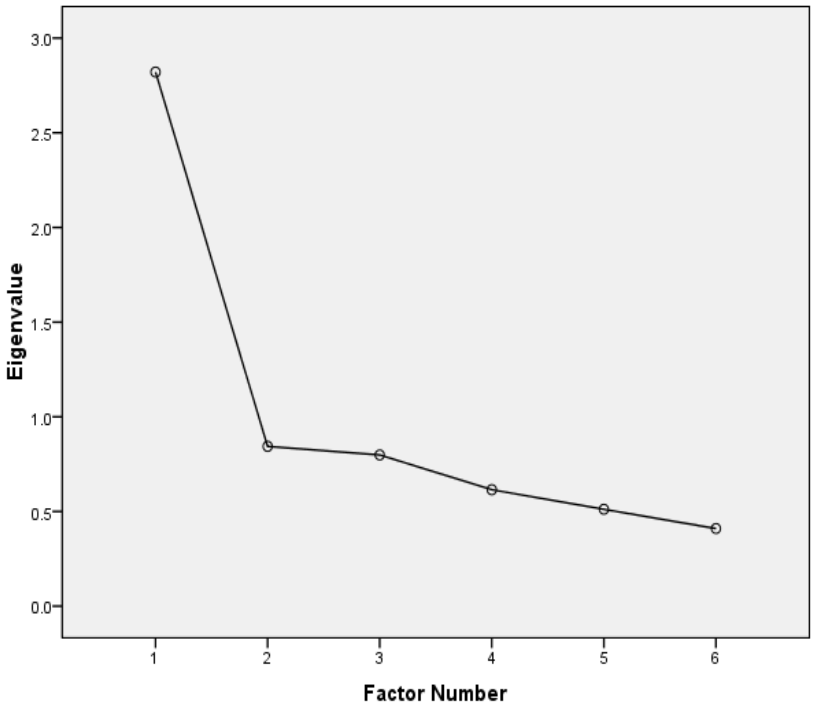
common factor variance for this type of variable (Byrne, 2001; Kim & Mueller, 1978; McDonald, 2002). Factor analysis differs from principal component analysis in several ways. First, principal component analysis analyzes all of the observed variance, while factor analysis focuses on the shared variance between variables; second, factor analysis uses rotation to help explain variance in a large set of variables while principal component analysis does not use rotation; third, principal component analysis is always exploratory in nature and is more useful for dealing with multicollinearity, whereas factor analysis can be used to either explore the nature of variables by running exploratory factor analysis (EPA) or test hypothesis about variables by running confirmatory factor analysis (CFA) (Gorsuch, 1990) . Because the author has no hypotheses about the underlying factor structure of these four latent variables, this study used exploratory factor analysis to measure them.

Exploratory factor analysis (EPA) involves three basic steps: deciding the number of factors, choosing the extraction method, and selecting a rotation method if more than one factor is extracted (Kim & Mueller, 1978). The most common approach to deciding the number of factor is to generate a scree plot, which is a two-dimension graph with factors on the x-axis and eigenvalues on the y-axis. Eigenvalues represent the variance accounted for by each underlying factor and they are typically arranged in a scree plot in a descending order. This study used scree plots to select the number of factors for the four included latent variables. Once the number of factors is determined, the next step is to obtain the factor loadings for each item on every factor by using the extraction method. Factor loadings are also called the correlation coefficients between the items and factors. Typically, factor loadings above 0.6 are considered high and those below 0.4 are low

(Fayers & Hard, 1997). This study adopted the value of 0.4 as a threshold in retaining items extracted from the measures of the four latent variables. There are five extraction approaches: principal component analysis, maximum likelihood, alpha factoring, image factoring, and principal axis factoring, and most approaches will produce similar results of factor loadings for a large sample (Snook & Gorsuch, 1989). To extract factors for exploratory factor analyses, this study used the principal axis factoring method. The last step in running exploratory factor analysis is to identify the simplest possible structure of latent variables by rotating the factor loadings. There are two basic types of rotation: orthogonal rotation that assumes factors are uncorrelated to one another and oblique rotation in which factors are consisted to be correlated. This study used the oblique rotation method of promax to maximize high factor loadings and minimize low factor loadings for the four latent variables.

The CAHPS 3.0 adult survey used for this study contained 7 items (q9, q19, q25, q27, q29, q32, and q52) that asked respondents to perceive the difficulty or frequency in accessing health care services covered by the Medicaid managed care program in North Carolina. Because there were very few (0.5%) respondents reporting a need for interpreters to help speak with doctors or other health providers, question 52 was not included as an indicator of the latent variable of access to health care services. An exploratory factor analysis, using the extraction method of principal axis factoring, was performed through SPSS version 17 to identify the factor structure underlying the six items of access to health care services among Medicaid managed care adult enrollees from North Carolina.

Figure 6: Scree Plot of Indicators for Access to Health Care Services



The scree plot, as shown in Figure 6, suggests that only one factor was worth retaining in the analysis, because the other factors had eigenvalues less than 1. Because only one factor was extracted from the six access items, there is no need to rotate the factor loadings. The factor alone accounts for 47.01% of the total variance among the six access items. Table 2 reports the factor loadings for each of the six access items on this factor. Because all the factor loadings are above the threshold of 0.4, this study retained all of the six access items.

Table 2: Factor Loadings of Indicators for Access to Health Care Services

Items	Factor 1
How much of a problem was it to get a personal doctor or nurse? (Q9)	***.428***
How much of a problem was it to see a specialist? (Q19)	***.461***
How often did you get the help or advice you needed? (Q25)	***.691***
How often did you get care as soon as you wanted? (Q27)	***.761***
How often did you get an appointment for health care? (Q29)	***.668***
How much of a problem was it to get the care, tests, or treatments? (Q32)	***.585***

The CAHPS 3.0 adult survey in this study provided the needed information for three of the four separate measures of medical utilization. Since hospitalization is a relatively rare event in Medicaid managed care populations, the survey did not include this variable. An exploratory factor analysis, using the extraction method of principal axis factoring, was conducted through SPSS 17.0 on the three utilization items of primary care visits (q31), emergency room visits (q30), and specialty visits (q21).

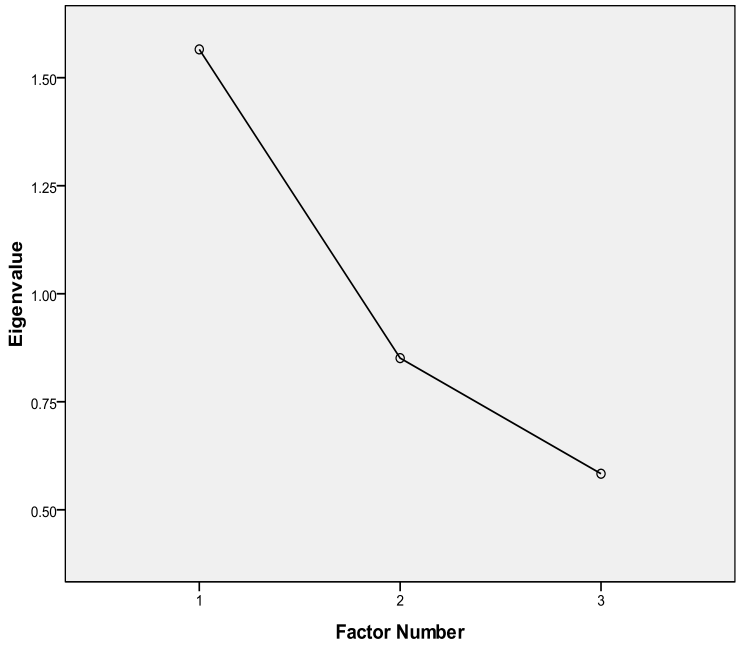
Table 3: Factor Loadings of Indicators for Utilization of Health Care Services

Items	Factor 1
How many times did you go to specialists for care for yourself? (Q21)	***.565***
How many times did you go to ER to get care for yourself? (Q30)	***.323***
How many times did you go to a doctor's office to get care for yourself? (Q31)	***.727***

The scree plot, as shown in Figure 7, suggests that only one factor was worth retaining in the analysis. Again, because only one factor was extracted from the three utilization items, there was no need to rotate the factor loadings. The factor alone accounts for 52.19% of the total variance among the three utilization items. The factor loadings for each of the three utilization items on this factor, as reported in Table 3, show that q21 (.565) and q31 (.727) loaded well on the extracted factor. Although the factor loading for q30 (.323) is below the threshold of 0.4, this item was retained as another indicator for the latent variable of utilization of health care services to achieve identification for the three structural equation models in this study.[4]

[4] See the following section of *Structural Equation Model* for more description about the model identification.

Figure 7: Scree Plot of Indicators for Utilization of Health Care Services

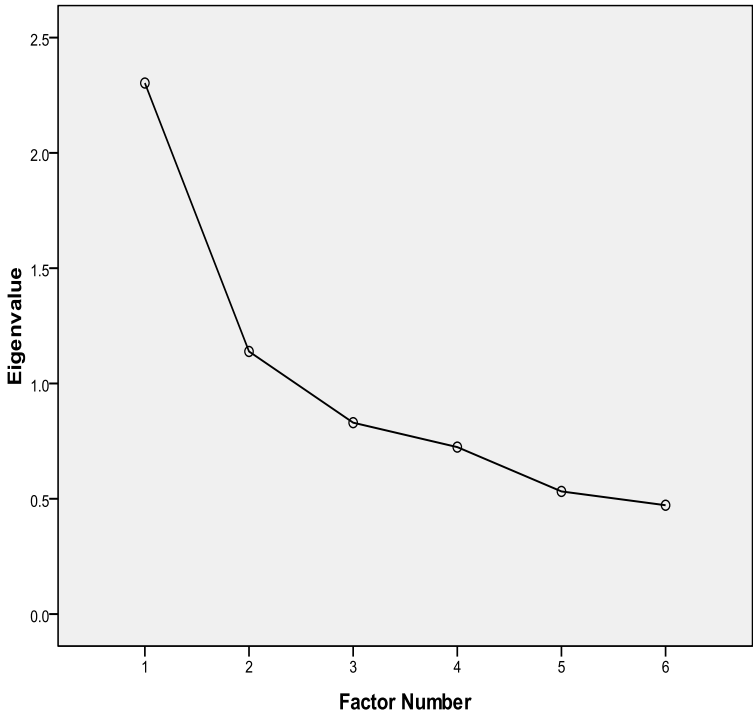


The survey used for this study had six items (q12, q13, q14, q15, q16, and q17) that estimated the patients' level of trust in their Medicaid primary care providers. To capture the factor structure of these trust items, an exploratory factor analysis, using the extraction method of principal axis factoring, was performed through SPSS 17.0. To achieve the measurement consistency of the latent variable of trust in primary care providers, q13[5] and q17[6] were recoded so that a higher value from each of the two questions indicates a higher level of trust in primary care providers.

[5] The original text for this question was "I trust my doctor or nurse to put my medical needs above all other considerations when treating my medical problems*"*. It was recoded as "I *do not* trust my doctor or nurse to put my medical needs above all other considerations when treating my medical problems".

[6] The original text for this question was "My doctor or nurse always pay full attention to what I am trying to tell him or her". It was recoded as "My doctor or nurse *does not* always pay full attention to what I am trying to tell him or her".

Figure 8: Scree Plot of Indicators for Trust in Primary Care Providers



The scree plot, as shown in Figure 8, suggests that two factors were worth retaining in the analysis. Factor loadings for each of the ten items on trust in primary care providers are reported in Table 4. It shows that the first factor had q12, q13 (recoded), q15, q16, and q17 (recoded) loaded well upon it, and this factor accounted for 38.38% of the total variance. The second factor also had q13 (recoded) and q17 (recoded) loading upon it, but this factor explained only 18.98% of the total variance. Regarding respondents' opinion about the impact of government rules upon decisions made by their primary care physicians, this question did not load upon any of the two extracted factors, so it was not retained as an indicator for the latent variable of trust in primary care providers. To achieve the simplest possible structure of the six items on trust in primary care providers, the two factors were rotated with the oblique method of promax. However, although the factor loadings reproduced by rotation made it easier to interpret

the structure of the five trust items, it caused the model identification problem for this study. Therefore, this study reported the factor loadings without rotation and retained five out of the six trust items that loaded well upon the first extracted factor.

Table 4: Factor Loadings of Indicators for Trust in Primary Care Providers

Items	Factor 1	Factor 2
I think my doctor or nurse may not refer me to a specialist when needed. (Q12)	***0.465***	0.190
I think my doctor or nurse is strongly influenced by government rules when making decisions about my medical care. (Q14)	0.199	0.234
I think that my doctor or nurse might perform unnecessary tests or procedures. (Q15)	***0.520***	0.347
The medical skills of my doctor or nurse are not as good as they should be. (Q16)	***0.661***	0.221
I do not trust my doctor or nurse to put my medical needs above all other considerations when treating my medical problems. (Q13-recoded)	***0.636***	-0.404
My doctor or nurse does not always pay full attention to what I am trying to tell him or her. (Q17-recoded)	***0.616***	-0.333

The survey used for this study included 10 items (q33, q34, q35, q36, q37, q38, q39,q41, q42, and q43) that asked patients' perceptions of satisfaction with health care services provided by the Medicaid managed care program in North Carolina. To capture the structure of satisfaction, an exploratory factor analysis was performed on the 10 items using the extraction method of principal axis factoring. The scree plot, as shown in Figure 9, suggests that one factor was worth retaining in the analysis. In addition, nine out of the ten satisfaction items loading well upon this factor, and this factor alone accounts for 44.19% of the total variance among the 10 satisfaction items. Factor loadings for each of the ten items on satisfaction with health care services are reported in Table 5, showing that the majority of the ten items loading well on the extracted factor. We need to notice that q37 did not load well on the extracted factor. One possible explanation is that more

than 86% of adult respondents in this study did not report having a hard time in communicating with their primary care providers because they spoke different languages.

Figure 9: Scree Plot of Indicators for Satisfaction with Health Care Services

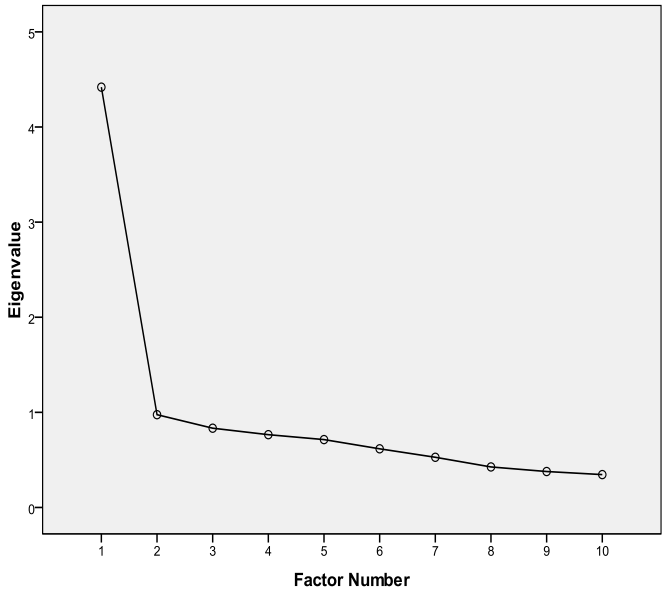


Table 5: Factor Loadings of Indicators for Satisfaction with Health Care Services

Items	Factor 1
How often were you taken to the exam room within 15 minutes of your appointment? (Q33)	***.420***
How often did office staff at a doctor's office or clinic treat you with courtesy and respect? (Q34)	***.608***
How often were office workers at a doctor's office or clinic as helpful as you thought they should be? (Q35)	***.732***
How often did doctors or other health providers listen carefully to you? (Q36)	***.760***
How often did you have a hard time speaking with or understanding a doctor or other heath providers because you spoke different languages? (Q37)	-.279
How often did doctors or other health providers explain things in a way that you could understand? (Q38)	***.583***
How often did doctors or other health providers show respect for what you had to say? (Q39)	***.769***
How often were you involved as much as you wanted in these decisions about your health care? (Q41)	***.552***
How much of a problem was it to get your doctors or other health providers to agree with you to best manage your health conditions or health problems? (Q42)	***.627***
How often did doctors or other health providers spend enough time with you? (Q43)	***.711***

Control Variables

Many studies indicate that sociodemographic characteristics are associated with health status (Shi et al., 2002). Andersen's revised behavioral model of health care utilization (1995) suggests three components that might influence an individual' utilization of health care services: predisposing, enabling, and need factors. The predisposing characteristics are represented by six main variables: age, gender, education, employment status, trust in health provider, and perceptions in efficacy of treatment. To accurately estimate the racial disparities in health status among the North Carolina Medicaid managed care adult population, this study included age, gender, and socioeconomic status to serve as control variables.

Age in this study was measured in years, and it was coded into five categories, with 1 standing for people aged 18-24 (17.6%), 2=25-34 (20.5%), 3=35-44 (20.7%), 4=45-54 (22.1%), and 5=55 or above (19.1%). Gender was treated as a dichotomous variable, with female adults being coded as the reference group. Socioeconomic status is often measured by educational attainment, salary, combined household income, occupational status, or employment status (Bradley & Corwyn, 2002; Farmer & Ferraro, 2005; Schoenbaum & Waidmann, 1997). Since all Medicaid beneficiaries, by virtue of the Medicaid eligibility, must have low income and employment for this group is unlikely to be stable, the only meaningful characteristic for registering SES in this Medicaid population is education. Therefore, this study measured socioeconomic status by asking respondents to report their highest number of years of schooling completed at the time of drawing the sample. Respondents did exhibit a considerable range of educational attainment, with 11.6% finishing 8^{th} grade or less, 27.9% having some high school

without graduation, 36.6% finishing high school or having GED, 20.2% having some college or associate degree, 3.1% graduating from college, and 0.6% reporting more than 4-year college education. For the univariate statistics, the variables of age and education were treated as categorical variables that consist of the above-mentioned levels. For the multivariate analyses, however, they were interpreted as continuous variables, with a higher value on age indicating older and a higher value on education standing for a higher educational attainment.

A couple of studies have shown that community characteristics, such as place of residence, the urbanization level of communities, and neighborhood affluence influence people's access to health care services and their health status (Andersen et al., 2002; Cagney, Browning & Wen, 2005; McLafferty & Grady, 2005). To adjust for the community or environmental effects on self-reported health status of Medicaid managed care enrollees, this study included two contextual variables as covariates. To describe the geographical region within North Carolina where program enrollees resided, the first context variable was termed as region. This variable was coded into four categories to recognize the four distinct land regions in North Carolina, with 1=the *Appalachian Mountains* of western North Carolina, 2=the *Piedmont Plateau* in the center of the state, 3=the *Inner Coastal Plain* that lies in eastern North Carolina inland from the Atlantic Ocean and is not directly influenced by the ocean, and 4=the *Outer Coastal Plain*, or *Tidewater* region, that lies adjacent to the ocean.[7] To describe the degree to which residents lived in rural or urban areas, the second context variable of urbanicity was coded and classified into three categories, with 1=urban areas, 2=rural areas and 3=areas

[7] See *Appendix B* for detailed information about the coding and frequency distribution of the four regions.

lying between urban and rural. [8] To simplify the interpretation of study results, urbanicity was recoded as a dummy variable, with 1=living in urban areas and 0=not living in urban areas.

Analytic Strategy

This is a cross-sectional study that examines the racial disparities in health status among Medicaid managed care adult population using data collected from North Carolina. To achieve this goal, this study took three analytic approaches. First, univariate statistics of mean, standard deviation, and frequency distribution were computed to examine the general pattern of health status among Medicaid managed care adult enrollees. Next, bivariate analyses were conducted using the Pearson Chi-square test of independence to assess the relationship between race and self-reported health. The third approach was to perform three separate structural equation models (SEM) to explore the relationships between the dependent variable of self-reported health status and its predictors, as well as relationships between the latent variables and observed variables in the three models. Before running structural equation models, four exploratory factor analyses were conducted to measure the four latent variables in this study. The univariate and bivariate statistical analyses, as well as exploratory factor analyses, were conducted using the SPSS (Statistical Package for the Social Sciences) 17.0 software. The three structural equation models were performed using Amos (Analysis of Moment Structures) 17.0 software, a solution from SPSS that extends standard multivariate analysis methods (Arbuckle, 2007). A p-value of $<.05$ was considered significant for all the analyses in this study.

[8] See *Appendix C* for detailed information about the creation and subsequent coding and frequency distribution of the three-level classification of county urbanicity.

Structural Equation Model

Structural equation model is a comprehensive statistical approach that combines features of factor analysis and path analysis for studying both the measurement and the structural properties of theoretical models (Byrne, 2010; Kline, 2005). A full structural equation model consists of two components: the measurement model and the structural model. The measurement model details factor loadings for the latent variables, whereas the structural model provides information about the relationship between latent variables, as well as relationship between the predictor of interest and the dependent variable (Byrne, 2010; Kline, 2005; McDonald, 2002). In general, structural equation model is superior to standard regression analysis in the following ways: it can test relationships among latent variables while reducing the error associated with observed or indicator variables; it allows for measurement error and correlated residuals; it tests the causal links between variables; and it can test multiple independent and dependent variables simultaneously, thus making it easy to control the mediating effect of one variable upon the other (Bryant & Yarnold, 1995; Byrne, 2010; Kline, 2005; McDonald, 2002; Muller, 1996). Based on the above-mentioned advantages over standard regression techniques, structural equation modeling was selected as a more appropriated approach to examining the racial disparities in health among Medicaid managed care enrollees in this study.

Model Specification

To put it simply, model specification is the explicit translation of theory into mathematical equations (Kline, 2005). It involves formulating statements about parameters, which are the numerical coefficients that describe the relationships between constructs. It also involves selecting indicators for the latent variables. Model

specification is central to SEM, because failing to specify the relevant constructs, both latent and observed, and the relationships between the constructs would run the risk of creating an under-specified or spurious model. In addition, model specification should avoid including every possible causal variable, because doing so would render the model not testable. To specify the hypothesized model in this study, the variables, both latent and observed, were selected carefully based on findings from the literature in this field. Second, each latent variable in this study had three or more indicators. Third, the relationships between latent and observed variables were clearly specified.

Model Identification

Model identification is another important issue for structural equation models. Prior to estimating parameters, the identification status of a SEM model must be assessed to ensure that enough variance and covariance information is available from the observed variables. According to Byrne (2001), a structural equation model may be just-identified, over-identified, or under-identified, depending on whether a single and unique value can be obtained for each free parameter or not. If a single and unique value can be obtained for each free parameter, the model is considered to be either just identified or over-identified; otherwise it is under-identified. Model identification can also be determined by subtracting the number of free parameters to be estimated from the total number of variances and covariances in the observed variables. If there are fewer free parameters to be estimated than variances and covariances, the model is considered as over-identified.

An over-identified model is required for testing hypothesis and obtaining fit indices that are necessary to determine overall model fit between the theoretical model and the sample data (Byrne, 2001; Kline, 2005). To make the hypothesized model in this

study over-identified, the paths from the error term to the measured variables and the paths from the disturbance term to the latent variables were fixed to a value of 1. In addition, for every latent variable, one of the paths from the latent variable to the indicators for that latent variable was fixed to a value of 1. Last but not least, the regression paths among the latent variables in the hypothesized models were identified carefully by basing them on theory, so that not every possible permutation of regression paths was included in the models. All of the three models tested in the current study proved to be over-identified, with the number of observed variables exceeding the number of parameters estimated.

Model Estimation and Data Evaluation

The hypothesized three SEM models in this study were estimated using the maximum likelihood, an estimation method that involves an iterative procedure which generates a set of parameter estimates that are most likely to have been produced from the significant relationships. Prior to estimating models, the author evaluated the sample size and screened the data for assumption violations. Mueller (1996) suggests that the ratio of number of participants to number of observed variables should be at least 10 to 1. In this study, the model for overall sample had 2571 participants, the model for adults with reported chronic conditions had 1636, and the model for adults without reported chronic conditions had 932, so sample size is not a problem in this study. Normality was checked by looking at the skewness and kurtosis values for each variable. A small departure from normality was detected for the dependent variable of self-reported health status, so a log transformation was performed to make this variable more normally distributed. However, this transformation did not substantially alter the results, so the

study used the untransformed variable of self-reported health status in all the analyses. Outliers in the data were checked using the cutoff three (3) standard deviations from the mean. Very few outliers were identified, so all outliers were kept in the analyses. Multicollinearity of the key independent variables was tested using the Pearson correlation coefficient. No variables had the correlation coefficient value over 0.8, indicating that the multicollinearity problem does not exist in this study. Linearity of variables was checked by examining the scatter plots. Because the majority of variables in this study are categorical, linearity of variables was a problem. The author conduced analyses with this limitation in mind. Some variables in this study were found to have missing values. To address this problem, models were estimated by activating "*estimate means and intercepts*"[9] option in the *Analysis Properties* dialog box appeared in Amos version 17.0.

Model Goodness-of-Fit Indices

The chi-square goodness-of-fit is one of the commonly used goodness-of-fit indices to assess how well a structural equation model fits the sample data. Unlike traditional chi-square testing, researchers hope that the reproduced variance-covariance matrix is not significantly different from the observed variance-covariance matrix, so a non-significant chi-square value in SEM indicates that the hypothesized model fits well with the data. However, the chi-square goodness-of-fit is very sensitive to sample size and are often statistically significant for models with large sample size, thereby indicating poor data fit and leading to the rejection of a model. To address this problem, several other alternative measures of fit have been developed to adjust for sample size. For

[9] When missing values are present it is necessary to request that Amos estimate means and intercepts, which is not the default.

example, Joreskorg and Sorbom (1999) developed the goodness of fit index (GFI), with GFI values greater than 0.90 suggesting a good model fit. Bentler (1990) developed the comparative fit index (CFI), with CFI values greater than 0.90 indicating a good model fit. Root mean square error of approximation (RMSEA) is another popular measure of model fit, with a value of below 0.5 indicating a good model fit (Brown & Cudeck, 1993). In practice, it is recommended to use a combination of one absolute fit measure, one incremental fit index, one goodness-of-fit index, and one badness-of-fit index to assess model fit, because using multiple indices can help reduce the risk of discarding a good fit model or retaining a poor fitting model ((Hair et al., 2006; Kline, 2005). To measure the goodness-of-fitness of three structural equation models, this study used the chi-square and associated degree of freedom as one absolute fit measure, the root mean square error of approximation (RMSEA) as the absolute fit index and the badness-of-fit index, and the comparative fit index (CFI) as the incremental fit index and the goodness-of-fit index.

Model Modification

Modification indices (MI) are suggestions made by Amos for paths that can be entered into the model to improve the goodness-of-fit (Kline, 1998). Empirically, modification indices can be very useful for improving the overall model fit. However, obtaining modification indices in SEM requires complete data. To meet this requirement, the missing values of several variables were replaced using linear interpolation method in SPSS 17.0. Although modification indices obtained from the dataset with replaced values were referenced for improving the model fit, the determination of adding a path to the hypothesized models should base on theoretical and logical indications. Therefore, paths

suggested by Amos that did not make theoretical or logical sense were not added to the models in this study. To maintain the originality of data, the final results of the three SEM models were estimated from the data without using the linear interpolation replacement of missing values.

Conventions for Drawing Path Diagram and Symbol Notation

This study used Amos 17.0 to draw path diagrams. This software has several conventions in drawing path diagrams and symbol notations. First, circles or ellipses are used to represent latent variables or constructs; squares or rectangles are used to represent measured or observed variables. Second, single-headed arrows are used to represent covariance or correlations, whereas curved arrows are allowed only between independent variables. Third, all measured variables have attached individual error or disturbance term, which are represented in lowercase. Finally, the path from the error or disturbance term is usually set to 1; and fifth, error terms for each dependent variable are denoted by a circle in the path model (Arbuckle, 2007).

To summarize, this chapter provides the background information that is necessary to conduct, understand, and evaluate the statistical analyses that are the subject of Chapter 5. The next chapter will begin by reporting findings from the univariate and bivariate analyses, and concludes with findings from the structural equation models that examine the relationships between race, self-reported health status, and a variety of latent or observed variables.

CHAPTER 5: RESULTS

The purpose of this study is to examine the racial disparities in health among Medicaid managed care adult populations. This chapter presents results of this study, starting with a description of the demographic characteristics of the study population, the sample, and the survey respondents. Then it reports findings from univariate and bivariate analyses, which are conducted to address research questions 1 and 2. Next, this chapter presents findings from the three the structural equation models that are computed to answer research questions 3 and 4. To accurately examine and gain a better understanding of the racial disparities in health status between non-Hispanic black adults and non-Hispanic white adults covered by the North Carolina Medicaid managed care program, this study runs three separate structural equation models, with the first model focusing on the overall sample of adult enrollees, the second on adult enrollees with chronic conditions, and the third on adult enrollees without chronic conditions. Findings from the three structural equation models are summarized at the end of this chapter.

Sociodemographic Characteristics of the Study Population and Survey Respondents

The population for this study included 100,014 adults who continuously enrolled in the North Carolina Medicaid managed care program for at least six months prior to the drawing of the adult sample in 2006. The sample size for this study included 29,122

adults. Among the random sample of adults, 2815 were interviewed for the survey. To make results of this study representative for the study population, it is necessary to make sure that adult enrollees included in this study did not differ significantly from the study population. Thus, some preliminary analyses were conducted to compare the sociodemographic characteristics of the survey respondents with those of the study population.

Table 6: Demographic, Region, and Urbanicity Characteristics of the Study Population, Sample, and Survey Respondents

		Study Population (N=100,014) %	**Sample** (n=29,122) %	**Respondents** (n=2815) %
Gender	Female	72.60	72.50	74.70
	Male	27.40	27.50	25.30
Age	18-24	28.60	28.70	17.60
	25-34	24.40	24.50	20.50
	35-44	20.40	20.70	20.70
	45-54	15.10	15.10	22.10
	>= 55	11.50	11.00	19.10
Race	Black	51.10	49.40	39.00
	Other	8.60	7.40	8.20
	White	40.30	43.20	52.80
Region	Mountains	11.40	11.90	13.60
	Piedmont	45.90	57.90	56.20
	Coastal Plain	33.70	23.80	24.70
	Tidewater	9.00	6.40	5.50
Urbanicity	Urban	60.20	64.30	61.50
	Mixed	24.20	23.40	24.90
	Rural	15.60	12.30	13.50

Table 6 displays findings from these analyses. With regard to gender, the survey respondents did not differ from the study population, with approximately one quarter of the included adult enrollees (25.30% versus 27.40%) being males. Age for the study

population ranged from 18 to over 65 years old. The adult enrollees participated in this study registered a fairly equal distribution by each age group. Relative to the study population, the survey respondents had a higher proportion in the age groups of 45-54 (22.10% versus 15.10%) and over 55 years old (19.10% versus 11.50%), but had a lower proportion in the age group of 18-24 (17.60% versus 28.60%). Regarding race, a higher proportion of white adults (52.8% versus 40.30%) and a lower proportion of black adults (39.00% versus 51.10%) participated in the survey relative to their proportions in the study population. In terms of urbanicity, the survey respondents did not differ significantly from the study population, with 61.50% of the survey respondents and 60.20% of the study population living in urban areas. Regarding another context variable of region, a higher proportion of adult enrollees living in the Piedmont plateau (56.20% versus 45.90) were included in this study relative to their proportion in the study population. Overall, although some slight variations in age and race were identified between the two groups, the included adult enrollees for this study represented the study population quite well.

Descriptive Statistics of Control Variables by Race

To accurately examine the racial disparities in health status among the North Carolina Medicaid managed care adult beneficiaries, this study included five control variables. As noted earlier, about 92% of respondents in this study claimed to be either white or black, making the remaining 8% of respondents from diverse racial and ethnic groups not large enough to produce statistically significant and meaningful comparisons. Therefore, this study only included black adults and white adults, reducing the sample size of this study to 2571.

Table 7: Descriptive Statistics of Control Variables by Race for Medicaid Managed Care Non-Hispanic Black and White Adult Enrollees in North Carolina

	Overall (n=2571) %	**Non-Hispanic Black** (n=1106) %	**Non-Hispanic White** (n=1465) %
Gender			
Male	24.50	23.06	25.60
Female	75.50	76.94	74.40
Age			
18-24	17.74	19.71	16.25
25-34	20.93	20.61	21.16
35-44	21.08	19.08	22.59
45-54	21.86	22.15	21.64
>= 55	18.40	18.44	18.36
Education			
8th grade or less	11.09	8.23	13.24
Some high school	28.00	29.20	27.10
High school or GED	36.68	39.69	34.40
Some college	20.15	18.44	21.43
College	2.99	3.07	2.94
Above college	0.51	0.45	0.55
Urbanicity			
Non-urban	38.20	34.09	41.30
Urban	61.80	65.91	58.70
Region			
Mountains	13.73	2.35	22.32
Piedmont	57.49	61.30	54.61
Coastal Plain	23.10	31.56	16.72
Tidewater	5.68	4.79	6.35

Table 7 provides the descriptive statistics for the five control variables. Regarding gender, three out of the four respondents in this study were female adults, and there was no significant variation in gender between non-Hispanic white adults and non-Hispanic black adults. Respondents in this study displayed a fairly even distribution in each age group. In addition, non-Hispanic black adults did not differ significantly from non-Hispanic white adults in age. Not surprisingly, respondents in this study reported having a low level of educational attainment, with more than 96% reporting having less than 4-

year college education. Moreover, non-Hispanic black adults and non-Hispanic white adults in this study showed a similar pattern in each category of educational attainment. With regard to the contextual variable of urbanicity, the majority of respondents (61.8%) reported living in urban areas, although non-Hispanic black adults from these areas registered a higher proportion (65.91%) than did non-Hispanic white adults (58.70%). In terms of region, more than half (57.49%) of respondents in this study reported residing in the *Piedmont Plateau* that lies in the center of North Carolina. Relative to non-Hispanic black adults (2.35%), a much higher proportion of non-Hispanic white adults (22.32%) resided in the *Appalachian Mountains* of western North Carolina.

Univariate and Bivariate Statistical Analyses of Health Status

As stated previously, the important issue of racial and ethnic disparities was understudied in the context of Medicaid managed care. To address this deficiency in the literature, this study is designed to compare the health status between non-Hispanic white adults and non-Hispanic black adults using data collected from the North Carolina Medicaid managed care program. To guide this study, the author develops four research questions, with the first research question inquiring about the general health status pattern among Medicaid managed care adult enrollees. Respondents in this study were asked to rate their overall health status on a 5-point scale, ranging from poor health (coded as a number of 1) to excellent health (coded as a number of 5).

The first research question is addressed by conducting some univariate statistical analyses based on adult enrollees' perceptions of their overall health status and chronic conditions. Table 8 shows that more than half (50.02%) of the adult beneficiaries covered by the North Carolina Medicaid managed care program rated their current health status as

either poor or fair. In contrast, less than one quarter (24%) of them reported having good or excellent health. With regard to chronic conditions or diseases, almost two third (63.6%) of respondents in this study reported having certain physical or mental conditions that had lasted for at least 3 months. It is evident that the overall health status for the Medicaid managed care beneficiaries residing in North Carolina was unpromising. This finding is expected in light of Medicaid eligibility requirements and is consistent with the existing research, in which enrollees from public health programs are consistently found to have fair or poor health.

Table 8: Descriptive Statistics of Self-Reported Health Status by Race for Medicaid Managed Care Adult Enrollees in North Carolina

	White (n=1465)	**Black** (n=1106)	**Overall** (n=2571)
Self-Reported Health			
Mean(SD)	2.0 (1.19)	2.87 (1.20)	2.64 (1.21)
Median	2	3	2
Poor	24.10%	11.57%	18.71%
Fair	31.26%	31.37%	31.31%
Good	23.69%	28.03%	25.55%
Very Good	13.58%	15.82%	14.55%
Excellent	6.96%	12.66%	9.41%
Chronic Conditions			
No	24.60%	47.80%	36.30%
Yes	72.40%	52.20%	63.60%

χ^2=81.348, p<0.001

The second research question for this study is to examine the relationship between race and health status of Medicaid managed care adult enrollees. This question is answered by conducting a Pearson Chi-square analysis to compare self-reported health status between non-Hispanic black adults and non-Hispanic white adults. As shown in Table 8, a significant variation in self-reported health status emerged between the two racial groups (χ^2=81.348, p<0.001), with non-Hispanic black adults as a group reporting better health (mean=2.87) relative to white adults (mean=2.0). Specifically, 12.66% of

non-Hispanic black adults reported having excellent health, whereas this number dropped to 6.96% among non-Hispanic white adults. In addition, non-Hispanic black adults in this study were significantly less likely (52.2%) than non-Hispanic white adults (72.40%) to report having certain chronic diseases. Although the significant relationship between race and self-reported health status is expected, it is contrary to the general findings in the health literature, that is, black adults were consistently found to have worse health outcomes than white adults, and this finding still holds after adjusting for certain social and demographic characteristics of the two racial groups (Smedley et al., 2003; U.S. Department of Health and Human Services, 2009).

Results of Testing the Hypothesized Structural Equation Models

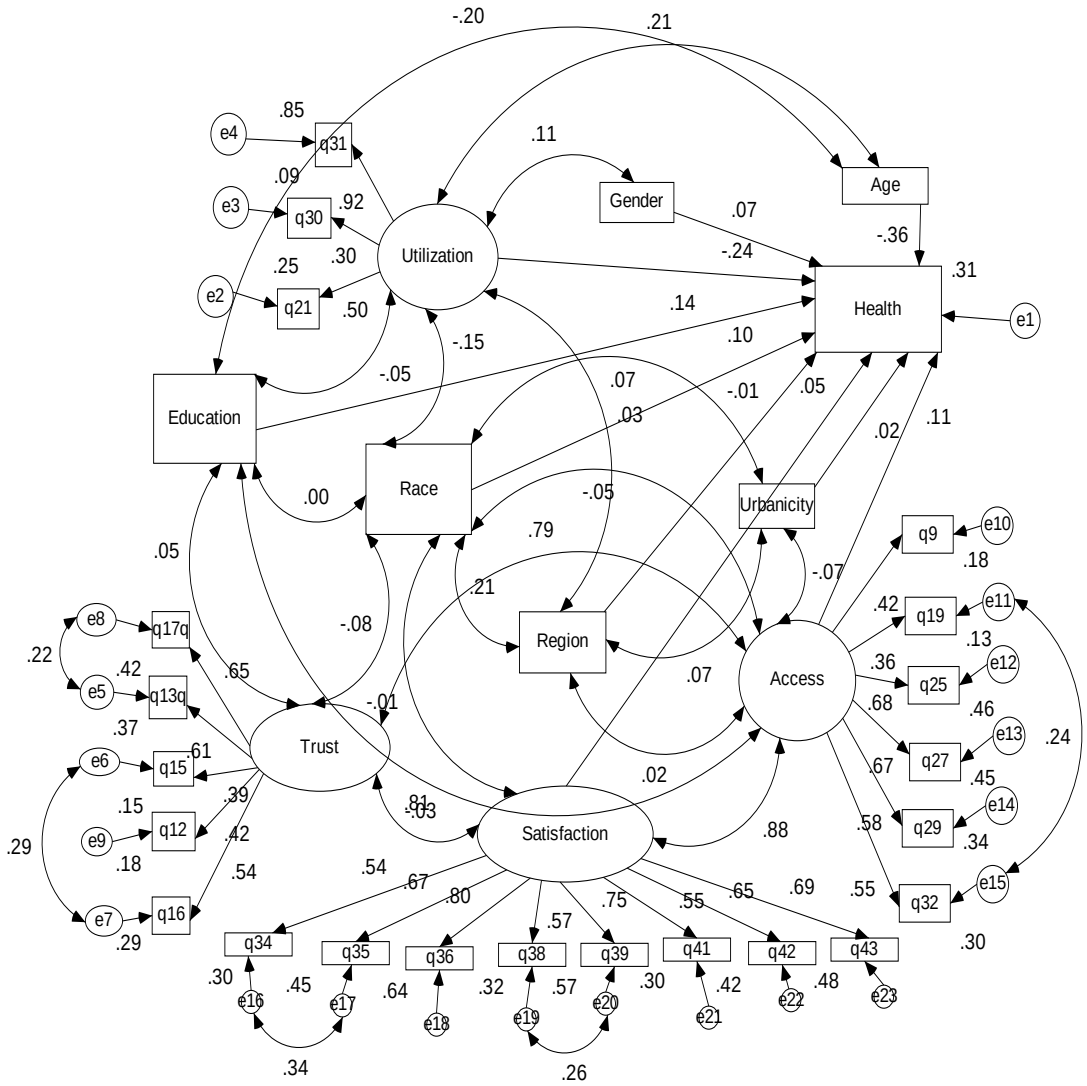
The third research question is interested in indentifying the factor or factors that might have contributed to the health status reported by Medicaid managed care adult enrollees in this study. The fourth research question is to examine the relationships between race, self-reported health status, and the contributing factor or factors of health status. Based on the existing literature on disparities in health and health care, the author develops a conceptual framework, as shown in Figure 10, to capture the relationships. To answer research questions 3 and 4, the author conducts three separate structural equation models to test the hypothesized framework. Specifically, the first structural equation model is to examine the racial disparities in health among the overall sample of adult enrollees in the North Carolina Medicaid managed care program, the second model focuses on adult enrollees with chronic conditions, and the third model concentrates on adult enrollees without chronic conditions.

As stated previously, a full structural equation model is constituted by measurement and structural components. The measurement component tests how well each of the observed variables loads upon a particular factor of the latent or unobserved variables, whereas the structural component specifies relationships between the latent or unobserved variables. The Amos 17.0 program (Arbuckle, 2007) is used to compute the three structural equation models to examine the relationships between race, health status, and the factor or factors that are related to health. The following section presents results from each of the three structural equation models.

Model-1 for the Overall Sample of Adult Enrollees

The first structural equation model examines the racial disparities in health among the overall sample of adult beneficiaries from the North Carolina Medicaid managed care program. With 29 observed variables, there are 2571 observations available to estimate the 114 parameters of this model, among which 27 are regression weights, 25 are covariances, 33 are variances, 6 are means, and 23 are intercepts.

Figure 10: A Structural Equation Model Estimating Health Status for the Overall Sample of North Carolina Medicaid Managed Care Adult Enrollees
(Standardized Solution: n=2571)



As shown in Figure 11, this model is over-identified, with the degree of freedom equaling to 350. To save space, this graph reports only the standardized estimates of relationships in this model. As a whole, this model explained 31% of the variance in the dependent variable of self-reported health status. Table 9 lists values of the several commonly used model fit indices for this structural equation model. Because this model has a large sample size of 2571, it is a surprise to find that the chi-square value for this model is statistically significant ($X^2_{(degree\ of\ freedom\ =\ 350)}$ =1450.527, p<.001), indicating that the reproduced model-implied variances and covariances are not similar to the sample variance and covariance matrix. However, since chi-square is very sensitive to sample size and it is almost always statistically significant for models with more than 200 cases, this study used the comparative fit index (CFI) and the root mean square error of approximation (RMSEA) as the alternative measures of model fit. The CFI value for this model of the overall sample of adult enrollees is 0.921, which is above the recommended value of 0.90 (Bentler, 1990). In addition, the RMSEA value for this model is 0.035, and it is below the acceptable level of 0.05 (Jöreskog and Sörbom, 1996). Therefore, both of the measures indicate that that the structural equation model that is designed to examine the racial disparities in health fits adequately with the data collected from the overall sample of North Carolina Medicaid managed care adult enrollees.

Table 9: Model Fit Indices of the Structural Equation Model Estimating Health Status for the Overall Sample of North Carolina Medicaid Managed Care Adult Enrollees

Indicator	Study Value	Recommended Value
CMIN	1450.527	
DF	350	
CMIN/DF	4.144	
CFI	0.921	> =.90
RMSEA	0.035	< =.05

Results from the Measurement Component

Regarding the measurement component for this model, Table 10 reports information about the regression weights, both standardized and unstandardized, and the significance level of indicators for the four latent variables. An examination of the fit statistics indicates that the four latent variables in this model are measured well by their indicators. Specifically, the first latent variable of access to health care services has six indicators (q9, q19, q25, q27, q29, q32) and factor loadings for all the six indicators are statistically positive and significant. The second latent variable of utilization of health care services includes three indicators (q31, q30, q21). As shown in Table 10, factor loadings for the three indicators are all positive and statistically significant, indicating that the three indicators are valid measures of the latent variable of utilization of health care services. The third latent variable of satisfaction with health care services consists of eight indicators: q34, q35, q36, q38, q39, q41, q42, and q43. The fit statistics in Table 10 confirm that the eight indicators constitute valid measures of this latent variable, with factor loadings of the eight indicators being all positive and statistically significant. The fourth latent variable of trust in primary care providers had five indicators: q12, q13, q15, q16, and q17. As stated previously, to achieve the measurement consistency among the five indicators of trust in primary care providers, q13 and q17 were recoded so that a higher value from each of the two indicators indicating a higher level of trust in patient's primary care providers.

The confirmatory factor analysis for this model of the overall sample of adult enrollees was conducted based on the two recoded indicators, as well as the other three indicators of trust in primary care providers. As shown in Table 10, factor loadings for

the five indicators are all positive and statistically significant, indicating that these five indicators are valid measures of the latent variable of trust in primary care providers.

Table 10: Fit Statistics for Indicators of the Four Latent Variables in the Structural Equation Model for the Overall Sample of Adult Enrollees

Parameter		Estimate	Standardized	Unstandardized	S. E	C.R.	P
q9	<---	Access	.424	1.000			
q19	<---	Access	.359	.921	.095	9.695	***
q25	<---	Access	.681	2.123	.146	14.525	***
q27	<---	Access	.673	2.112	.151	13.972	***
q29	<---	Access	.584	1.736	.126	13.759	***
q32	<---	Access	.552	1.037	.073	14.155	***
q21	<---	Utilization	.501	.466	.047	9.941	***
q30	<---	Utilization	.301	.208	.022	9.339	***
q31	<---	Utilization	.921	1.000			
q36	<---	Satisfaction	.798	.994	.030	32.752	***
q35	<---	Satisfaction	.668	.890	.032	27.980	***
q34	<---	Satisfaction	.545	.575	.025	23.055	***
q38	<---	Satisfaction	.565	.758	.032	23.772	***
q39	<---	Satisfaction	.753	.925	.030	31.123	***
q41	<---	Satisfaction	.550	.719	.038	18.928	***
q42	<---	Satisfaction	.645	.625	.028	22.558	***
q43	<---	Satisfaction	.691	1.000			
q17	<---	Trust	.648	1.000			
q13	<---	Trust	.612	.865	.033	26.441	***
q15	<---	Trust	.392	.720	.046	15.579	***
q12	<---	Trust	.423	.926	.055	16.838	***
q16	<---	Trust	.540	1.024	.051	20.261	***

*P<.05; **P<.01; ***P<.001.

Results from the Structural Component

The structural component of the structural equation model for the overall sample of adult enrollees from the North Carolina Medicaid managed care program assesses relationships between the latent variables and the observed variables. To simplify interpretation, those relationships are organized into four categories: nine relationships focusing on the dependent variable of self-reported health status and its predictors, seven relationships focusing on the primary independent variable of race, four relationships

focusing on socioeconomic status, and eight relationships relating to other variables in this model. The following section describes and compares those relationships to the hypothesized relationships.

Relationships between Self-Reported Health Status and Its Predictors

In this model, self-reported health status is the dependent variable. Self-reported health status is hypothesized to be a function of access to health care services, utilization of health care services, trust in primary care providers, satisfaction with health care services, age, gender, race, region, and urbanicity. As a whole, this structural equation model for the overall sample of adult enrollees from the North Carolina Medicaid managed care program explained about 31.7% of the total variance in health status.

Table 11: Relationships between Self-Reported Health Status and its Predictors for Overall Sample of Adult Enrollees

Parameter Estimate			Standardized	Unstandardized	S. E	C.R.	P
Health Status	<---	Education	.140	.043	.005	8.152	***
Health Status	<---	Utilization	-.241	-.041	.005	-8.335	***
Health Status	<---	Gender	.072	.053	.012	4.241	***
Health Status	<---	Access	.109	.124	.086	1.450	.147
Health Status	<---	Race	.100	.064	.011	5.553	***
Health Status	<---	Satisfaction	.051	.029	.040	.709	.478
Health Status	<---	Urbanicity	.023	.015	.011	1.337	.181
Health Status	<---	Region	-.006	-.003	.007	-.361	.718
Health Status	<---	Age	-.360	-.083	.004	-20.074	***

*P<.05; **P<.01; ***P<.001.

Table 11 reports the fit statistics and path coefficients, both standardized and unstandardized, for the relationships between self-reported health status and its nine predictors. The standard regression coefficients included in this table demonstrate the change in the dependent variable for each unit of change in the independent variable, thus allowing a relative assessment of the importance of each independent variable in

predicting self-reported health status for the overall sample of adult enrollees from the North Carolina Medicaid managed care program. The following section describes and assesses the nine relationships about self-reported health status and its predictors in reference to the study hypotheses:

- $H_{1.1:}$ Race is related to health status;
    - *The structural equation model for the overall sample of adult enrollees demonstrates a significant and positive relationship between race and self-reported health status (β=.100), with non-Hispanic black adults in this model reporting better health status relative to non-Hispanic white adults;*
- $H_{1.2:}$ Age is negatively related to health status, with older adult respondents reporting worse health status;
    - *As expected, age in this model is a significant and negative predictor of self-reported health status(β=-.360), with older adult enrollees in this model reporting worse health status;*
- $H_{1.3:}$ Gender is related to health status;
    - *The structural equation model for the overall sample of adult enrollees demonstrates a significant and positive relationship between gender and self-reported health status (β=.072), with female adult enrollees in this model reporting better health than relative to male adult enrollees;*
- $H_{1.4:}$ Socioeconomic status is positively related to health status, with adult respondents having higher socioeconomic status reporting better health status;

  - *Consistent with the study hypothesis, the structural equation model for the overall sample of adult enrollees demonstrates a significant and positive relationship between socioeconomic status and self-reported health status(β=.140), with better-educated adult enrollees reporting better health;*

- $H_{1.5:}$ Satisfaction with health care services is positively related to health status, with adult enrollees who are more satisfied with health care services reporting better health status;
  - *Inconsistent with the study hypothesis, satisfaction with health care services is not a significant variable in predicting the subjective assessment of health status for adult enrollees in this model;*
- $H_{1.6:}$ Access to health care services is positively related to health status, with adult respondents reporting less difficulty in accessing health care services reporting better health status;
  - *Surprisingly, the structural equation model for the overall sample of adult enrollees demonstrates that access to health care services is not significantly related to self-reported health status for adult enrollees in this model;*
- $H_{1.7:}$ Region is related to health status;
  - *Inconsistent with the study hypothesis, region in this model is not a significant predictor of self-reported health status;*
- $H_{1.8:}$ Urbanicity is negatively related to health status, with adult respondents living in urban areas reporting worse health status;

- *Similar to region, urbanicity in this model is not a significant predictor of self-reported health status for adult enrollees;*

- $H_{1.9:}$ Utilization of health care services is positively related to health status, with adult respondents utilizing more of heath care services reporting better health status;
  - *Contrary to the study hypothesis, the structural equation model for the overall sample of adult enrollees demonstrates that utilization of health care services is a significant but negative predictor of self-reported health status for adult enrollees in this model(β=-.241);*

To summarize, five out of the nine independent variables are significant predictors of self-reported health status for the North Carolina Medicaid managed care adult enrollees. Among the five significant predictors, age has the highest absolute value of standardized regression coefficient (β=-.360), indicating that it has the greatest impact upon the dependent variable of self-reported health status. Utilization of health care services has the second largest but negative impact on self-reported health status (β=-.241), indicating that adult enrollees from the North Carolina Medicaid managed care with worse health were less likely to utilize health care services. Education has the third largest impact upon self-reported health status (β=.140), with adult enrollees achieving higher education reporting better health. Race is another significant predictor of self-reported health status, with being a non-Hispanic black adult predicting better health than being a non-Hispanic white adult. In addition, gender is significantly related to self-reported health status, with being a female adult predicting better health than being a male adult. Surprisingly, the two latent variables of satisfaction with health care services

and access to health care services, as well as the two context variables of region and urbanicity, are not significant predictors of self-reported health status for the adult enrollees in this model.

Hypotheses Related to Race and Ethnicity

Table 12 displays findings of the seven relationships that are related to the primary independent variable of race. Those seven relationships are presented below:

- $H_{2.1:}$ Race is related to socioeconomic status, with non-Hispanic black adults reporting lower socioeconomic status relative to non-Hispanic white adults;
    - *Different from the study hypothesis, the structural equation model for the overall adult enrollees does not demonstrate a significant relationship between race and socioeconomic status;*

Table 12: Relationships Related to Race in the Structural Equation Model for the Overall Sample of Adult Enrollees

Covariances			Standardized	Unstandardized	S. E	C.R.	P
Race and Ethnicity	<-->	Education	0.003	0.002	0.01	0.168	0.867
Race and Ethnicity	<-->	Access	-0.053	-0.007	0.003	-2.091	*
Race and Ethnicity	<-->	Utilization	-0.147	-0.136	0.02	-6.978	***
Race and Ethnicity	<-->	Urbanicity	0.067	0.016	0.005	3.445	***
Race and Ethnicity	<-->	Trust	-0.083	-0.026	0.008	-3.465	***
Race and Ethnicity	<-->	Region	0.214	0.079	0.007	10.658	***
Race and Ethnicity	<-->	Satisfaction	-0.014	-0.004	0.006	-0.653	0.514

    - *P<.05; **P<.01; ***P<.001.

- $H_{2.2:}$ Race is related to access to health care, with non-Hispanic black adults reporting greater difficulty in accessing heath care services relative to non-Hispanic white adults;
    - *Consistent with the study hypothesis, the structural equation model for the overall sample of adult enrollees demonstrates a significant and*

negative relationship (β=-.053) between race and access to health care services, indicating that non-Hispanic black adults encountered more problem than non-Hispanic white adults in accessing health care services provided by the North Carolina Medicaid managed care program;

- $H_{2.3:}$ Race is related to satisfaction with health care services, with non-Hispanic black adults being less satisfied with health care services relative to non-Hispanic white adults;
    - *Inconsistent with the study hypothesis, non-Hispanic black adults in this model did not differ significantly from non-Hispanic white adults in reporting their satisfaction with health care services;*
- $H_{2.4:}$ Race is related to trust in primary health providers, with non-Hispanic black adults reporting a higher level of mistrust in their primary care providers relative to non-Hispanic white adults;
    - *Consistent with the study hypothesis, the structural equation model for the overall sample of adult enrollees demonstrates a significant and negative relationship between race and trust in primary care providers (β=-0.083),indicating that non-Hispanic black adults were less likely than non-Hispanic white adults to trust their primary care providers;*
- $H_{2.5:}$ Race is related to urbanicity, with non-Hispanic black adults being more likely than non-Hispanic white adults to reside in urban areas;

- *Consistent with the study hypothesis, non-Hispanic black adults in this model were more likely than non-Hispanic white adults to report living in the urban areas of North Carolina(β=0.067);*

- $H_{2.6:}$ Race is significantly related to region;
  - *Consistent with the study hypothesis, the structural equation model for the overall sample of adult enrollees demonstrates a significant relationship between race and region (β=0.214);*
- $H_{2.7:}$ Race is related to utilization of health care services, with non-Hispanic black adults being less often than non-Hispanic white adults to utilize health care services;
  - *Consistent with the study hypothesis, the structural equation model for the overall adult enrollees shows that non-Hispanic black adults were less likely than non-Hispanic white adults to utilize health care services (β=-.147);*

Hypotheses Related to Socioeconomic Status

Socioeconomic status in this model was measured by educational attainment. Table 13 displays findings of the four relationships that are related to socioeconomic status. The four relationships are presented below:

Table 13: Relationships Related to Socioeconomic Status in the Structural Equation Model for the Overall Sample of Adult Enrollees

Covariances			Standardized	Unstandardized	S. E	C.R.	P
Education	<-->	Utilization	-0.052	-0.099	0.041	-2.414	*
Education	<-->	Trust	0.053	0.034	0.013	2.616	**
Education	<-->	Access	-0.026	-0.007	0.006	-1.349	0.177
Education	<-->	Age	-0.196	-0.274	0.028	-9.739	***

*P<.05; **P<.01; ***P<.001.

- $H_{3.1:}$ Socioeconomic status is negatively related to access to health care, with adult respondents having higher socioeconomic status reporting less difficulty in accessing health care services;
    - *Inconsistent with the study hypothesis, the structural equation model for the overall sample of adult enrollees does not demonstrate a significant relationship between socioeconomic status and access to health care services;*
- $H_{3.2:}$ Socioeconomic status is positively related to trust in primary care providers, with adult respondents having higher socioeconomic status reporting a higher level of trust in their primary care providers;
    - *As expected, the structural equation model for the overall sample of adult enrollees demonstrates a significant and positive relationship between socioeconomic status and trust in primary care providers(β=0.053), with adult respondents having a higher educational attainment reporting a higher level of trust in their primary care providers;*
- $H_{3.3:}$ Socioeconomic status is negatively related to utilization of health care services, with adult respondents having higher socioeconomic status being less often to utilize health care services;
    - *Consistent with the study hypothesis, adults enrollees with higher education used less of the health care services provided by the North Carolina Medicaid managed care program(β=-.052);*
- $H_{3.4:}$ Socioeconomic status is related to age;

- *The structural equation model for the overall sample of adult enrollees demonstrates a significant but negative relationship (β=-.196)between socioeconomic status and age, with older adults in this model reporting a lower level of educational attainment;*

Hypotheses Related to Other Variables

Table 14 presents findings of the eight relationships that are related to other variables in this model. Those eight relationships are described below in comparison to the study hypotheses:

Table 14: Relationships Related to Other Variables in the Structural Equation Model for the Overall Sample of Adult Enrollees

Covariances			Standardized	Unstandardized	S. E	C.R.	P
Trust	<-->	Access	0.786	0.140	0.011	13.173	***
Trust	<-->	Satisfaction	0.813	0.294	0.015	19.569	***
Region	<-->	Access	0.02	0.004	0.004	1.005	0.315
Urbanicity	<-->	Access	-0.066	-0.009	0.003	-3.292	***
Region	<-->	Urbanicity	0.071	0.026	0.007	3.573	***
Gender	<-->	Utilization	0.114	0.092	0.017	5.424	***
Age	<-->	Utilization	0.21	0.538	0.055	9.746	***
Access	<-->	Satisfaction	0.875	0.137	0.01	13.856	***

*P<.05; **P<.01; ***P<.001.

- $H_{4.1:}$ Trust in primary care providers is positively related to access to health care services, with adults having a higher level of trust in their primary care providers reporting less difficulty in accessing health care services;
    - *The structural equation model for the overall sample of adult enrollees confirms this study hypothesis by demonstrating a positive and significant relationship between trust in primary care providers and access to health care services (β=.786);*

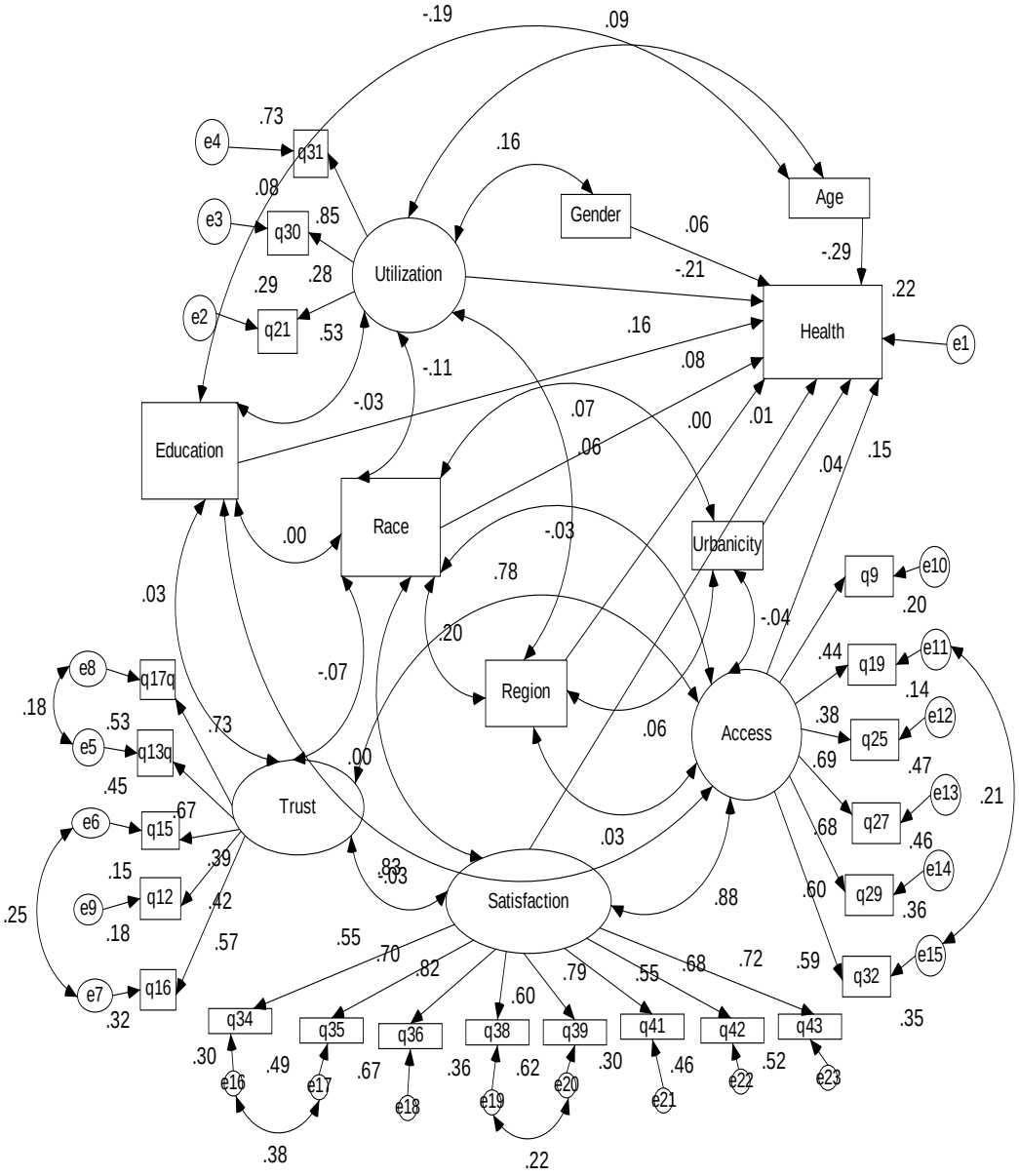
- $H_{4.2:}$ Trust in primary care providers is positively related to satisfaction with health care services, with adult respondents having a higher level of trust in their primary care providers being more satisfied with health care services;
    - *As expected, the structural model demonstrates a significant and positive relationship between trust in primary care providers and satisfaction with health care services (β=-.813), suggesting that adult enrollees who reported a higher level of trust in their primary care providers were more satisfied with the health care services that they received from the North Carolina Medicaid managed care program;*
- $H_{4.3:}$ Region is related to access to health care services;
    - *Different from the study hypothesis, region in this model does not significantly influence adult enrollees' access to health care services;*
- $H_{4.4:}$ Urbanicity is negatively related to access to health care services, with adults living in urban areas reporting greater difficulty in accessing health care services relative to adults living in non-urban areas;
    - *Consistent with the study hypothesis, urbanicity in this model is negatively related to access to health care services (β=-.066), with adult enrollees living in urban areas reporting more difficulty than adults in non-urban areas in accessing health care services;*
- $H_{4.5:}$ Region is related to urbanicity;
    - *Not surprisingly, the structural equation model for the overall sample of adult enrollees suggests a significant and positive relationship between the two context variables of region and urbanicity(β=.071);*

- $H_{4.6:}$ Gender is related to utilization of health care services;
    - *Consistent with the study hypothesis, gender in this model is significantly related to utilization of health care services, with female adult enrollees from the North Carolina Medicaid managed care program utilizing more of the health care services relative to male adult enrollees (β=.114);*
- $H_{4.7:}$ Access to health care services is positively related to satisfaction with health care services, with adults reporting less difficulty in accessing health care services being more satisfied with health care services;
    - *Consistent with the study hypothesis, the structural equation model for the overall sample of adult enrollees demonstrates a significant and positive relationship between access to health care services and satisfaction with health care services (β=.875);*
- $H_{4.8:}$ Age is related to utilization of health care services, with older adults being more often to utilize health care services.
    - *Consistent with the study hypothesis, older adults in this model utilized more of the health care services covered by the North Carolina Medicaid managed care program (β=.210).*

Model-2 for the Adult Enrollees with Chronic Conditions

The second structural equation model explores the racial disparities in self-reported health among the North Carolina Medicaid managed care adult beneficiaries with chronic conditions.

Figure 11: A Structural Equation Model Estimating Health Status for the North Carolina Medicaid Managed Care Adult Enrollees with Chronic Conditions
(Standardized Solution: n=1636)



With 29 observed variables, there are 1636 observations available to estimate the 114 parameters of this model, among which 27 are regression weights, 25 are covariances, 33 are variances, 6 are means, and 23 are intercepts. Figure 11 demonstrates that this model is also over-identified, with the degree of freedom equaling to 350. This model explained 22% of the variance in self-reported health status. For convenience, this graph reports only the standardized estimates of relationships in this model.

Table 15: Model Fit Indices of the Structural Equation Model of the Adult Enrollees with Chronic Conditions

Indicator	Study Value	Recommended Value
CMIN	1074.700	
DF	350	
CMIN/DF	3.071	
CFI	0.930	> =.90
RMSEA	0.036	< =.05

Table 15 lists values of several commonly used model fit indices for this model of adult enrollees who reported to be chronically ill. Not surprisingly, since this model has a sample size of 1636, the chi-square value for this model was statistically significant ($X^2_{(degree\ of\ freedom\ =\ 350)}$ =1074.700, p<.001), indicating that the reproduced model-implied variances and covariances are not similar to the sample variance and covariance matrix. However, the CFI value for this model is 0.93, and it is above the recommended value of 0.90 (Bentler, 1990). In addition, the RMSEA value for this model is 0.036, and this value is below the acceptable level of 0.05 (Jöreskog and Sörbom, 1996). Therefore, this hypothesized model for examining the racial disparities in health among the North Carolina Medicaid managed care adult enrollees with chronic conditions fits adequately with the sample data.

Results from the Measurement Component

This model includes four latent variables as the independent variables. To measure them, this model uses the confirmatory factor analysis approach to determine whether the selected indicators are valid measures of the four latent variables.

Table 16: Fit Statistics for Indicators of the Four Latent Variables in the Structural Equation Model for the Adult Enrollees with Chronic Conditions

Parameter		Estimate	Standardized	Unstandardized	S. E	C.R.	P
q9	<---	Access	.445	1.000			
q19	<---	Access	.378	.873	.097	9.014	***
q25	<---	Access	.688	1.953	.155	12.604	***
q27	<---	Access	.679	1.906	.156	12.205	***
q29	<---	Access	.602	1.554	.128	12.112	***
q32	<---	Access	.594	1.057	.085	12.504	***
q21	<---	Utilization	.534	.576	.073	7.914	***
q30	<---	Utilization	.284	.234	.034	6.968	***
q31	<---	Utilization	.853	1.000			
q36	<---	Satisfaction	.819	1.013	.033	30.298	***
q35	<---	Satisfaction	.701	.912	.035	25.944	***
q34	<---	Satisfaction	.545	.558	.028	20.072	***
q38	<---	Satisfaction	.599	.766	.035	21.973	***
q39	<---	Satisfaction	.787	.945	.032	29.096	***
q41	<---	Satisfaction	.551	.700	.040	17.374	***
q42	<---	Satisfaction	.676	.652	.030	21.891	***
q43	<---	Satisfaction	.724	1.000			
q17	<---	Trust	.729	1.000			
q13	<---	Trust	.668	.839	.033	25.331	***
q15	<---	Trust	.385	.547	.041	13.236	***
q12	<---	Trust	.419	.784	.054	14.478	***
q16	<---	Trust	.567	.884	.047	18.871	***

*P<.05; **P<.01; ***P<.001.

Table 16 displays information about the regression weights, both standardized and unstandardized, and the significance level of indicators for the four latent variables. Consistent with the structural equation model for the overall sample of adult enrollees, the measurement component in the model of the adult enrollees with chronic conditions

confirms the measurement validity for the four latent variables, with all indicators of the four latent variables being positive and statistically significant.

Results from the Structural Component

The structural component of the structural equation model for adult enrollees with chronic conditions evaluates relationships between the latent variables and the observed variables. To simplify the interpretation, the relationships are organized into four categories: the first category having nine relationships that focus on the dependent variable of self-reported health status and its predictors, the second category having seven relationships that are related to race, the third category having four relationships that are related to socioeconomic status, and the fourth category having eight relationships that are related to other variables in this study. The following section describes those relationships in reference to the study hypotheses.

Relationships between Self-Reported Health Status and Its Predictors

Self-reported health status is the dependent variable in this model, and this model hypothesizes that self-reported health status is a function of access to health care services, utilization of health care services, trust in primary care providers, and satisfaction with health care services, as well as age, gender, race and ethnicity, region, and urbanicity. The structural equation model for the adult enrollees with chronic conditions as a whole explained about 22% of the total variance in self-reported health status. The fit statistics and path coefficients, both standardized and unstandardized, for those relationships are reported in Table 17.

Table 17: Relationships between Self-Reported Health Status and its Predictors for Adult Enrollees with Chronic Conditions

Parameter Estimate			Standardized	Unstandardized	S. E	C.R.	P
Health Status	<---	Education	.160	.044	.006	6.979	***
Health Status	<---	Utilization	-.211	-.038	.006	-5.961	***
Health Status	<---	Gender	.055	.037	.015	2.430	*
Health Status	<---	Access	.153	.145	.091	1.590	.112
Health Status	<---	Race	.078	.048	.014	3.326	***
Health Status	<---	Satisfaction	.010	.005	.047	.110	.913
Health Status	<---	Urbanicity	.038	.023	.014	1.681	.093
Health Status	<---	Region	.002	.001	.009	.101	.919
Health Status	<---	Age	-.292	-.068	.005	-12.801	***

*P<.05; **P<.01; ***P<.001.

The nine relationships between the dependent variable of self-reported health status and its predictors are presented blew in comparison to their respective hypothesis:

- $H_{1.1:}$ Race is related to health status;
    - *The structural equation model for the adult enrollees with chronic conditions demonstrates a significant but positive relationship between race and self-reported health status (β=.078), with non-Hispanic black adults in this model reporting better health status relative to non-Hispanic white adults;*
- $H_{1.2:}$ Age is negatively related to health status, with older adult respondents reporting worse health status;
    - *As expected, age is a significant predictor of self-reported health status(β=-.292), with older adult enrollees in this model reporting worse health status;*
- $H_{1.3:}$ Gender is related to health status;
    - *The structural equation model for the adult enrollees with chronic conditions demonstrates a significant and positive relationship*

between gender and self-reported health status (β=.055), with female adult enrollees in this model reporting better health relative to male adult enrollees;

- $H_{1.4:}$ Socioeconomic status is positively related to health status, with adult respondents having higher socioeconomic status reporting better health status;
    - *Consistent with the study hypothesis, the structural equation model for the adult enrollees with chronic conditions demonstrates a significant and positive relationship between socioeconomic status and self-reported health status(β=.160), with adult enrollees receiving higher education reporting better health;*
- $H_{1.5:}$ Satisfaction with health care services is positively related to health status, with adult enrollees who are more satisfied with health care services reporting better health status;
    - *Inconsistent with the study hypothesis, satisfaction with health care services is not a significant variable in predicting the subjective assessment of health status for the adult enrollees with chronic conditions;*
- $H_{1.6:}$ Access to health care services is positively related to health status, with adult respondents reporting less difficulty in accessing health care services reporting better health status;
    - *Surprisingly, the structural equation model for the adult enrollees with chronic conditions does not demonstrate a significant relationship between access to health care services and self-reported health status;*

- $H_{1.7:}$ Region is related to health status;
    - *Inconsistent with the study hypothesis, region in this model is not significantly related to the dependent variable of self-reported health status;*
- $H_{1.8:}$ Urbanicity is negatively related to health status, with adult respondents living in urban areas reporting worse health status;
    - *Similar to region, urbanicity in this model is not a significant predictor of self-reported health status for the adult enrollees with chronic conditions;*
- $H_{1.9:}$ Utilization of health care services is positively related to health status, with adult respondents utilizing more of heath care services reporting better health status;
    - *Contrary to the study hypothesis, the structural equation model for the adult enrollees with chronic conditions demonstrates that utilization of health care services is a significant but negative predictor of self-reported health status for adult enrollees in this model(β=-.211);*

To summarize, five out of the nine independent variables are significant predictors of self-reported health status for the North Carolina Medicaid managed care adult enrollees with chronic conditions. Among the five significant predictors, age has the highest absolute value of standardized regression coefficient (β=-.292), indicating that it has the largest impact upon the dependent variable of self-reported health status. Utilization of health care services has the second largest impact on self-reported health status (β=-.211). Then comes with education (β=.160), with adult enrollees achieving

higher education reporting better health status. Race is another significant predictor of self-reported health status, with being a non-Hispanic black adult predicting better health than being a non-Hispanic white adult. In addition, gender is significantly related to health status, with being a female adult predicting better health than being a male adult. Surprisingly, the two latent variables of satisfaction with health care services and access to health care services, as well as the two context variables of region and urbanicity, are not statistically related o the dependent variable of self-reported health status.

Hypotheses Related to Race and Ethnicity

Table 18 displays findings of the seven relationships related to the primary independent variable of race. The relationships are presented below in reference to the study hypotheses:

Table 18: Relationships Related to Race in the Structural Equation Model for the Adult Enrollees with Chronic Conditions

Covariances			Standardized	Unstandardized	S. E	C.R.	P
Race and Ethnicity	<-->	Education	-.003	-.002	.012	-.140	.888
Race and Ethnicity	<-->	Access	-.027	-.004	.004	-.898	.369
Race and Ethnicity	<-->	Utilization	-.109	-.085	.022	-3.854	***
Race and Ethnicity	<-->	Urbanicity	.072	.017	.006	2.911	**
Race and Ethnicity	<-->	Trust	-.068	-.024	.010	-2.374	*
Race and Ethnicity	<-->	Region	.202	.073	.009	8.036	***
Race and Ethnicity	<-->	Satisfaction	-.004	-.001	.007	-.143	.886

*P<.05; **P<.01; ***P<.001.

- $H_{2.1:}$ Race is related to socioeconomic status, with non-Hispanic black adults reporting lower socioeconomic status relative to non-Hispanic white adults;
    - *Inconsistent with the study hypothesis, the structural equation model for the adult enrollees with chronic conditions does not demonstrate a significant relationship between race and socioeconomic status;*

- $H_{2.2:}$ Race is related to access to health care, with non-Hispanic black adults reporting greater difficulty in accessing heath care services relative to non-Hispanic white adults;
    - *Inconsistent with the study hypothesis, the structural equation model for the adult enrollees with chronic conditions does not demonstrate a significant relationship (β=-.053) between race and access to health care services;*
- $H_{2.3:}$ Race is related to satisfaction with health care services, with non-Hispanic black adults being less satisfied with health care services relative to non-Hispanic white adults;
    - *Inconsistent with the study hypothesis, non-Hispanic black adults in this model did not differ significantly from non-Hispanic white adults in reporting their satisfaction with health care services;*
- $H_{2.4:}$ Race is related to trust in primary health providers, with non-Hispanic black adults reporting a higher level of mistrust in their primary care providers relative to non-Hispanic white adults;
    - *Consistent with the study hypothesis, the structural equation model for the adult enrollees with chronic conditions demonstrates a significant and negative relationship between race and the latent variable of trust in primary health providers (β=-.068),indicating that non-Hispanic black adults in this model showed more mistrust in their primary care providers than did non-Hispanic white adults;*

- $H_{2.5:}$ Race is related to urbanicity, with non-Hispanic black adults being more likely than non-Hispanic white adults to reside in urban areas;
    - *Consistent with the study hypothesis, non-Hispanic black adults in this model were more likely than non-Hispanic white adults to report living in urban areas(β=0.072);*
- $H_{2.6:}$ Race and ethnicity is related to region;
    - *Consistent with the study hypothesis, the structural equation model for the adult enrollees with chronic conditions demonstrates a significant relationship between race and region (β=0.202);*
- $H_{2.7:}$ Race is related to utilization of health care services, with non-Hispanic black adults being less often than non-Hispanic white adults to utilize health care services;
    - *Contrary to the study hypothesis, the structural equation model for the adult enrollees with chronic conditions shows that relative to non-Hispanic white adults, non-Hispanic black adults in this model utilized less of health care services that were provided by the North Carolina Medicaid managed care program (β=-.109);*

Hypotheses Related to Socioeconomic Status

Socioeconomic status in this model is measured by educational attainment. Table 19 provides findings about the four relationships that are related to socioeconomic status. The four relationships are presented below in comparison to the corresponding study hypotheses:

Table 19: Relationships Related to Socioeconomic Status in the Structural Equation Model for the Adult Enrollees with Chronic Conditions

Covariances			Standardized	Unstandardized	S. E	C.R.	P
Education	<-->	Utilization	-.028	-.049	.049	-.990	.322
Education	<-->	Trust	.033	.026	.018	1.457	.145
Education	<-->	Access	-.028	-.009	.007	-1.243	.214
Education	<-->	Age	-.186	-.252	.034	-7.395	***

*P<.05; **P<.01; ***P<.001.

- $H_{3.1:}$ Socioeconomic status is negatively related to access to health care, with adult respondents having higher socioeconomic status reporting less difficulty in accessing health care services;
    - *Inconsistent to the study hypothesis, the structural equation model for the adult enrollees with chronic conditions does not demonstrate a significant relationship between socioeconomic status and access to health care services;*
- $H_{3.2:}$ Socioeconomic status is positively related to trust in primary care providers, with adult respondents having higher socioeconomic status reporting a higher level of trust in their primary care providers;
    - *Inconsistent with the study hypothesis, the structural equation model for the adult enrollees with chronic conditions does not demonstrate a significant between socioeconomic status and trust in primary care providers;*
- $H_{3.3:}$ Socioeconomic status is negatively related to utilization of health care services, with adult respondents having higher socioeconomic status being less often to utilize health care services;

- *Inconsistent with the study hypothesis, this model shows that adults enrollees with higher education did not differ significantly in utilizing health care services relative to adult enrollees with lower education;*

- $H_{3.4:}$ Socioeconomic status is related to age;
  - *Consistent with the study hypothesis, the structural equation model for the adult enrollees with chronic conditions demonstrates a significant but negative relationship (β=-.186)between socioeconomic status and age, with older adults in this model reporting a lower level of educational attainment;*

Hypotheses Related to Other Variables

Table 20: Relationships Related to Other Variables in the Structural Equation Model for the Adult Enrollees with Chronic Conditions

Covariances			Standardized	Unstandardized	S. E	C.R.	P
Trust	<-->	Access	.775	.179	.016	11.445	***
Trust	<-->	Satisfaction	.827	.355	.020	17.824	***
Region	<-->	Access	.025	.006	.005	1.140	.254
Urbanicity	<-->	Access	-.043	-.006	.003	-1.898	.058
Region	<-->	Urbanicity	.063	.023	.009	2.538	**
Gender	<-->	Utilization	.161	.115	.020	5.605	***
Age	<-->	Utilization	.090	.187	.058	3.194	**
Access	<-->	Satisfaction	.884	.160	.013	11.934	***

*P<.05; **P<.01; ***P<.001.

Table 20 details findings of the eight relationships that are related to other variables in this model. The eight relationships are presented below in comparison to the study hypotheses:

- $H_{4.1:}$ Trust in primary care providers is positively related to access to health care services, with adults having a higher level of trust in their primary care providers reporting less difficulty in accessing health care services;

- *Consistent with the study hypothesis, the structural equation model for the adult enrollees with chronic conditions demonstrates that trust in primary care providers is positively related to perception of difficulty in accessing health care services (β=.775);*

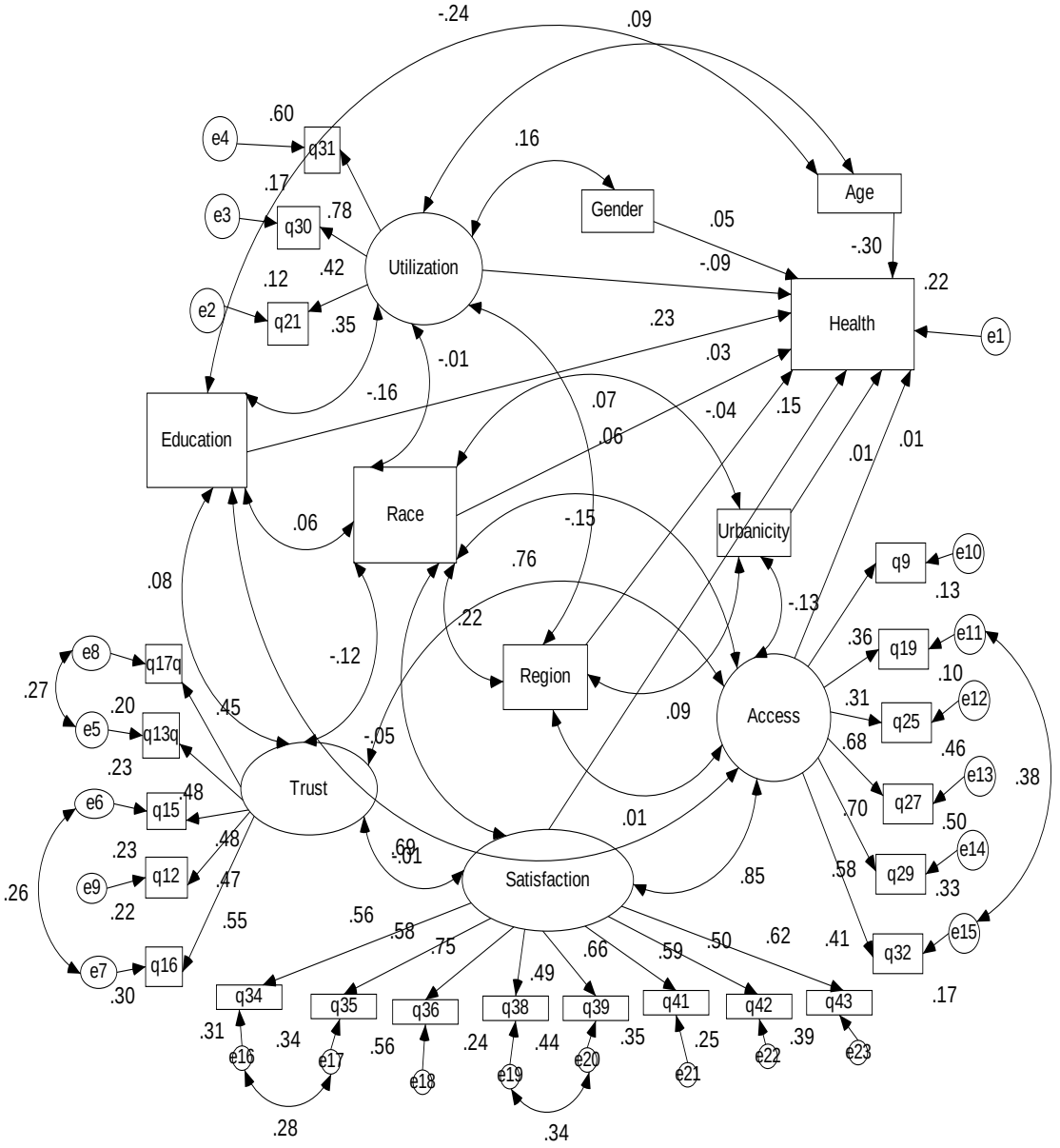
- $H_{4.2:}$ Trust in primary care providers is positively related to satisfaction with health care services, with adult respondents having a higher level of trust in their primary care providers being more satisfied with health care services;
  - *As expected, the structural model for the adult enrollees with chronic conditions demonstrates a significant and positive relationship between trust in primary care providers and satisfaction with health care services (β=.827), indicating that adult enrollees having a higher level of trust in their primary care providers were more satisfied with health care services that they received from the North Carolina Medicaid managed care program;*
- $H_{4.3:}$ Region is related to access to health care services;
  - *Inconsistent with the study hypothesis, region in this model does not significantly affect adult enrollees' perception of difficulty in accessing health care services;*
- $H_{4.4:}$ Urbanicity is negatively related to access to health care services, with adults living in urban areas reporting greater difficulty in accessing health care services relative to adults living in non-urban areas;
  - *Inconsistent with the study hypothesis, urbanicity in this model is not significantly related to access to health care services;*

- $H_{4.5:}$ Region is related to urbanicity;
    - *Consistent with the study hypothesis, the structural equation model for the adult enrollees with chronic conditions suggests a significant and positive relationship between the two context variables (β=.071);*
- $H_{4.6:}$ Gender is related to utilization of health care services;
    - *Consistent with the study hypothesis, gender in this model is significantly related to utilization of health care services, with female adult enrollees in this model utilizing more of health care services relative to male adult enrollees (β=.161);*
- $H_{4.7:}$ Access to health care services is positively related to satisfaction with health care services, with adults reporting less difficulty in accessing health care services being more satisfied with health care services;
    - *Consistent with the study hypothesis, the structural equation model for the adult enrollees with chronic conditions demonstrates a significant and positive relationship between access to health care services and satisfaction with health care services (β=.884);*
- $H_{4.8:}$ Age is related to utilization of health care services, with older adults being more often to utilize health care services.
    - *Consistent with the study hypothesis, relative to younger adults, older adults in this model utilized more of health care services that were provided by the North Carolina Medicaid managed care program.*

Model-3 for the Adult Enrollees without Chronic Conditions

The third structural equation model examines the racial disparities in self-reported health among North Carolina Medicaid managed care adult beneficiaries without reporting chronic conditions.

Figure 12: A Structural Equation Model Estimating Health Status for the North Carolina Medicaid Managed Care Adult Enrollees without Chronic Conditions
(Standardized Solution: n=932)



With 29 observed variables, there are 932 observations available to estimate the 114 parameters of this model, among which 27 are regression weights, 25 are covariances, 33 are variances, 6 are means, and 23 are intercepts. Consistent with Model-1 and Model-2, Figure 12 demonstrates that this model is over-identified, with the degree of freedom equaling to 350. As a whole, this model explained 22% of the variance in self-reported health status. To save space, this graph reports only the standardized estimates of relationships in this model.

Table 21: Model Fit Indices of the Hypothesized Structural Equation Model for the Adult Enrollees without Chronic Conditions

Indicator	Study Value	Recommended Value
CMIN	742.616	
DF	350	
CMIN/DF	2.122	
CFI	.880	> =.90
RMSEA	0.035	< =.05

Table 21 lists values of several commonly used model fit indices of this model of the adult enrollees without chronic conditions. As expected, the chi-square value for this model was statistically significant ($X^2_{(degree\ of\ freedom\ =\ 350)}$ =742.616, p<.001), indicating that the reproduced model-implied variances and covariances might represent the sample variance and covariance matrix. However, the CFI value of 0.88 and the RMSEA value of 0.035 suggest that this model fits fairly well with the sample data.

Results from the Measurement Component

The structural equation model used confirmatory factor analysis to determine the measurement validity of the four latent variables that were included in this study as four important independent variables. The following Table 22 reports information about the regression weights, both standardized and unstandardized, and the significance level of

indicators for the four latent variables. An examination of information in Table 22 indicates that the four latent variables (utilization of health care services, trust in primary care providers, access to health care services, and satisfaction with health care services) were all validly measured by the selected indicators in this model of the adult enrollees without chronic conditions.

Table 22: Fit Statistics for Indicators of the Four Latent Variables in the Structural Equation Model for the Adult Enrollees without Chronic Conditions

Parameter		Estimate	Standardized	Unstandardized	S. E	C.R.	P
q9	<---	Access	.359	1.000			
q19	<---	Access	.314	1.066	.281	3.791	***
q25	<---	Access	.676	2.784	.399	6.979	***
q27	<---	Access	.704	3.111	.460	6.767	***
q29	<---	Access	.578	2.562	.391	6.552	***
q32	<---	Access	.413	.899	.145	6.203	***
q21	<---	Utilization	.352	.356	.114	3.125	**
q30	<---	Utilization	.418	.347	.087	4.004	***
q31	<---	Utilization	.776	1.000			
q36	<---	Satisfaction	.745	.934	.065	14.337	***
q35	<---	Satisfaction	.582	.819	.068	12.007	***
q34	<---	Satisfaction	.555	.627	.054	11.538	***
q38	<---	Satisfaction	.493	.733	.070	10.417	***
q39	<---	Satisfaction	.662	.858	.065	13.246	***
q41	<---	Satisfaction	.592	.841	.098	8.628	***
q42	<---	Satisfaction	.504	.477	.066	7.240	***
q43	<---	Satisfaction	.624	1.000			
q17	<---	Trust	.449	1.000			
q13	<---	Trust	.482	.993	.098	10.086	***
q15	<---	Trust	.484	1.565	.193	8.087	***
q12	<---	Trust	.473	1.619	.196	8.270	***
q16	<---	Trust	.550	1.722	.199	8.636	***

*P<.05; **P<.01; ***P<.001.

Results from the Structural Component

The structural component of the model for the adult enrollees without chronic conditions assesses the relationships between the latent variables and the observed variables. To simplify interpretation, the relationships are organized into four categories:

with nine relationships focusing on the dependent variable of self-reported health status and its predictors, seven relationships focusing on race, four relationships focusing on socioeconomic status, and eight relationships focusing on other variables in this study. The following section describes those relationships in comparison to the study hypotheses.

Relationships between Self-Reported Health Status and Its Predictors

This model hypothesizes that the dependent variable of self-reported health status is a function of access to health care services, utilization of health care services, trust in primary care providers, and satisfaction with health care services, as well as age, gender, race, region, and urbanicity. As a whole, this hypothesized model explained about 22% of the total variance in self-reported health status for the North Carolina Medicaid managed care adult enrollees without chronic conditions.

Table 23: Relationships between Self-Reported Health Status and its Predictors for the Adult Enrollees without Chronic Conditions

Parameter Estimate			Standardized	Unstandardized	S. E	C.R.	P
Health Status	<---	Education	.225	.062	.008	7.298	***
Health Status	<---	Utilization	-.088	-.016	.008	-2.044	*
Health Status	<---	Gender	.052	.033	.019	1.742	.082
Health Status	<---	Access	.011	.015	.181	.083	.934
Health Status	<---	Race	.027	.014	.018	.816	.415
Health Status	<---	Satisfaction	.148	.073	.066	1.113	.266
Health Status	<---	Urbanicity	.009	.005	.018	.249	.804
Health Status	<---	Region	-.037	-.013	.011	-1.216	.224
Health Status	<---	Age	-.300	-.060	.006	-9.926	***

*P<.05; **P<.01; ***P<.001.

The fit statistics and path coefficients, both standardized and unstandardized, for the nine relationships between self-reported health status and its predictors are reported in Table 23. The standard regression coefficients are included in this table to allow for a relative assessment of the importance of each independent variable in the model. The

following section explains the nine relationships in reference to their corresponding study hypotheses in this study:

- $H_{1.1:}$ Race is related to health status;
    - *Surprisingly, the structural equation model for the adult enrollees reporting no chronic conditions does not demonstrate a significant relationship between race and self-reported health status;*
- $H_{1.2:}$ Age is negatively related to health status, with older adult respondents reporting worse health status;
    - *As expected, age in this model is negatively related to self-reported health status(β=-.300), with older adult enrollees reporting worse health status;*
- $H_{1.3:}$ Gender is related to health status;
    - *Inconsistent with the study hypothesis, the structural equation model for the adult enrollees without chronic conditions does not demonstrate a significant relationship between gender and self-reported health status;*
- $H_{1.4:}$ Socioeconomic status is positively related to health status, with adult respondents having higher socioeconomic status reporting better health status;
    - *Consistent with the study hypothesis, the structural equation model for the adult enrollees without chronic conditions demonstrates a significant and positive relationship between socioeconomic status and self-reported health status(β=.225), with adult enrollees receiving higher education reporting better health;*

- $H_{1.5:}$ Satisfaction with health care services is positively related to health status, with adult enrollees who are more satisfied with health care services reporting better health status;
    - *Inconsistent with the study hypothesis, satisfaction with health care services is not a significant variable in predicting the subjective assessment of health status for adult enrollees without chronic conditions;*
- $H_{1.6:}$ Access to health care services is positively related to health status, with adult respondents reporting less difficulty in accessing health care services reporting better health status;
    - *Inconsistent with the study hypothesis, the structural equation model for the adult enrollees without chronic conditions does not demonstrate a significant relationship between access to health care services and self-reported health status;*
- $H_{1.7:}$ Region is related to health status;
    - *Inconsistent with the study hypothesis, region in this model is not significant predictor of self-reported health status for adult enrollees without chronic conditions;*
- $H_{1.8:}$ Urbanicity is negatively related to health status, with adult respondents living in urban areas reporting worse health status;
    - *Similar to region, urbanicity in this model is not a significant predictor of self-reported health status for adult enrollees without chronic conditions;*

- $H_{1.9:}$ Utilization of health care services is positively related to health status, with adult respondents utilizing more of heath care services reporting better health status;
    - *Contrary to the study hypothesis, the structural equation model for the adult enrollees without chronic conditions demonstrates that utilization of health care services is a significant but negative predictor of self-reported health status for adult enrollees in this model(β=-.088);*

To summarize, three out of the nine independent variables are significant predictors of self-reported health status for the North Carolina Medicaid managed care adult enrollees who reported no chronic conditions. Age has the highest absolute value of standardized regression coefficient (β=-.300), indicating that it has the largest impact upon the dependent variable of self-reported health status. Education has the second largest impact upon self-reported health status (β=.225), with adult enrollees achieving higher education reporting better health status. Utilization of health care services is another significant predictor of self-reported health status for adult enrollees without chronic conditions (β=-.088). Surprisingly, race is not significantly related to self-reported health status among adult enrollees without chronic conditions. In addition, gender, the two latent variables of satisfaction with health care services and access to health care services, as well as the two context variables of region and urbanicity are not significantly related to health status reported by the North Carolina Medicaid managed care adult enrollees without chronic conditions.

Hypotheses Related to Race

Table 24 displays findings about the seven relationships that are related to the primary independent variable of race. The following section describes the seven relationships in comparison to their corresponding study hypotheses:

Table 24: Relationships Related to Race in the Structural Equation Model for the Adult Enrollees without Chronic Conditions

Covariances			Standardized	Unstandardized	S. E	C.R.	P
Race and Ethnicity	<-->	Education	.056	.026	.015	1.813	.070
Race and Ethnicity	<-->	Access	-.149	-.015	.005	-2.952	**
Race and Ethnicity	<-->	Utilization	-.012	-.009	.029	-.304	.761
Race and Ethnicity	<-->	Urbanicity	.073	.018	.008	2.248	*
Race and Ethnicity	<-->	Trust	-.119	-.025	.009	-2.706	**
Race and Ethnicity	<-->	Satisfaction	-.051	-.013	.011	-1.240	.215
Race and Ethnicity	<-->	Region	.224	.080	.012	6.699	***

*P<.05; **P<.01; ***P<.001.

- $H_{2.1:}$ Race is related to socioeconomic status, with non-Hispanic black adults reporting lower socioeconomic status relative to non-Hispanic white adults;
    - *Inconsistent with the study hypothesis, the structural equation model for the adult enrollees without chronic conditions does not demonstrate a significant relationship between race and socioeconomic status;*
- $H_{2.2:}$ Race is related to access to health care, with non-Hispanic black adults reporting greater difficulty in accessing heath care services relative to non-Hispanic white adults;
    - *Consistent with the study hypothesis, the structural equation model for the adult enrollees without chronic conditions demonstrates a significant and negative relationship (β=-.053) between race and access to health care services, indicating that relative to non-Hispanic*

white adults, non-Hispanic black adults perceived greater difficulty in accessing health care services provided by the North Carolina Medicaid managed care program;

- $H_{2.3:}$ Race is related to satisfaction with health care services, with non-Hispanic black adults being less satisfied with health care services relative to non-Hispanic white adults;
    - *Inconsistent with the study hypothesis, the structural equation model for the adult enrollees without chronic conditions does not demonstrate a significant relationship between race and satisfaction with health care services;*
- $H_{2.4:}$ Race is related to trust in primary health providers, with non-Hispanic black adults reporting a higher level of mistrust in their primary care providers relative to non-Hispanic white adults;
    - *As expected, the structural equation model for the adult enrollees without chronic conditions demonstrates a significant and negative relationship between race and trust in primary health providers (β=-.119),with non-Hispanic black adults reporting a higher level of mistrust in their primary care providers relative to non-Hispanic white adults;*
- $H_{2.5:}$ Race is related to urbanicity, with non-Hispanic black adults being more likely than non-Hispanic white adults to reside in urban areas;

- *Consistent with the study hypothesis, non-Hispanic black adults in this model were more likely than non-Hispanic white adults to live in urban areas of North Carolina(β=0.073);*

- $H_{2.6:}$ Race is related to region;
  - *Consistent with the study hypothesis, the structural equation model for the adult enrollees without chronic conditions demonstrates a significant relationship between race and region (β=0.224);*
- $H_{2.7:}$ Race is related to utilization of health care services, with non-Hispanic black adults being less often than non-Hispanic white adults to utilize health care services;
  - *Contrary to the study hypothesis, the structural equation model for the adult enrollees without chronic conditions shows that non-Hispanic black adults did not different significantly from non-Hispanic white adults in utilizing health care services (β=-.109);*

Hypotheses Related to Socioeconomic Status

Socioeconomic status in this model is measured by educational attainment. Table 25 displays findings of the four relationships that are related to socioeconomic status. The four relationships are presented below in comparison to the study hypotheses:

- $H_{3.1:}$ Socioeconomic status is negatively related to access to health care, with adult respondents having higher socioeconomic status reporting less difficulty in accessing health care services;
  - *Inconsistent to the study hypothesis, the structural equation model for the adult enrollees without chronic conditions does not demonstrate a*

significant relationship between socioeconomic status and access to health care services;

Table 25: Relationships Related to Socioeconomic Status in the Structural Equation Model for the Adult Enrollees without Chronic Conditions

Covariances			Standardized	Unstandardized	S. E	C.R.	P
Education	<-->	Utilization	-.157	-.218	.058	-3.784	***
Education	<-->	Trust	.084	.034	.016	2.136	*
Education	<-->	Access	-.013	-.002	.007	-.340	.734
Education	<-->	Age	-.245	-.303	.042	-7.268	***

*P<.05; **P<.01; ***P<.001.

- $H_{3.2:}$ Socioeconomic status is positively related to trust in primary care providers, with adult respondents having higher socioeconomic status reporting a higher level of trust in their primary care providers;
    - *Consistent with the study hypothesis, the structural equation model for the adult enrollees without chronic conditions demonstrates a significant and positive relationship between socioeconomic status and trust in primary care providers (β=.084);*
- $H_{3.3:}$ Socioeconomic status is negatively related to utilization of health care services, with adult respondents having higher socioeconomic status being less often to utilize health care services;
    - *Consistent with the study hypothesis, this model shows that adults enrollees with higher education utilized less of health care services relative to adult enrollees with lower education (β=-.157);*
- $H_{3.4:}$ Socioeconomic status is related to age;
    - *The structural equation model for the adult enrollees without chronic conditions demonstrates a significant but negative relationship (β=-*

.245)between socioeconomic status and age, with older adults in this model reporting a lower level of educational attainment;

Hypotheses Related to Other Variables

Table 26 lists findings of the eight relationships that are related to other variables in this study. The eight relationships are described below in comparison to the study hypotheses:

- $H_{4.1:}$ Trust in primary care providers is positively related to access to health care services, with adults having a higher level of trust in their primary care providers reporting less difficulty in accessing health care services;
    - *Consistent with the study hypothesis, the structural equation model for the adult enrollees without chronic conditions demonstrates that trust in primary care providers is positively related to access to health care services (β=.757);*

Table 26: Relationships Related to Other Variables in the Structural Equation Model for the Adult Enrollees without Chronic Conditions

Covariances			Standardized	Unstandardized	S. E	C.R.	P
Trust	<-->	Access	.757	.063	.011	5.944	***
Trust	<-->	Satisfaction	.691	.153	.020	7.748	***
Region	<-->	Access	.005	.001	.006	.130	.897
Urbanicity	<-->	Access	-.134	-.013	.004	-3.143	**
Region	<-->	Urbanicity	.088	.031	.012	2.677	**
Gender	<-->	Utilization	.156	.094	.025	3.753	***
Age	<-->	Utilization	.092	.176	.079	2.232	*
Access	<-->	Satisfaction	.850	.089	.013	6.662	***

*P<.05; **P<.01; ***P<.001.

- $H_{4.2:}$ Trust in primary care providers is positively related to satisfaction with health care services, with adult respondents having a higher level of trust in their primary care providers being more satisfied with health care services;

- *As expected, the structural model for the adult enrollees without chronic conditions demonstrates a significant and positive relationship between trust in primary care providers and satisfaction with health care services (β=.691), indicating that adult enrollees having a higher level of trust in their primary care providers were more satisfied with health care services that they received from the North Carolina Medicaid managed care program;*

- $H_{4.3:}$ Region is related to access to health care services;
  - *Inconsistent with the study hypothesis, region in this model is not significantly related to adult enrollees' perception of difficulty in accessing health care services covered by the North Carolina Medicaid managed care program;*
- $H_{4.4:}$ Urbanicity is negatively related to access to health care services, with adults living in urban areas reporting greater difficulty in accessing health care services relative to adults living in non-urban areas;
  - *As expected, urbanicity in this model is significantly related to access to health care services (β=-.134);*
- $H_{4.5:}$ Region is related to urbanicity;
  - *Consistent with the study hypothesis, the structural equation model for the adult enrollees without chronic conditions suggests a significant and positive relationship between the two context variables (β=.088);*
- $H_{4.6:}$ Gender is related to utilization of health care services;

- *Consistent with the study hypothesis, gender in this model is significantly related to utilization of health care services, with female adult enrollees in this model utilizing more of health care services relative to male adult enrollees (β=.156);*

- $H_{4.7:}$ Access to health care services is positively related to satisfaction with health care services, with adults reporting less difficulty in accessing health care services being more satisfied with health care services;
  - *Consistent with the study hypothesis, the structural equation model for the adult enrollees without chronic conditions demonstrates a significant and positive relationship between access to health care services and satisfaction with health care services (β=.850);*
- $H_{4.8:}$ Age is related to utilization of health care services, with older adults being more often to utilize health care services.
  - *Consistent with the study hypothesis, relative to younger adults, older adults in this model utilized more of health care services (β=.092).*

Summary

To summarize, the complex interrelationships surrounding race and health status required three structural equation models, one for the overall population of the adult enrollees, one for the adult enrollees with chronic conditions, and one for the adult enrollees without chronic conditions. Separate models proved to be necessary because self-reported health status and reports of "do you have any physical or medical conditions that have lasted for at least three months," although independent, were closely related. In addition, confidence in the reliability of the structural equation modeling is strengthened

by the remarkable stability across the three models in the findings of significant relationships between health status and the hypothesized predictor variables. Findings from the univariate and bivariate statistical analyses of this study, as well as findings from the three separate structural equation models, are summarized and compared at the beginning of the next chapter. In addition, discussion of the findings, conclusions drawn from these findings, study limitations, policy implications suggested by the findings, and recommendations for future study are addressed in the next chapter of discussion and conclusions.

CHAPTER 6: DISCUSSION AND CONCLUSIONS

The study examines the important issue of racial disparities in health among Medicaid managed care populations using data collected from adults who were continuously enrolled in selected North Carolina's Medicaid managed care programs for at least six months prior to the drawing of the survey sample in 2006. Four research questions are developed to guide this study, with the first question looking at the general pattern of health status, the second examining the relationship between health status and race, the third question identifying the factor or factors that relate to health status, and the last question investigating the relationships between race, health status, and a variety of latent and observed variables that theory suggests. Multiple statistical methods, including univariate statistics, Pearson's chi-square test, and structural equation modeling, are used to answer the four research questions. This chapter begins by summarizing the research findings reported in the previous chapter. Then, it discusses the findings and draws conclusions. Policy implications, study limitations, and directions for future research are also explicitly addressed in this chapter.

Summary of Research Findings

Self-Reported Health Status

In terms of health status for the adult enrollees from the North Carolina Medicaid managed care program, the take-home message is that as a group they did not enjoy

good health. Specifically, this study found that more than half of non-elderly and non-institutionalized adult respondents in a representative sample of enrollees in a Medicaid program reported having either "poor" (18.71%) or "fair" (31.31%) health. In contrast, less than one fourth reported having "very good" (14.55%) or "excellent" (9.41%) health. In regard to chronic disease, the majority of the adult enrollees (63.60%) were chronically ill.[10] In light of Medicaid eligibility requirements in the United States, the findings of having poor health status and a high prevalence of chronic conditions among the adult population from the North Carolina Medicaid managed care program are not very surprising.

Racial Disparities in Health Status

This study assesses the relationship between race and health status by comparing the self-reported health status between non-Hispanic black adults and non-Hispanic white adults using a Pearson chi-square test of independence. As expected, a significant relationship between race and health status emerges (χ^2=81.348, p<0.001). As a group, non-Hispanic black adults reported better health than non-Hispanic white adults. For example, the proportion of non-Hispanic black adult enrollees having "excellent" health (12.66%) is almost twice that of non-Hispanic white adult enrollees (6.96%), and the proportion of non-Hispanic black adult enrollees with "poor health" (11.57%) is less than half that of non-Hispanic white adult enrollees (24.10%), although non-Hispanic black adults (31.26%) and non-Hispanic white adults (31.37%) had almost the same proportion of respondents reporting "fair" health. Surprisingly, relative to non-Hispanic black adults

[10] Chronicity in this study is defined as having a physical or medical condition lasting at least 3 months.

(52.20%), a higher proportion of non-Hispanic white adults (72.40%) in this study suffered from certain chronic diseases.

Structural Equation Models Examining Racial Disparities in Health

As explained previously, three separate structural equation models are performed in order to accurately estimate the relationships between race, health status, and a group of latent and observed variables that theory suggests are related to health status. Three separate measures of goodness-of-fit were used to gauge the validity of the three models: the chi-square and associated degree of freedom, an absolute fit measure; the root mean square error of approximation (RMSEA), an absolute fit index and badness-of-fit index; and the comparative fit index (CFI), an incremental fit index and goodness-of-fit index. As shown in Table 27, only one measure in one model (the CFI for the model with no chronic conditions) failed to meet the recommended level of acceptability and it fell short by only a value of 0.02. Thus, considerable confidence can be placed in the validity of the results produced by the three separate structural equation models.

Table 27: Goodness-of-Fit Indices for the Three Structural Equation Models Estimating the Racial Disparities in Health Among the North Carolina Medicaid Managed Care Adult Enrollees

Indicator	Overall Sample	Adults with Chronic Conditions	Adults without Chronic Conditions	Recommended Value
	(n=2571)	(n=1636)	(n=932)	
CMIN	1450.527	1074.7	742.616	
DF	350	350	350	
CMIN/DF	4.144	3.071	2.122	
CFI	0.921	0.93	0.88	> =.90
RMSEA	0.035	0.036	0.035	< =.05

Table 28: Findings from the Three Structural Equation Models Estimating the Racial Disparities in Health Among the North Carolina Medicaid Managed Care Adult Enrollees

Relationships (Notation Indicates Associated Hypothesis)		**Overall Sample** (n=2571)		**Adults with Chronic Conditions** (n=1636)		**Adults without Chronic Conditions** (n=932)	
		Standardized	P	Standardized	P	Standardized	P
Health Status	Race($H_{1.1}$)	***Positive***	***	***Positive***	***		
Health Status	Age($H_{1.2}$)	***Negative***	***	***Negative***	***	***Negative***	***
Health Status	Gender($H_{1.3}$)	***Positive***	***	***Positive***	**		
Health Status	Education ($H_{1.4}$)	***Positive***	***	***Positive***	***	***Positive***	***
Health Status	Satisfaction($H_{1.5}$)						
Health Status	Access($H_{1.6}$)						
Health Status	Region($H_{1.7}$)						
Health Status	Urbanicity($H_{1.8}$)						
Health Status	Utilization($H_{1.9}$)	***Negative***	***	***Negative***	***	***Negative***	*
Race/Ethnicity	Education ($H_{2.1}$)						
Race/Ethnicity	Access($H_{2.2}$)	***Negative***	*			***Negative***	**
Race/Ethnicity	Satisfaction($H_{2.3}$)					***Positive***	***
Race/Ethnicity	Trust($H_{2.4}$)	***Negative***	***	***Negative***	*	***Negative***	**
Race/Ethnicity	Urbanicity($H_{2.5}$)	***Positive***	***	***Positive***	**	***Positive***	*
Race/Ethnicity	Region($H_{2.6}$)	***Positive***	***	***Positive***	***		
Race/Ethnicity	Utilization($H_{2.7}$)	***Negative***	***	***Negative***	***		
Education	Access($H_{3.1}$)						
Education	Trust($H_{3.2}$)	***Positive***	**			***Positive***	*
Education	Utilization($H_{3.3}$)	***Negative***	*			***Negative***	***
Education	Age($H_{3.4}$)	***Negative***	***	***Negative***	***	***Negative***	***
Trust	Access($H_{4.1}$)	***Positive***	***	***Positive***	***	***Positive***	***
Trust	Satisfaction($H_{4.2}$)	***Positive***	***	***Positive***	***	***Positive***	***
Region	Access($H_{4.3}$)						
Urbanicity	Access($H_{4.4}$)	***Negative***	***			***Negative***	**
Region	Urbanicity($H_{4.5}$)	***Positive***	***	***Positive***	*	***Positive***	**
Gender	Utilization($H_{4.6}$)	***Positive***	***	***Positive***	***	***Positive***	***
Access	Satisfaction($H_{4.7}$)	***Positive***	***	***Positive***	***	***Positive***	***
Age	Utilization($H_{4.8}$)	***Positive***	***	***Positive***	**	***Positive***	*

*P<.05; **P<.01; ***P<.001; Empty cells indicate insignificant relationships.

Table 28 summarizes findings from the three separate structural equation models. Obviously, confidence in the reliability of the SEM methodology is strengthened by the

remarkable stability across the three models in the findings of significant relationships between health status, race, and the latent and observed variables that theory suggests.

- In all three models, three predictors (age, education, and utilization of health care services) were significantly related to the dependent variable of self-reported health status; two variables (gender and race) were significantly related to self-reported health status at some level, with p-values ranging from <.01 to <.001, in two but not all three of the models; and four variables (satisfaction with health care services, access to health care services, region of residence, and urbanicity) were not significant predictors of health status in any of the three models.
- The independent variable of race was significantly related to two variables (trust in primary care providers and urbanicity) in all three models; three variables (access to health care services, region of residence, and utilization of health care services) were significantly related to race at some level, with p-values ranging from <.05 to <.001, in two but not all three of the models; one variable (satisfaction with health care services) was significantly related to race only in the model for adult enrollees without chronic conditions; and the relationship between education and race was found to be statistically insignificant in all three models.
- Age was significantly related to education in all three models; trust in primary care providers and utilization of health care services were significantly related to education in two but not all three of the models;

and the relationship between access to health care services and education turned out to be insignificant in all three models.

- In terms of the relationships between other important variables that were included in this study, at some level the variable of trust in primary care providers was significantly related to the variable of access to health care services and the variable of satisfaction with health care services in all three models; access to health care services was significantly related to satisfaction in all three models; the two sociodemographic variables of age and gender were both significantly related to utilization of health care services in all three models; and the two context variables of urbanicity and region were significantly related to each other in all three models. In contrast, access to health care services was significantly related to urbanicity in only two of the three models, and the relationship between access to health care services and region of residence was found to be insignificant in all three models.

Discussion and Conclusions

The next section discusses the study findings and draws conclusions that are derived from these findings. As with all case studies, we need to be aware that some of the conclusions might only be applicable to Medicaid managed care adult populations or might be unique to populations in the state of North Carolina.

Analysis by Health Status

Self-reported health status of Medicaid managed care beneficiaries can be a key determinant of their health behaviors and their efforts to seek heath care. Existing

research clearly demonstrates the presence of racial disparities in health status (Agency for Healthcare Research and Quality, 2009; Hall et al., 2009; Halle et al., 2008; Smedley et al., 2003), and the most consistent finding is that minority populations are usually in worse health than the general population of whites, even they had similar socioeconomic characteristics with the white population (Mead et al., 2008; Reichmann et al., 2009; Smedley et al., 2003; U.S. National Center for Health Statistics, 2009). This study supports finding from the previous research by displaying racial disparities between non-Hispanic black adults and non-Hispanic white adults. However, the pattern of disparities in health found in this study is surprising. Specifically, controlling for age and certain sociodemographic variables, non-Hispanic black adults surveyed in this study were in considerably better health relative to the non-Hispanic white adults. This finding is also inconsistent with a finding from a study conducted by Coeytaux and colleagues (1994), using data collected from adult patients from a representative sample of family practice offices in North Carolina, which discovered that African Americans reported poorer general health status than whites.

Even more perplexing is the result obtained by the analysis conducted on the adult population that was partitioned into those with chronic conditions and those without chronic conditions. It showed that non-Hispanic black adults with chronic conditions reported better health than non-Hispanic white adults with chronic conditions. Because no obvious explanation, such as white-black differences in age, education or difficulty in accessing services, emerged from the variables used in the model, it is appropriate to speculate about conditions beyond those that could be incorporated into the model that might help in understanding this unexpected phenomenon. To explain this anomalous

finding of better health for non-Hispanic black adults than for non-Hispanic white adults under the Medicaid managed care program in North Carolina, the author proposes the following four hypotheses:

- Health status is a function of differential recruitment to Medicaid managed care programs due to differential employment opportunities in North Carolina communities.
    - It might be the case that relative to non-Hispanic white adults, healthy non-Hispanic black adults encountered greater difficulty in finding a job or received lower wages when employed. Thus, because of unemployment or low wages, non-Hispanic black adults might be more likely than non-Hispanic white adults to have the minimal incomes that qualify them to enroll in Medicaid.
    - One way to test this hypothesis is to compare the unemployment rate for non-Hispanic white adults and for non-Hispanic black adults. If the unemployment rate for non-Hispanic black adults is higher than that for non-Hispanic white adults, the hypothesis about job market discrimination will be supported. In addition, a lot more analysis would be necessary to confirm this hypothesis, including individual Medicaid-recipient level evidence. The population for this study was derived from the 2006 sampling frame of Medicaid managed care eligible enrollees provided by the North Carolina Department of Health and Human Services. On its face this hypothesis is partially confirmed by total unemployment data for North Carolina in July

2006, which showed that 3.5% of white adults in North Carolina were unemployed while the unemployment rate for black adults was 9% (N.C. Employment Security Commission, 2006). It is reasonable that non-Hispanic whites with more severe chronic conditions and generally poorer health could not compete in the employment market and hence as a group would report worse health than non-Hispanic blacks with chronic conditions. Yet no difference in health status was found between non-Hispanic blacks and whites without chronic conditions, the subpopulation where disparities in employment ought to be most noticeable.

- Using the total unemployment rates of the two groups to assess the unemployment situation for Medicaid managed care individual enrollees in this study might reasonably be regarded as committing the ecological fallacy. To address this problem, another way to test this hypothesis is to conduct interviews or focus group studies among non-Hispanic white adults and non-Hispanic black adults. These methods allow for learning more about their work history and experiences in employment. One suggested way to select participants for the interviews or focus groups is from jury pools, because that will help avoid reference to or bias by employment status.
- If the hypothesis of job market discrimination is confirmed, the North Carolina Medicaid managed care program might need to explore further to find out whether the higher unemployment rate for non-

Hispanic black adults was due to their lack of certain job skills. If this is true, policymakers from the North Carolina Medicaid managed care program can make efforts, such as holding job workshops or seminars and providing job counseling on a regular basis to help this group of individuals become better prepared for jobs. If the disparities appeared in part to be due to invidious discrimination by employers, then government may need to strengthen enforcement of anti-discrimination provisions of the equal employment opportunity laws. However, if the hypothesis of job market discrimination is rejected, future study can focus more attention on testing the other three proposed hypotheses.

- Health status is a function of differential recruitment to Medicaid due to the specific programs from which the survey sample was drawn.
    - The second possible reason why non-Hispanic black adults in this study might have enjoyed better health than non-Hispanic white adults is that more non-Hispanic white adults with chronic conditions were recruited into the North Carolina Medicaid managed care programs specifically designed as part of Medicaid for enrollees with disability or chronic illness. This explanation focuses on the discovery generated by partitioning the population into those with and without chronic conditions: non-Hispanic black-white differences in health status were statistically significant only for respondents who reported a chronic condition. It may be the case that enrollees in these populations, both

black and white, had different or perhaps more severe chronic conditions and generally had worse health than enrollees in the Medicaid managed care programs where non-Hispanic black adults outnumbered non-Hispanic white adults.

- This hypothesis can be tested by comparing the racial differences in health status among enrollees from Medicaid programs designed for individuals with chronic conditions. Table 29 shows that relative to non-Hispanic black adult respondents (48.60%), a higher proportion of non-Hispanic white adult respondents (63.40%) enrolled in the Medicaid program of *Aid to the Disabled*, which has a nontrivial number of enrollees. In contrast, non-Hispanic black adults proportionally dominated the Medicaid program of *Aid to Families with Dependent Children* (AFDC). Further analysis can examine whether the health status of non-Hispanic white adults from the subprogram of *Aid to the Disabled* was statistically different from the health status of non-Hispanic black adults from the same program. It is also helpful to check whether there were statistically significant racial differences in health among enrollees from the Medicaid program of *Aid to Families with Dependent Children*. It should be noticed that this hypothesis is compatible with the first hypothesis that relates to wage levels and employment conditions, if these programs for the disabled enrolled a population that was largely unemployable, whereas the larger Medicaid programs in which non-Hispanic blacks predominate

more closely approximated the general population with a range of health status.

Table 29: Cross-tabulation between Medicaid Programs and Race for the Adult Respondents from North Carolina

Program Description	Non-Hispanic White Adults		Non-Hispanic Black Adults	
	Frequency	%	Frequency	%
Aid to families with dependent children and Now Work First	115	7.80%	125	11.30%
Aid to the Blind	9	0.60%	9	0.80%
Aid to the Disabled	928	***63.40%***	538	***48.60%***
Aid to families with dependent children	349	23.80%	388	35.10%
Aid to Infants and Children	64	4.40%	46	4.20%
Total	1465	100.00%	1106	100.00%

- This hypothesis will be disproved if no statistically significant differences in health status emerged between non-Hispanic white adults and non-Hispanic black adults in the specific programs contributing non-trivial numbers of respondents. The disproval of this hypothesis would indicate that the health disparities observed in this study were a reality that had little to do with the performance of the North Carolina Medicaid managed care program. If this hypothesis about differential recruitment is confirmed, this indicates that the observed better health of non-Hispanic black adults in this study could be attributed to the structure of the North Carolina Medicaid managed care program. Such a discovery might suggest that the state target specific resources to the adult enrollees with chronic conditions in these programs. However, a discovery that the findings were due to an artifact of the data that reflected program structure would not suggest the need for dramatic policy responses.

- Health status based on self-report is a relative rather than absolute value that depends on the burden of illness and disability among those in the respondent's immediate environment. Thus, those respondents who lived in a racial-ethnic group that had a greater burden of illness and disability might judge themselves better off relative to group norms than individuals who tended to be in daily contact with individuals who appear to be relatively healthier than themselves.
    - The third hypothesis is suggested by analogy to the theory that perceptions of wealth are based on relative rather than absolute values. For example, a study conducted by Hsee and colleagues (2009 and the literature cited therein) found that individuals' happiness with money and acquisition is relative rather than absolute. Housing patterns in North Carolina, especially in urban and suburban areas, often reflected racial and ethnic concentrations and social interactions were commonly with members of the same group. If respondents asked to rate their own health were influenced by the health conditions that they perceived to be common among their neighbors, they might rate themselves in better health if the reference group seemed sicker and/or older. Thus, ironically, the burden of ill health in low-income communities may have led non-Hispanic Medicaid respondents with chronic conditions to regard themselves as in better health than did the counterpart white respondents with chronic conditions.

- One way to test this hypothesis is to survey a group of newly graduated nurses about their health status. After finishing the survey, they will work in hospitals to take care of old patients with chronic illness or disability for one or two months. After that, the same group of nurses will be surveyed again to report their health status. It is assumed that their health status will not change much during this short period of time. If the second-time average rating of health status for this group of nurses is significantly improved relative to the first-time average rating of health status, it confirms the hypothesis of relative health.
- If this hypothesis is true, it would theoretically be possible to apply weights to correct for community influences, which might be very hard to calculate in the community setting, in evaluating the health status of Medicaid managed care enrollees. This analytical innovation would aid policymakers in Medicaid managed care obtain a more accurate estimation of the health status of Medicaid beneficiaries. The more accurate estimate, in turn, would permit them to target limited resources to deliver health services more effectively and efficiently.

- The fourth hypothesis involves differential perception of stigma or other disincentives for enrolling in Medicaid. If one racial-ethnic group, either because of cultural beliefs or family support, had greater reason to avoid enrolling in Medicaid than another, one might expect that the latter would have a larger proportion of somewhat healthier individuals on Medicaid.

Presumably, as the need for health care becomes more imperative as health status worsens, those who were reluctant when they could more easily ignore health care needs would have no alternative to Medicaid enrollment.

- This hypothesis can be tested by either conducting interviews or focus group studies that allow comparison of non-Hispanic black adults and non-Hispanic white adults in order to obtain their perceptions or viewpoints about seeking and receiving charity medical assistance, such as Medicaid.
- If this hypothesis is confirmed by finding racial variations in accepting welfare medical assistance, the related policy implication for the North Carolina Medicaid managed care program is to put more effort into marketing Medicaid as involving non stigma, so that individuals with similar health needs would be equally willing to resort to Medicaid managed care programs, regardless of their race and ethnicity.

Although the analysis has achieved progress in answering the questions regarding superior self-reported health status by non-Hispanic black adults, the search for answers has suggested explanatory factors that largely lie beyond the quantitative data provided by the survey. This finding is far from discouraging, for it emphasizes the heuristic value of initial studies like this one. Indeed, it would be discouraging if such studies failed to generate ideas and questions that can spark additional research. Moreover, the progress that has been made is genuine and should be fully acknowledged. The study has first demonstrated that the finding of superior health status in the non-Hispanic black Medicaid population is an objective fact. The analysis further refined this knowledge by

partitioning the overall population into those with and without chronic conditions. This analysis revealed that the superior health status rested on differences between non-Hispanic black adults and white adults who reported chronic conditions. It was this advance in the analysis, in part, that helped generate the four additional hypotheses discussed in this section that can usefully become the object of further research. Because health status was the variable of interest that motivated this study, it has been appropriate to address it first and at length in this discussion. However, it is necessary now to examine the implications of the statistically significant associations involving the other variables included in the three separate structural equation models.

Analysis by Race

The legacy of past racial injustice in the United States makes it important to determine from the experiences of the adult respondents in this study whether there are racial and ethnic disparities related to the perception of needing care and seeking the care. Access to health care services is significantly related to health status, so policymakers in the United States have considered improving access to health care as key to reduce health disparities among minority and low-income populations (Shin, Jones & Rosenbaum, 2003). Consistent with a study by Brandon, Schoeps, Sun and Smith (2008), this study showed that the North Carolina Medicaid managed care program did an excellent job in assuring access to care for its Medicaid adult enrollees, as is indicated by the insignificant relationship between access to health care services and self-reported health status. However, this study also found that non-Hispanic black adults, both in the model using the overall sample of adult enrollees and the model for adult enrollees without chronic conditions, still perceived that they had greater difficulty or problems in accessing health

care services. This finding is consistent with the previous research (Agency for Healthcare Research and Quality, 2008; Smedley et al., 2003), in which blacks and other minority populations have been constantly reported less access to health care than whites, and receiving lower-quality health care when the care is available.

Regarding utilization of health care services, this study found that non-Hispanic black adults from the model of the overall sample of adult enrollees and the model for adult enrollees with chronic conditions reported less utilization of health care services. This finding supports the notion that differential racial, ethnic, and socioeconomic groups were observed to have different patterns of health care utilization (U.S. Department of Health and Human Services, 2008). In addition, this finding is also consistent with the previous finding that blacks in general were less likely than whites to have an ambulatory visit, even after adjusting for insurance status, income, and other factors (Brandon, Schoeps, Sun & Smith, 2008; Shi & Stevens, 2005).

Previous study indicates that socioeconomic status is significantly related to race. Specifically, African Americans as a group consistently report having a lower education attainment than whites (Newburger & Curry 2000), are more likely to be unemployed relative to their white counterpart (Thomas & Hughes, 1986), and have higher poverty rates at all ages (McKinnon, 2003). Surprisingly, this study observed an insignificant relationship between race and socioeconomic status, which is measured by educational attainment. In terms of the two context variables of region and urbanicity, this study found that non-Hispanic black adults were more likely than non-Hispanic white adults to live in the Piedmont region of North Carolina, and relative to non-Hispanic white adults, non-Hispanic black adults were more likely to live in urban areas of North Carolina.

Analysis by Trust and Satisfaction

Trust in primary care providers plays an important role in developing the doctor-patient relationship and influencing patients' motivations or incentives to seek health care (Musa et al., 2009; Trachtenberg, Dugan & Hall, 2005). In addition, satisfaction with health care services is related to patients' compliance with treatment regimens and continuity of utilizing health care services (LaVeist & Nuru-Jeter, 2002; Myburgh et al., 2005). Therefore, it is important to explore whether there were noticeably different levels of trust in primary care providers and satisfaction with health care services in a Medicaid managed care setting. As expected, this study found that the variable of trust in primary care providers was significantly and positively related to the variable of satisfaction with health care services. In addition, this study observed a significant relationship between race and trust in primary care providers, with non-Hispanic black adults being more likely than non-Hispanic white adults to mistrust their primary care providers. This finding is consistent with the previous research, in which African American patients are often less likely than white patients to trust health care providers (Benkert, Peters, Clark & Keves-Foster, 2006). In terms of satisfaction with health care services, results from the three models varied. Among people with chronic conditions, no significant variation was observed between non-Hispanic black adults and non-Hispanic white adults. However, for adults without chronic conditions, non-Hispanic black enrollees tended to be more satisfied with health care services than did non-Hispanic white enrollees. This finding is inconsistent with a study conducted by Greenberg, Brandon, Tingle and Shull (2003), in which they did not find an association between race and satisfaction among Medicaid managed care populations in North Carolina.

Analysis by Access and Utilization

One principal goal for Medicaid to achieve is to ensure that its beneficiaries are able to secure needed health care in an effective manner (Kongstvedt, 2009). The effectiveness of achieving this goal can be assessed by looking at difficulties experienced by Medicaid enrollees in securing access to medical services. Different from the previous research that access to health care services is directly related to health status (Shin, Jones & Rosenbaum; Sherkat, Kilbourne, Cain, Hull, Levine & Husaini, 2007), this study did not observe a significant relationship between access to health care services and health status. As stated previously, this finding suggests that the North Carolina Medicaid managed care program have done an excellent job in assuring equal access to care for its Medicaid adult enrollees. A previous study by Brandon, Schoeps, Sun and Smith (2008), using the same data, also found that the majority (79.6%) of adult respondents (n=2808) reported that they currently had access to a personal doctor or nurse and there was no racial variations in accessing a personal doctor or nurse. Surprisingly, this study suggests a negative relationship between health status and utilization of health services. It is more likely that healthier enrollees were less likely to utilize health care services because they felt that they did not need to go to the doctor, rather than that utilizing more of health services worsened their health status. Since this study is cross-sectional, future research could collect more data on respondents' previous health status to identify the accurate causal link between health status and utilization of health services.

Analysis by Other Independent Variables

This study suggests that age, gender, education, and utilization of health care services are significant predictors of self-reported health status. The significantly

negative relationship between age and health status makes sense and is consistent with the previous research (Bar, 2008; Brandon, Schoeps, Sun & Smith, 2008; U.S. National Center for Health Statistics, 2009). In addition, female adults in this study reported better health than their male counterpart. Consistent with the previous study (Adler & Ostrove; 1999; Donald, 2008; Mayberry, Mili & Ofili, 2000), adult enrollees in this study tended to have better health if they had higher education. Neighborhood characteristics, such as place of residence situated within a particular social milieu and urbanicity could have substantial impact on health outcomes through exposure to more pollutants (Cagney, Browning & Wen, 2005; Copeland, 2005; Prentice, 2006; Skinner et al., 2003; Williams & Collins, 1995). However, this study did not find evidence to support this statement.

Socioeconomic status is an interesting variable that reflects one's education, employment status, or income (Donald, 2008; Mayberry, Mili & Ofili, 2000). As mentioned previously, since Medicaid populations, by virtue of the Medicaid eligibility, tended to have low income and unstable employment status, this study measured socioeconomic status by respondents' educational attainment. This study found that adults with higher educational attained displayed a higher level of trust in their primary care providers and utilized less of health care services provided by the North Carolina Medicaid managed care program. Regarding age, older adults in this study tended to have lower educational attainment, and they as a group were more likely than young adults to utilize health care services. In addition, respondents who perceived less difficulty in accessing health care services showed a higher level of trust in their primary care providers and were more satisfied with the provision of health care services. Consistently with the previous research (McLafferty & Grady, 2005; Skinner et al., 2003), respondents

living in the urban areas of North Carolina experienced greater difficulty in accessing health care services covered by the North Carolina Medicaid managed care program.

Policy Implications for State Medicaid

The data in this study suggest that race was associated with self-reported health status for adults in the North Carolina Medicaid managed care program, with non-Hispanic black adults reporting superior health status relative to non-Hispanic white adults. To promote better health for Medicaid beneficiaries, primary care providers, health care systems, managed care plans, and policymakers should work jointly to identify effective steps to ameliorate disparities in health. Based on the findings in this study, the author proposes the following two policy implications that might help policymakers from the North Carolina Medicaid managed care program organize and deliver health care services to low-income or vulnerable populations in the United States in a more effective and efficient way.

Addressing Racial Disparities in Accessing Health Care Services

Non-Hispanic black adults in this study reported greater difficulty in accessing health care services covered by the North Carolina Medicaid managed care program. There are many factors that might have contributed to the difficulty that non-Hispanic black adult respondents experienced in accessing health care services. This study showed that living in urban areas was negatively related to access to health care services. A good starting point for policymakers in the North Carolina Medicaid managed care program to secure equal access to Medicaid is to find out the reasons why Medicaid enrollees living in urban areas reported experiencing greater difficulty in accessing health care services. First, it might be because Medicaid enrollees living in urban areas relied heavily upon

public transportation to reach Medicaid clinics, and unfortunately, most urban areas did not have a good public transportation system. One way to address this is to cooperate with social service organizations to provide vans for Medicaid enrollees who might need help with transportation. Second, it might be because the North Carolina Medicaid managed care program had a higher patient-physician ratio in urban areas. If this is true, one way to address it is to have more physicians work in urban areas. Third, it might be because many physicians in urban areas were reluctant to take Medicaid patients, either because of the low payment for services rendered to Medicaid patients or the long process of receiving the payment for treatment. If so, policymakers in the North Carolina Medicaid managed care program need to create some mechanisms to improve the incentives for physicians to accept Medicaid enrollees. For example, they can either increase the financial reward for treating Medicaid enrollees or simplify and accelerate the reimbursement process for treating Medicaid patients.

Increasing Patients' Trust in Primary Care Providers

Non-Hispanic black adults in this study utilized less health care service provided by the North Carolina Medicaid managed care program. A possible reason is that non-Hispanic black adults as a group appeared to have enjoyed better health than their white peers. However, non-Hispanic black adults in this study were also found to be less likely to trust their primary care providers, which might have influenced their motivations or incentives to utilize health care services. If the latter case is true, the state Medicaid program needs to identify effective ways to address the racial variations in trust. Recruiting, retaining, and managing a more diverse workforce and developing culturally appropriate systems of care can be an effective way to improve trust in health care

providers (Weech-Maldonado et al., 2003). In addition, involving local communities or churches in providing health care services might help improve patients' feeling of belonging, particularly for minority groups, thereby increasing their trust in primary care providers and the Medicaid managed care system.

Study Limitations

As with other research, findings and conclusions from this study must be interpreted in light of study limitations. This study has several limitations that need to be acknowledged. First, data for this study were gathered by a telephone survey. To follow the accepted survey research practice, this survey excluded those without working telephones and those registering only cell-phone numbers. If those without telephones, with cell phones, or without accurate telephone numbers differed systematically in important ways from those who were reached by the survey interviewers, respondents in this study will be less representative of the underlying population from which the study sample was drawn, thereby introducing some bias into the research findings. Fortunately, there might be no apparent reason to think that significant bias exists, because a study by Schoeps, Chaudry, and Brandon (1998), which did include face-to-face interviews with persons without telephone availability, found very few differences between Medicaid recipients contacted by telephone and the group interviewed in person.

Second, the survey response rate of 27.1% is far below the traditional target of 70%. As explained previously, faulty phone numbers and the reliance of many Medicaid enrollees on cell-phones, which could not be contacted under the survey protocol, were responsible for the failure to reach many of those whom the interviewers attempted to call. In addition, some who were reached declined to be interviewed. However, Berk,

Schur, and Feldman (2007) argued that measuring survey quality should go beyond response rates but look more at interviewer and response error. They pointed out that if the respondent does not know or does not wish to reveal the answer, the best of questions will not result in good data. In addition, several recent studies suggest that low response rates may not necessarily lead to bias in the findings of survey research, if there is no systematic bias between the respondents and those who did not respond (Groves, 2006; Keeter et al., 2006; Stang & Jockel, 2004; Triplett, 2006). Fortunately, the demographic information in Table 6 demonstrates that the adult survey used in this study is very representative of the study population of Medicaid managed care adult enrollees from the state of North Carolina.

Third, the primary data used in this study were reported by the adults surveyed and were not based on claims reported by health professionals. Respondents might have tended to give socially desirable answers in surveys (Lieu et al, 2002). If this problem applied to the surveyed adult enrollees from the North Carolina Medicaid managed care program, findings from this study might be biased or at least inaccurate. However, this limitation might be not a big problem for this study. The subjective measure of self-reported health has proven to be a valid and reliable indicator of individual health in various populations (Finch, Hummer, Reindl & Vega, 2002; George, 2001; Idler & Benyamini, 1997). Moreover, many researchers argue that self-reported health status is superior to objective measures of health status, because it takes into account many different dimensions of health (Idler, Hudson & Leventhal, 1999; Ross & Mirowsky, 1995). In addition, some questions on the survey elicited answers which could be compared with data already in the files provided by the North Carolina Department of

Health and Human Services. Fortunately, very few discrepancies between the two data sources were found when the relevant comparisons were made.

Areas for Future Research

According to the author's best knowledge, the present study is the only study that examines racial disparities in health in a Medicaid managed care setting. However, there are many ways in which this study could be expanded or improved. First, since Medicaid managed care organizations differ on various dimensions, such as methods of provider reimbursement, scope of benefit coverage, access to primary and specialty care, patient cost-sharing, and utilization management, it would be very interesting for future research to explore whether the conceptual framework developed in this study is applicable to Medicaid managed care adult populations in other states.

Second, this study focused on adults who had insurance coverage via Medicaid. But a parallel survey was conducted for children covered in Medicaid. An important next step involves testing how well the conceptual framework of this study explains racial disparities in the Medicaid managed care child population that was also surveyed by UNC Charlotte's Urban Institute in 2007.

Third, the model for the overall sample of Medicaid managed care adult enrollees explained 31% of the variance in the dependent variable of self-reported health status, and the other two models each accounted for 22% of the variance in the perceived health status. Due to data limitation or some other reason, the models hypothesized in this study might have missed some crucial variables that affect health status. For example, factors such as the cultural beliefs about health, individual health practices, and social support systems were not included in the models. One recommendation for the future research

would be to explore models that include more exogenous variable that may account for the subjective assessment of health. The discussion section above suggests at least four hypotheses for future research dealing with variables that could not be included in the model developed in this study.

Fourth, due to the lower number of Hispanic respondents in the adult Medicaid population at the time of the survey, this study excluded this ethnic group. Future research might use the stratified random sampling technique to include enough participants from Hispanic and other racial and ethnic groups to compare their health status with that of blacks and whites. Because of a large influx of Hispanics since 2006 and the greater Medicaid eligibility of Hispanic children, it is possible that future surveys may not require stratification in order to secure sufficient numbers of respondents in these racial and ethnic groups to perform this analysis.

Finally, this study was cross-sectional, making it very hard to objectively determine the causal direction between health status and utilization of health services. One possible solution is to collect data from the same group of adult enrollees on a continuous basis, thus allowing statistical analysis to control for the respondents' previous health. Although conventional wisdom might well regard as absurd the assumption that utilization of modern, effective health services could lead one to report lower health status, the legacy of "Medicaid mills" reported in the early years of Medicaid, especially in the Northeast, makes it easy to imagine that venal physicians wishing to maximize reimbursements might convince patients that they were sicker than they might feel (Olson, 2010).

Dissertation Summary

The issue of racial and ethnic disparities has been well documented and has attracted increased attention from policymakers in the United States. However, this important issue is understudied in a Medicaid managed care setting. To address the deficiency in the existing literature, this study, using data collected from a randomly stratified sample of adults who were continuously enrolled in the North Carolina Medicaid managed care program for at least six months prior to drawing the sample in 2006, explored disparities in self-reported health between non-Hispanic black adults and non-Hispanic white adults. Specifically, this study is driven by four research questions. To avoid redundancy and in the name of brevity, we can reasonably summarize the four research questions as: *Is race significantly related to health status among Medicaid managed care enrollees, and if so, how*?

As expected, the univariate statistical analysis conducted in this study suggests that the Medicaid managed care adult population had bad health: 50.02% reported "poor" or "fair" health, and 63.60% suffered from a chronic condition. In addition, using the Pearson chi-square analysis, this study observes a significant relationship between race and health status. Yet, contrary to most of the literature on race and health, the health status of non-Hispanic black adults in this study surpassed their white peers in self-reported health status. Because chronic conditions were significantly related to health status, the study also computes three separate structural equation models to investigate the complex relationships between race, health status, and a number of other independent variables that theory suggests. This surprising relationship between race and health status held for both the model of overall sample of adults, which fitted adequately with the

sample data (CFI=0.921; RMSEA=.035) and explained 31% of the variance in health, and the model of adults with chronic conditions, which also fitted adequately with the sample data (CFI=0.93; RMSEA=.036) and explained 22% of the variance in health. However, the model for adults without chronic conditions, which fitted the sample data fairly well (CFI=0.88; RMSEA=.035) and explained 22% of the variance in health, displayed an insignificant relationship between race and health. In addition, non-Hispanic black adults in this study reported greater difficulty in accessing health care services, showed a higher level of mistrust in their primary care providers, and utilized fewer health care services than did non-Hispanic white adults.

North Carolina has been a leader in reforming Medicaid to provide health care services to low-income populations. Specifically, North Carolina has chosen to develop primary care case management with primary care networks organized and managed by small-scale organizations typically covering several counties (Steiner et al., 2008). In contrast, many other states have chosen to make managed care organizations serving their populations assume full financial risk by paying for all care on a per capita basis. Thus, findings from this study serve to inform other states concerning the role of Medicaid managed care in serving vulnerable populations with primary care case management. At the same time, it provides policy implications for North Carolina Medicaid that can promote equal access to health services and address the racial variation in mistrust of primary care providers.

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APPENDIX A: NORTH CAROLINA MEDICAID CAHPS® ADULT SURVEY, 2006

INTRODUCTION: "Hello, this is _____ and I am calling from the University of North Carolina at Charlotte on behalf of North Carolina Medicaid in connection with an effort to improve health care.

Is this the home of _____ (*target respondent*)?

IF NOT, say, "Do you know the phone number where I might reach *target respondent*? (Record new phone number and then call).

IF YES, say, "I'd like to talk with *target respondent* about his/her healthcare, is *he/she* available?"

IF PERSON AVAILABLE: When selected person answers, repeat introduction and continue.

IF PERSON NOT AVAILABLE: "Can you tell me a convenient time to call back to speak with (him/her)?" RECORD CALL BACK NOTES

Let me tell you a little about the study before we continue. This interview will last approximately 20 minutes. We want you to know that your answers are confidential. You are a volunteer and may stop at any time. Your Medicaid benefits will not be affected in any way by your participation in the survey. No one at the doctor's office or Medicaid will see any names or know how you answered. May I continue with the interview?

1. YES – Start Interview
2. No – "Thank you for your time."

1. Our records show that you are now in Carolina Access or Medicaid. Is that right?

[1]☐ Yes ➔ **If Yes, Go to Question 2**
[2]☐ No ➔ **If No, End Survey**

YOUR PERSONAL DOCTOR OR NURSE

The next questions ask about <u>your own</u> health care. <u>Do not</u> include care you got when you stayed overnight in a hospital. <u>Do not</u> include the times you went for dental care visits.

2. A <u>personal doctor or nurse</u> is the health provider who knows you best. This can be a general doctor, a specialist doctor, a nurse practitioner, or a physician assistant. Do you have one person you think of as your personal doctor or nurse?

[1]☐ Yes
[2]☐ No ➔ **If No, Go to Question 9**

3. Is this person a <u>general doctor</u>, a <u>specialist</u> doctor, a <u>physician assistant</u>, or a <u>nurse</u>?

[1]☐ General Doctor (Family Practice or Internal Medicine)
[2]☐ Specialist Doctor
[3]☐ Physician Assistant
[4]☐ Nurse

4. How many months or years have you been going to your personal doctor or nurse?

[1]☐ Less than 6 months
[2]☐ At least 6 months but less than 1 year
[3]☐ At least 1 year but less than 2 years
[4]☐ At least 2 years but less than 5 years
[5]☐ 5 or more years

5. Do you have a physical or medical condition that seriously interferes with your ability to work, attend school, or manage your day-to-day activities?

[1]☐ Yes
[2]☐ No ➔ **If No, Go to Question 7**

6. Does your personal doctor or nurse understand how any health problems you have affect your day-to-day life?

[1]☐ Yes
[2]☐ No

7. Using <u>any number from 0 to 10</u> where 0 is the worst personal doctor or nurse possible and 10 is the best personal doctor or nurse possible, what number would you use to rate your personal doctor or nurse?

[0]☐ 0 Worst personal doctor or nurse possible
[1]☐ 1
[2]☐ 2
[3]☐ 3
[4]☐ 4
[5]☐ 5
[6]☐ 6
[7]☐ 7
[8]☐ 8
[9]☐ 9
[10]☐ 10 Best personal doctor or nurse possible

8. Did you have the same personal doctor or nurse <u>before</u> you joined Carolina Access or Medicaid?

[1]☐ Yes ➔ **If Yes, Go to Question 10**
[2]☐ No

9. Since you joined Carolina Access or Medicaid, how much of a problem, if any, was it to get a personal doctor or nurse you are happy with?

[1]☐ A big problem
[2]☐ A small problem
[3]☐ Not a problem

TRUST IN YOUR PROVIDER

Please think about the doctor or nurse you usually see when you are sick or need advice about your health.

10. Is this doctor or nurse a male or female?

[1]☐ Male
[2]☐ Female

11. What is the race of this doctor or nurse?

[1]☐ White
[2]☐ Black or African-American
[3]☐ Asian
[4]☐ Native Hawaiian or other Pacific Islander
[5]☐ American Indian or Alaska Native
[6]☐ Other

Please think of this personal doctor or nurse. For each of the following statements, tell me whether you strongly agree, somewhat agree, somewhat disagree, or strongly disagree.

12. I think my doctor or nurse may not refer me to a specialist when needed.

[1]☐ Strongly Agree
[2]☐ Somewhat Agree
[3]☐ Neither Agree/Disagree
[4]☐ Somewhat Disagree
[5]☐ Strongly Disagree

13. I trust my doctor or nurse to put my medical needs above all other considerations when treating my medical problems.

[1]☐ Strongly Agree
[2]☐ Somewhat Agree
[3]☐ Neither Agree/Disagree
[4]☐ Somewhat Disagree
[5]☐ Strongly Disagree

14. I think my doctor or nurse is strongly influenced by government rules when making decisions about my medical care.

[1]☐ Strongly Agree
[2]☐ Somewhat Agree
[3]☐ Neither Agree/Disagree
[4]☐ Somewhat Disagree
[5]☐ Strongly Disagree

15. I sometimes think that my doctor or nurse might perform unnecessary tests or procedures.

[1]☐ Strongly Agree
[2]☐ Somewhat Agree
[3]☐ Neither Agree/Disagree
[4]☐ Somewhat Disagree
[5]☐ Strongly Disagree

16. My doctor's or nurse's medical skills are not as good as they should be.

[1]☐ Strongly Agree
[2]☐ Somewhat Agree
[3]☐ Neither Agree/Disagree
[4]☐ Somewhat Disagree
[5]☐ Strongly Disagree

17. My doctor or nurse always pays full attention to what I am trying to tell him or her.

[1]☐ Strongly Agree

[2]☐ Somewhat Agree
[3]☐ Neither Agree/Disagree
[4]☐ Somewhat Disagree
[5]☐ Strongly Disagree

GETTING HEALTH CARE FROM A SPECIALIST

When you answer the next questions, do not include dental visits.

18. Specialists are doctors like surgeons, heart doctors, allergy doctors, skin doctors, and others who specialize in one area of health care.

In the last 6 months, did you or a doctor think you needed to see a specialist?

[1]☐ Yes
[2]☐ No ➔ **If No, Go to Question 20**

19. In the last 6 months, how much of a problem, if any, was it to see a specialist that you needed to see?

[1]☐ A big problem
[2]☐ A small problem
[3]☐ Not a problem

20. In the last 6 months, did you see a specialist?

[1]☐ Yes
[2]☐ No ➔**If No, Go to Question 24**

21. In the last 6 months, how many times did you go to specialists for care for yourself?

[1]☐ 1
[2]☐ 2
[3]☐ 3
[4]☐ 4
[5]☐ 5 to 9
[6]☐ 10 or more

22. We want to know your rating of the specialist you saw most often in the last 6 months.

Using any number from 0 to 10 where 0 is the worst specialist possible and 10 is the best specialist possible, what number would you use to rate the

specialist?

[0]☐ 0 Worst specialist possible
[1]☐ 1
[2]☐ 2
[3]☐ 3
[4]☐ 4
[5]☐ 5
[6]☐ 6
[7]☐ 7
[8]☐ 8
[9]☐ 9
[10]☐ 10 Best specialist possible

23. In the last 6 months, was the specialist you saw most often the same doctor as your personal doctor?

[1]☐ Yes
[2]☐ No

YOUR HEALTH CARE IN THE LAST 6 MONTHS

24. In the last 6 months, did you call a doctor's office or clinic <u>during regular office hours</u> to get help or advice <u>for yourself</u>?

[1]☐ Yes
[2]☐ No ➔ **If No, Go to Question 26**

25. In the last 6 months, when you called during regular office hours, how often did you <u>get</u> the help or advice you <u>needed</u>?

[1]☐ Never
[2]☐ Sometimes
[3]☐ Usually
[4]☐ Always

26. In the last 6 months, did you have an illness, injury, or condition that <u>needed care right away</u> in a clinic, emergency room, or doctor's office?

[1]☐ Yes
[2]☐ No ➔ **If No, Go to Question 28**

27. In the last 6 months, when you <u>needed care right away</u> for an illness, injury, or condition, how often did you get care as soon as you wanted?

[1]☐ Never

[2]☐ Sometimes
[3]☐ Usually
[4]☐ Always

28. A <u>health provider</u> could be a general doctor, a specialist doctor, a nurse practitioner, a physician assistant, a nurse, or anyone else you would see for health care.

In the last 6 months, not counting the times you needed health care right away, did you make any <u>appointments</u> with a doctor or other health provider for health care?

[1]☐ Yes
[2]☐ No ➔ **If No, Go to Question 30**

29. In the last 6 months, not counting times you needed health care right away, how often did you get an appointment for health care as soon as you wanted?

[1]☐ Never
[2]☐ Sometimes
[3]☐ Usually
[4]☐ Always

30. In the last 6 months, how many times did you go to an <u>emergency room</u> to get care for yourself?

☐ None

[1]☐ 1
[2]☐ 2
[3]☐ 3
[4]☐ 4
[5]☐ 5 to 9
[6]☐ 10 or more

31. In the last 6 months (not counting times you went to an emergency room), how many times did you go to a <u>doctor's office or clinic</u> to get care for yourself?

[0]☐ None ➔ **If None, Go to Question 45**
[1]☐ 1
[2]☐ 2
[3]☐ 3
[4]☐ 4
[5]☐ 5 to 9
[6]☐ 10 or more

32. In the last 6 months, how much of a problem, if any, was it to get the care, tests, or treatments you or a doctor believed necessary?

[1]☐ A big problem
[2]☐ A small problem

[3]☐ Not a problem

33. In the last 6 months, how often were you taken to the exam room <u>within 15 minutes</u> of your appointment?

[1]☐ Never
[2]☐ Sometimes
[3]☐ Usually
[4]☐ Always

34. In the last 6 months, how often did office staff at a doctor's office or clinic treat you with <u>courtesy and respect</u>?

[1]☐ Never
[2]☐ Sometimes
[3]☐ Usually
[4]☐ Always

35. In the last 6 months, how often were office staff at a doctor's office or clinic as <u>helpful</u> as you thought they should be?

[1]☐ Never
[2]☐ Sometimes
[3]☐ Usually
[4]☐ Always

36. In the last 6 months, how often did doctors or other health providers <u>listen carefully to you</u>?

[1]☐ Never
[2]☐ Sometimes
[3]☐ Usually
[4]☐ Always

37. In the last 6 months, how often did you have a hard time <u>speaking with or understanding</u> a doctor or other health providers because you spoke different languages?

[1]☐ Never
[2]☐ Sometimes
[3]☐ Usually
[4]☐ Always

38. In the last 6 months, how often did doctors or other health providers <u>explain things</u> in a way you could understand?

[1]☐ Never

[2]☐ Sometimes
[3]☐ Usually
[4]☐ Always

39. In the last 6 months, how often did doctors or other health providers show <u>respect for what you had to say</u>?

[1]☐ Never
[2]☐ Sometimes
[3]☐ Usually
[4]☐ Always

40. We want to know how you, your doctors, and other health providers make decisions about your health care. In the last 6 months, were any decisions made about your health care?

[1]☐ Yes
[2]☐ No ➔ **If No, Go to Question 43**

41. In the last 6 months, how often were you involved as must as you wanted in these decisions about your health care?

[1]☐ Never
[2]☐ Sometimes
[3]☐ Usually
[4]☐ Always

42. In the last 6 months, how much of a problem, if any, was it to get your doctors or other health providers to agree with you on the best way to manage your health conditions or health problems?

[1]☐ A big problem
[2]☐ A small problem
[3]☐ Not a problem

43. In the last 6 months, how often did doctors or other health providers <u>spend enough time</u> with you?

[1]☐ Never
[2]☐ Sometimes
[3]☐ Usually
[4]☐ Always

44. Using <u>any number from 0 to 10</u> where 0 is the worst health care possible and 10 is the best health care possible, what number would you use to rate all your health care in the last 6 months?

[0]☐ 0 Worst health care possible
[1]☐ 1
[2]☐ 2
[3]☐ 3
[4]☐ 4
[5]☐ 5
[6]☐ 6
[7]☐ 7
[8]☐ 8
[9]☐ 9
[10]☐ 10 Best health care possible

45. In the last 6 months, did you have a health problem for which you needed special medical equipment, such as a cane, a wheelchair, or oxygen equipment?

[1]☐ Yes
[2]☐ No ➔**If No, Go to Question 47**

46. In the last 6 months, how much of a problem, if any, was it to get the special medical equipment you needed through Carolina Access or Medicaid?

[1]☐ A big problem
[2]☐ A small problem
[3]☐ Not a problem

47. In the last 6 months, did you have any health problems that needed special therapy, such as physical, occupational, or speech therapy?

[1]☐ Yes
[2]☐ No ➔**If No, Go to Question 49**

48. In the last 6 months, how much of a problem, if any, was it to get the special therapy you needed through Carolina Access or Medicaid?

[1]☐ A big problem
[2]☐ A small problem
[3]☐ Not a problem

49. Home health care, or assistance means home nursing, help with bathing or dressing, and help with basic household tasks. In the last 6 months, did you need someone to come into your home to give you home health care or assistance?

[1]☐ Yes
[2]☐ No ➔**If No, Go to Question 51**

50. In the last 6 months, how much of a problem, if any, was it to get the care or assistance you needed through Carolina Access or Medicaid?

[1]☐ A big problem
[2]☐ A small problem
[3]☐ Not a problem

51. An interpreter is someone who repeats or signs what one person says in a language used by another person.

In the last 6 months, did you <u>need</u> an interpreter to help you speak with doctors or other health providers?

[1]☐ Yes
[2]☐ No ➔**If No, Go to Question 53**

52. In the last 6 months, when you needed an interpreter to help you speak with doctors or other health providers, how often did you get one?

[1]☐ Never
[2]☐ Sometimes
[3]☐ Usually
[4]☐ Always

PRESCRIPTION MEDICATIONS

53. In the last 6 months, did you get any new prescription medicine or refill a prescription?

[1]☐ Yes
[2]☐ No ➔ **If No, Go to Question 56**

54. In the last 6 months, how much of a problem, if any, was it to get your prescription medicine from Carolina Access or Medicaid?

[1]☐ A big problem
[2]☐ A small problem
[3]☐ Not a problem

55. In the last 6 months, how often did you get the prescription medicine you needed through Carolina Access or Medicaid?

[1]☐ Never
[2]☐ Sometimes
[3]☐ Usually
[4]☐ Always

CAROLINA ACCESS OR MEDICAID

The next question asks about your experience with <u>Carolina Access or Medicaid</u>.

56. Using <u>any number from 0 to 10</u> where 0 is the worst Carolina Access or Medicaid possible and 10 is the best Carolina Access or Medicaid possible, what number would you use to rate Carolina Access or Medicaid now?

[0]☐ 0 Worst possible
[1]☐ 1
[2]☐ 2
[3]☐ 3
[4]☐ 4
[5]☐ 5
[6]☐ 6
[7]☐ 7
[8]☐ 8
[9]☐ 9
[10]☐ 10 Best possible

ABOUT YOU

57. In general, how would you rate your <u>overall health now</u>?

[1]☐ Excellent
[2]☐ Very good
[3]☐ Good
[4]☐ Fair
[5]☐ Poor

58. Because of any impairment or health problem, do you need the help of other persons with your personal care needs, such as eating, dressing, or getting around the house?

[1]☐ Yes
[2]☐ No

59. Because of any impairment or health problem, do you need help with your routine needs, such as everyday household chores, doing necessary business, shopping, or getting around for other purposes?

[1]☐ Yes
[2]☐ No

60. Do you have a physical or medical condition that seriously interferes with your independence, participation in the community, or quality of life?

[1]☐ Yes
[2]☐ No

61. In the last 6 months, have you been a patient in a hospital overnight or longer?

[1]☐ Yes
[2]☐ No

62. Do you now have any physical or medical conditions that have lasted for at least 3 months? (Women: Do not include pregnancy).

[1]☐ Yes
[2]☐ No ➔**If No, Go to Question 65**

63. In the last 6 months, have you seen a doctor or health provider more than twice for any of these conditions?

[1]☐ Yes
[2]☐ No

64. Have you been taking prescription medicine for at least 3 months for any of these conditions?

[1]☐ Yes
[2]☐ No

65. In the last six months, have you received health care from a provider who is not paid for by Medicaid, such as a faith healer or herbalist?

[1]☐ Yes
[2]☐ No

66. What is your age now?

[1]☐ 18 to 24
[2]☐ 25 to 34
[3]☐ 35 to 44
[4]☐ 45 to 54
[5]☐ 55 to 64
[6]☐ 65 to 74
[7]☐ 75 or older

67. Are you male or female?

[1]☐ Male
[2]☐ Female

68. What is the highest grade or level of school that you have <u>completed</u>?

[1]☐ 8th grade or less
[2]☐ Some high school, but did not graduate
[3]☐ High school graduate or GED
[4]☐ Some college or 2-year degree
[5]☐ 4-year college graduate

[6]☐ More than 4-year college degree

69. Are you of Hispanic or Latino origin or descent?

[1]☐ Yes, Hispanic or Latino
[2]☐ No, not Hispanic or Latino

70. What is your race? Please mark one or more.

[1]☐ White
[2]☐ Black or African-American
[3]☐ Asian
[4]☐ Native Hawaiian or other Pacific Islander
[5]☐ American Indian or Alaska Native
[6]☐ Other

71. What language do you <u>mainly</u> speak at home?

[1]☐ English
[2]☐ Spanish
[3]☐ Some other language
(Please print)

_____

_____

72. Which is your preferred way to receive information about Medicaid and Carolina Access so that you can best remember the information? Please choose only one answer.

[1]☐ A written brochure or pamphlet
[2]☐ Audio CD
[3]☐ VHS Video Tape
[4]☐ DVD
[5]☐ TV
[6]☐ Radio
[7]☐ Internet
[8]☐ Email
[9]☐ Magazine
[10]☐ Other

73. Do you know how to use a computer?

[1]☐ Yes
[2]☐ No - If no, go to question 77

74. Do you use the internet?

[1]☐ Yes
[2]☐ No - If no, go to question 77

75. Where do you most often use the internet? Please choose only one answer.

[1]☐ Home
[2]☐ School/Work
[3]☐ Public Library
[4]☐ Friend's/Family's House
[5]☐ Church
[6]☐ Other

76. How often do you use the internet?

[1]☐ Daily
[2]☐ Once/Week
[3]☐ Several Times/Week
[4]☐ A few times/month
[5]☐ Once/month or less often

77. Do you watch DVDs?

[1]☐ Yes
[2]☐ No - If no, go to question 81

78. Where do you most often watch DVDs? Please choose only one answer.

[1]☐ Home
[2]☐ School/Work
[3]☐ Public Library
[4]☐ Friend's/Family's House
[5]☐ Church
[6]☐ Other

79. How often do you watch DVDs?

[1]☐ Daily
[2]☐ Once/Week
[3]☐ Several Times/Week
[4]☐ A few times/month
[5]☐ Once/month or less often

80. If you were to receive a DVD about Medicaid and Carolina Access, would you be most likely to watch it if you received it from:

[1]☐ Your doctor's office?
[2]☐ The mail
[3]☐ Your Medicaid Case Worker
[4]☐ Other _____

81. What would most attract you to read or look at information about Medicaid and Carolina Access? Please choose only one answer.

[1]☐ A famous person
[2]☐ Someone of your own race or ethnic group
[3]☐ A Cartoon
[4]☐ Other _____

82. In an emergency situation related to your health, what is the quickest way for you to receive information? Please choose only one answer.

[1]☐ Email
[2]☐ Cell Phone
[3]☐ Home Phone
[4]☐ Work/School
[5]☐ TV
[6]☐ Church
[7]☐ Radio
[8]☐ Other

INTERVIEWER EVALUATION:

83. Were there any questions you thought might not have been understood?

[1]☐ Yes
[2]☐ No

84. First question misunderstood: _____
85. Second question misunderstood: _____
86. Third question misunderstood: _____
87. How you rate the respondent's overall cooperation during the interview?

[1]☐ Excellent
[2]☐ Good
[3]☐ Fair
[4]☐ Poor

88. Any other comments (BE SPECIFIC):

APPENDIX B: FREQUENCY DISTRIBUTION OF NC COUNTIES AND STUDY POPULATIONS' RESIDENCE BY DEGREE OF COUNTY URBANICITY, THREE-LEVEL CLASSIFICATION

Code	**Number of Counties**	**Population (n = 474,681)**
Urban (1); metropolitan area	40	61.3%
Mixed (2); Non-metropolitan with population ≥ 20,000	19	22.9%
Rural (3); Non-metropolitan with population < 20,000	41	15.8%

Source: Brandon W, P., Schoeps, N., Sun, C.X. and Smith, G. H. (2008).

APPENDIX C: FREQUENCY DISTRIBUTION OF STUDY POPULATIONS' RESIDENCE BY GEOGRAPHICAL REGION

Geographical Region	**Population (n = 474,681)**
Mountains	12.7%
Piedmont	49.3%
Coastal Plain	29.1%
Tidewater	9.0%

Source: Brandon W, P., Schoeps, N., Sun, C.X. and Smith, G. H. (2008).