

SOCIAL SUPPORT AND HEALTH OUTCOMES AMONG INDIVIDUALS LIVING  
WITH HIV IN THE DEEP SOUTH

by

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A dissertation submitted to the faculty of  
The University of North Carolina at Charlotte  
in partial fulfillment of the requirements  
for the degree of Doctor of Philosophy in  
Health Services Research

Charlotte

2010

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## ABSTRACT

SARA HAYES LEGRAND. Social support and health outcomes among individuals living with HIV in the Deep South. (Under the direction of DR. TERESA L. SCHEID)

**Study Purposes:** The purposes of this study were: 1) to provide a more comprehensive description of social support and to determine if gender and/or race were associated with social support; 2) to examine relationships between diverse forms of social support and health outcomes such as mental health, HIV disease severity, and physical quality of life; and 3) to analyze gender and racial differences in the associations between social support and health outcomes among individuals living with HIV in the Deep South.

**Methods:** Baseline data from the Duke University Coping with HIV/AIDS in the Southeast (CHASE) Study collected in 2001-2002 were used for this study.

Multivariable models based on the Commission for Social Determinants of Health Conceptual Framework were constructed to examine the associations between gender, race, and social support and social support and health outcomes. Stratified analyses were conducted to identify differences in the associations between social support and health outcomes by gender and race.

**Results:** Men were more likely to be socially isolated than women. Non-Hispanic Black individuals were more likely to experience social conflict than non-Hispanic Whites. Greater perceived social support was associated with less psychological distress and exposure to social conflict was associated with more psychological distress. A higher degree of social integration was associated with larger CD4 count values. Interactions between severe stress and perceived social support and

severe stress and social isolation were associated with physical health-related quality of life.

The strongest predictor of psychological distress among males was perceived social support, while social conflict was the strongest predictor of distress for women. Social conflict was also the strongest predictor of physical health-related quality of life among women. There was a significant difference in the relationship between social conflict and physical health-related quality of life for men and women. For non-Hispanic White individuals, social isolation was associated with physical health-related quality of life, but not for non-Hispanic Blacks. The relationship between social isolation and health-related quality of life was significantly different by race.

Conclusions: Multiple components of social support were associated with health outcomes in this study. Although HIV care has traditionally addressed the social needs of clients, medical treatment has increasingly become the focus of care. Reductions in financial support for social support services necessitate improvements in the effectiveness and efficiency of funded social support interventions. Identification of the components of social support that predict health outcomes for HIV-positive individuals living in the Deep South may inform intervention development or guide modifications to existing interventions. Knowledge about the differences in these associations by gender and race may further improve interventions and help identify the highest priority populations. In addition to efforts to improve social support interventions, the health effects of policies that reduce funding to address the social support needs of individuals living with HIV should be carefully evaluated.

## ACKNOWLEDGMENTS

I am grateful for all of the support I have received during the preparation of this dissertation. I would like to express my deepest gratitude to my committee chair, Dr. Teresa Scheid, who has provided extensive academic and personal guidance throughout the dissertation process. Her unwavering support has been invaluable and has extended far beyond any expectations. I would like to thank the members of my committee, Drs. Larissa Huber, Susan Reif, Jim Laditka, and David Langford for their insights, suggestions, and support. I would also like to express my gratitude to Dr. Jacek Dmochowski for his encouragement and willingness to share his knowledge and time.

The support I have received from my family and friends is immeasurable. I am eternally grateful for their encouragement and humbled by their love. I would especially like to thank my parents for cultivating a love of learning and stressing the importance education, through both their words and actions. They have been phenomenal role models. Lastly, the tenacious support provided by my closest friends has truly given me a different perspective on the meaning of friendship and will always be cherished.

Finally, I would like to thank the Center for Health Policy at Duke University for providing access to the data used for this research. The Center for Health Policy was funded by the National Institute of Mental Health to conduct the Coping with HIV/AIDS in the Southeast (CHASE) Study.

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## CHAPTER 1: INTRODUCTION

Components of social support such as social network size, perceived and received social support, and satisfaction with social support have all been associated with health outcomes for people living with HIV (Burgoyne & Renwick, 2004; Friedland, Renwick, & McColl, 1996; Lee & Rotheram-Borus, 2001; McDowell & Serovich, 2007; Serovich, Kimberly, Mosack, & Lewis, 2001; Swindells et al., 1999; Viswanathan, Anderson, & Thomas, 2005). Most studies that have examined these associations were conducted in large cities in the North or Midwest, therefore, little is known about social support or the associations between social support and mental and physical health outcomes among those living with HIV in the Deep South.

The Deep South, a region that includes North Carolina, South Carolina, Georgia, Alabama, Mississippi, and Louisiana, has been disproportionately affected by HIV. The number of newly reported AIDS cases in the Deep South states increased 36% between 2000 and 2005 compared to a 2% increase in the other southern states and a 6% decrease nationally, excluding the Deep South states. The Deep South also has some of the highest AIDS death rates in the country (B. W. Pence et al., 2007).

Unique contextual and cultural factors found in the Deep South may be related to social support among HIV-positive individuals living in this region. Factors such as poorer overall health status, higher rates of unemployment and poverty, lower rates of high school and college completion (Reif, Geonnotti, & Whetten, 2006), and greater HIV

stigma (Heckman et al., 1998) that characterize the Deep South are likely to negatively affect social support. When compared to other areas, HIV-positive individuals living in this region are more likely to be female and non-Hispanic Black (Reif, Whetten, Lowe, & Ostermann, 2006), both of which are characteristics that have been associated with social support (Ajrouch, Antonucci, & Janevic, 2001; Antonucci & Akiyama, 1987; Belle, 1987; Consedine, Magai, Cohen, & Gillespie, 2002; J. House, Umberson, & Landis, 1988; Kawachi & Berkman, 2001; Kiecolt-Glaser & Newton, 2001; Neff & Karney, 2005; Neighbors & Jackson, 1984; Stansfield, 2006; Umberson, Chen, House, Hopkins, & Slaten, 1996).

Few studies have examined social support or the associations between social support and health outcomes among individuals living with HIV in the Deep South. The unique contextual and cultural factors found in the Deep South such as higher rates of poverty and unemployment and differing HIV demographics may influence social support and the associations between social support and health outcomes; therefore, research focused on this region is needed.

### **Purpose of the Study**

The purposes of this study are: 1) to provide a more comprehensive description of social support and to determine if gender and/or race are associated with social support; 2) to examine relationships between diverse forms of social support and critical health outcomes such as mental health, HIV disease severity, and physical quality of life; and 3) to analyze gender and racial differences in the associations between social support and health outcomes among individuals living with HIV in the Deep South.

## **Theoretical Framework**

This research is guided by the Commission on Social Determinants of Health Conceptual Framework (Commission on Social Determinants of Health, 2007, 2008) (Figure 1.1). The framework describes the relationships between the socio-political context, social position, life circumstance factors, and health outcomes. According to the framework, socioeconomic and political factors such as governance, policies, and cultural and societal norms and values reinforce or discourage stratification of individuals into social hierarchies. Education level, type of occupation, income, gender and race/ethnicity often reflect an individual's position in the social hierarchy. Social position influences an individual's life circumstances and life circumstances are predictors of health outcomes.

In the Commission's framework (Commission on Social Determinants of Health, 2007, 2008), life circumstances include material circumstances, social cohesion, psychosocial factors, behaviors, biological factors, and health care system factors. Material circumstances include factors related to the physical environment such as housing, clothing, food accessibility, and neighborhood characteristics. Social cohesion describes the strength of relationships within communities. Community members' participation in community activities, groups, and civic affairs are often used as indicators of social cohesion (Stansfield, 2006). Negative life events, employment difficulties, financial strain, and other stressors are included as psychosocial factors. Social support and social exclusion are also identified as psychosocial factors. Examples of behavioral factors include smoking, alcohol use, diet, and physical activity. Age is considered a biological factor. Health care system factors include access to and quality of health care. The reverse effects of health outcomes on social position and the socio-

political context are also represented in the framework (Commission on Social Determinants of Health, 2007, 2008).

An adapted version of the Commission on Social Determinants of Health Conceptual Framework is used for this research (Figure 1.2). According to the framework, social position factors have an effect on individuals' life circumstances. Chapter Two examines gender and race as social position predictors of social support among individuals living with HIV in the Deep South. Other social position and life circumstances factors are considered as potential confounders. The framework also posits that life circumstances, including social support, are proximally related to health outcomes. Chapter Three examines the associations between social support and health outcomes among HIV-positive individuals living in the Deep South. The Commission on Social Determinants of Health Conceptual Framework does not consider that the associations between life circumstances and health outcomes may differ by social position. Chapter Four extends beyond the framework to examine differences in the associations between social support and health outcomes by gender and race among people living with HIV in the Deep South.

## **Research Questions and Hypotheses**

### *Chapter Two*

Chapter Two will describe structural (social integration, social isolation) and functional (perceived social support, social conflict) social support among individuals living with HIV in the Deep South. Studies of HIV-positive individuals have rarely examined multiple components of social support. Research on the negative components of social relationships is especially limited, although these factors may be particularly

relevant for individuals with HIV. For example, HIV-positive individuals may be socially isolated if their friends, family members, or community members limit or withdraw support. Isolation may also occur if individuals living with HIV limit participation in social relationships and activities due to fear of rejection. Conflict in relationships may be elevated because of the stress of living with a highly stigmatized disease. Social isolation and social conflict may be particularly pronounced in the Deep South where there are high levels of poverty, rural-living, and mental health and substance abuse problems. Chapter Two will also examine the associations between gender, race, and social support. The higher proportion of women and non-Hispanic Blacks infected with HIV in the Deep South and the strong gender expectations and racial divisions that persist in the region motivate research that examines the effects of gender and race on social support.

Research Question 1: How does social support differ by gender and race?

**Hypothesis 1a:** Men will be more likely to be socially isolated than women.

**Justification 1a:** Men typically have smaller social support networks than women and are more likely to rely on a spouse for social support (Antonucci & Akiyama, 1987; Umberson et al., 1996). Children can be an important part of individuals' social networks, however, HIV-positive men are less likely to be parents than HIV positive women (Lee & Rotheram-Borus, 2001; Lichtenstein, Laska, & Clair, 2002).

**Hypothesis 1b:** Women will be more likely to experience social conflict than men.

**Justification 1b:** Larger social support networks and a greater number of emotionally intimate relationships may increase the likelihood of exposure to social conflict among women (J. House et al., 1988; Kawachi & Berkman, 2001; Shumaker & Hill, 1991).

**Hypothesis 1c:** Blacks will be more likely to experience social conflict than Whites.

**Justification 1c:** Racism and discrimination may increase Black individuals' exposure to anger, stressful situations, and interpersonal conflict (Consedine et al., 2002).

### *Chapter Three*

Chapter Three will examine associations between social support and health outcomes among individuals living with HIV in the Deep South. Social support has been associated with health outcomes among people living with HIV, however, few studies have explored the associations between social support and health outcomes among those living with HIV in the Deep South (Burgoyne & Renwick, 2004; Friedland et al., 1996; Lee & Rotheram-Borus, 2001; McDowell & Serovich, 2007; Serovich et al., 2001; Swindells et al., 1999; Viswanathan et al., 2005). Further, most studies that have examined these relationships have primarily focused on perceived social support and mental health outcomes. This research will examine the associations between social integration, social isolation, perceived social support, and social conflict and psychological distress, HIV disease severity, and physical health-related quality of life.

#### Research Question 3: How is social support associated with health outcomes?

**Hypothesis 3a:** Perceived social support will be negatively associated with psychological distress.

**Justification 3b:** Perceived social support is believed to buffer the negative effects of stress on mental health (Cohen & Wills, 1985; McDowell & Serovich, 2007; Serovich et al., 2001).

**Hypothesis 3b:** Social conflict will be positively associated with psychological distress.

**Justification 3b:** Social conflict may negatively impact mental health by increasing levels of stress (Cohen, 2004; Leserman et al., 1994; C Sherbourne, Forge, Kung, Orlando, & Tucker, 2003).

**Hypothesis 3c:** Social integration will be positively associated with CD4 counts.

**Justification 3c:** Social integration is thought to directly affect health outcomes through adherence to positive normative health behaviors, improved health information access, and positive psychological responses associated with participation in social relationships (Cohen, 1988; Cohen, 2004; Cohen, Gottlieb, & Underwood, 2000; Cohen & Wills, 1985; Stroebe & Stroebe, 1996; P. A. Thoits, 1983; P.A. Thoits, 1985; B.N. Uchino, 2004; B. N. Uchino, Cacioppo, & Kiecolt-Glaser, 1996).

**Hypothesis 3d:** Social isolation will be negatively associated with physical health related quality of life.

**Justification 3d:** Negative psychological, neuroendocrine, and immune responses caused by the stress of social isolation (Brissette, Cohen, & Seeman, 2000; Cohen, 2004) may be related to physical HRQOL.

#### *Chapter Four*

Chapter Four will examine differences in the associations between social support and health outcomes among HIV-positive individuals in the Deep South by gender and race. Few studies were identified that examined the associations between social support and health outcomes stratified by gender and race. However, the relationships between social support and health outcomes may differ based on these characteristics. For example, the degree to which an individual is integrated into a social network may be a



significant predictor of HIV disease severity for women but not for men. Additionally, the direction and/or strength of the association may vary by gender or race.

Research Question 4: Are there differences in the associations between social support and health outcomes by gender and race?

**Hypothesis 4a:** The associations between social support and psychological distress will vary by gender.

**Hypothesis 4b:** The associations between social support and CD4 counts will vary by gender.

**Hypothesis 4c:** The associations between social support and physical health-related quality of life will vary by gender.

**Hypothesis 4d:** The associations between social support and psychological distress will vary by race.

**Hypothesis 4e:** The associations between social support and CD4 counts will vary by race.

**Hypothesis 4f:** The associations between social support and physical health-related quality of life will vary by race.

**Justification 4a-4f:** No prior research was identified to support directional hypotheses.

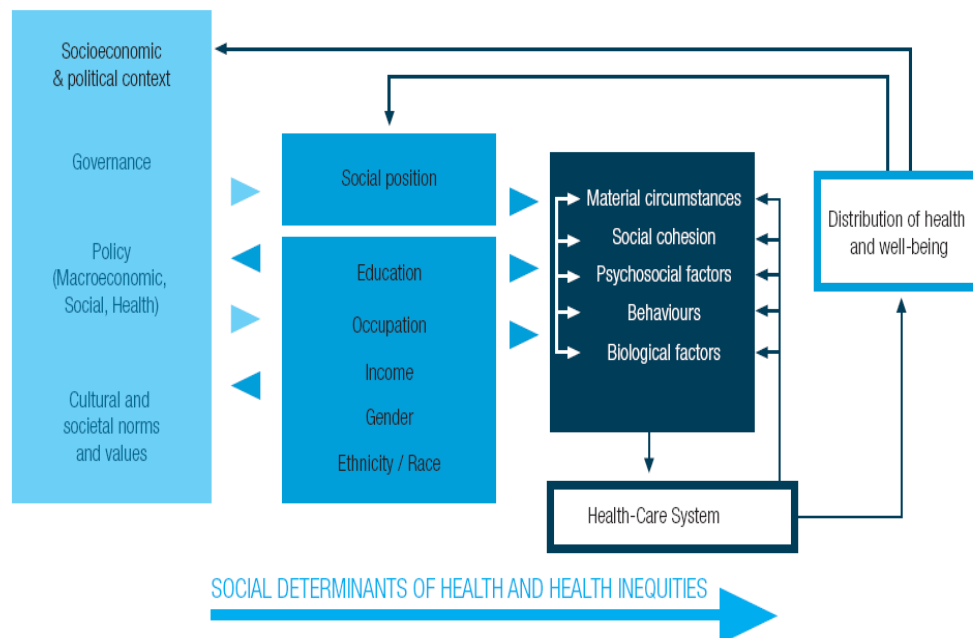
### **Significance**

An increased understanding of social support and how it is associated with health outcomes may help inform social support intervention strategies that improve the health of HIV-positive individuals in the Deep South. In order to design the most effective interventions, it is important to determine if the relationships between social support and

health outcomes vary by social position factors. Identification of any differences will ensure that interventions meet the unique social support needs of these groups.

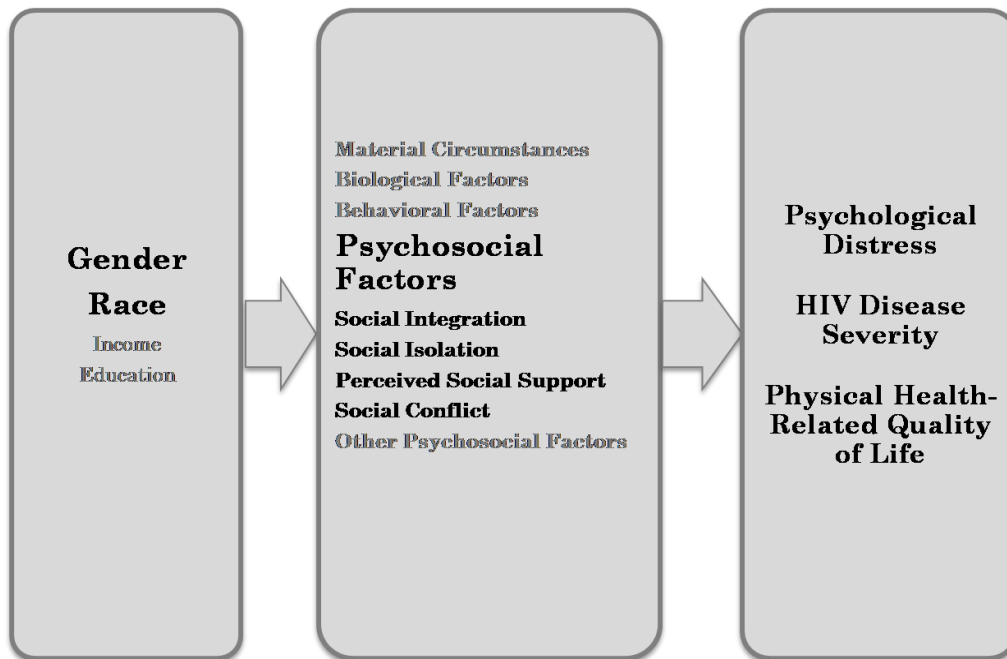
Although care for individuals living with HIV has traditionally included ancillary services such as case management, support groups, and mental health counseling in addition to medical treatment, recent changes in federal legislation reflect a shift in care priorities. The Ryan White HIV/AIDS Treatment Modernization Act of 2006 limits the amount of federal funding that can be spent on ancillary services that are not directly related to medical care. An increasing focus on medical treatment and the reduction of allowable spending on support services necessitate the development of effective and efficient interventions which address social support components most important in predicting health outcomes.

**Figure 4.1** Commission on Social Determinants of Health conceptual framework.



Commission on Social Determinants of Health. (2008). *Closing the gap in a generation: Health equity through action on the social determinants of health: Final report of the Commission on Social Determinants of Health*. Geneva: World Health Organization.

**Figure 1.1:** Commission on Social Determinants of Health Conceptual Framework



Adapted from: Commission on Social Determinants of Health. (2008). *Closing the gap in a generation: Health equity through action on the social determinants of health: Final report of the Commission on Social Determinants of Health*. Geneva: World Health Organization.

Figure 1.2: Study conceptual framework

## CHAPTER TWO: SOCIAL SUPPORT AND THE ASSOCIATIONS BETWEEN GENDER, RACE, AND SOCIAL SUPPORT AMONG INDIVIDUALS LIVING WITH HIV IN THE DEEP SOUTH

### **Introduction**

Components of social support such as social network size, perceived and received social support, and satisfaction with social support have all been associated with health outcomes for people living with HIV (Burgoyne & Renwick, 2004; Friedland et al., 1996; Lee & Rotheram-Borus, 2001; McDowell & Serovich, 2007; Serovich et al., 2001; Swindells et al., 1999; Viswanathan et al., 2005). Most studies that have examined these associations were conducted in large cities in the North or Midwest, therefore, little is known about social support or the associations between social support and mental and physical health outcomes among those living with HIV in the Deep South. The Deep South, a region that includes North Carolina, South Carolina, Georgia, Alabama, Mississippi, and Louisiana, has been disproportionately affected by HIV. The number of newly reported AIDS cases in the Deep South states increased 36% between 2000 and 2005 compared to a 2% increase in the other southern states and a 6% decrease nationally, excluding the Deep South states. The Deep South also has some of the highest AIDS death rates in the country (Reif, Geonnotti et al., 2006; K Whetten & Reif, 2006).

Unique contextual and cultural factors found in the Deep South may be related to social support among HIV-positive individuals living in this region. Factors such as

poorer overall health status, higher rates of unemployment and poverty, lower rates of high school and college completion (Reif, Geonnotti et al., 2006), and greater HIV stigma (Heckman et al., 1998) that characterize the Deep South are likely to negatively affect social support. When compared to other areas, HIV-positive individuals living in this region are more likely to be female and non-Hispanic Black (Reif, Whetten et al., 2006), both of which are characteristics that have been associated with social support (Ajrouch et al., 2001; Antonucci & Akiyama, 1987; Belle, 1987; Consedine et al., 2002; J. House et al., 1988; Kawachi & Berkman, 2001; Kiecolt-Glaser & Newton, 2001; Neff & Karney, 2005; Neighbors & Jackson, 1984; Stansfield, 2006; Umberson et al., 1996).

This study was designed to describe social support and examine associations between gender, race, and social support among individuals living with HIV in the Deep South.

## **Literature Review**

### *Social Support*

Social support has been studied across multiple disciplines, which contributes to a lack of consensus on its definition. Generally, social support is described as a multifactorial construct that includes the structures of an individual's social relationships and the functions the relationships provide (B.N. Uchino, 2004). The structural component of social support is often defined by social integration, social isolation, or social network characteristics (Turner & Turner, 1999). Functional social support includes informational, instrumental, and emotional support, as well as social conflict (Cohen, 2004).

### *Structural Social Support*

A structural measure of social support, social integration, describes the way an individual is situated or integrated into a social network (B.N. Uchino, 2004). For example, the number of different social roles a person occupies has been used to indicate degree of social integration in prior research (Brissette et al., 2000). Social integration has been associated with lower mortality rates, higher heart attack survival rates, and lower susceptibility to infections (Berkman & Syme, 1979; Cohen, Doyle, Skoner, Rabin, & Gwaltney, 1997; Farmer et al., 1996; J. S. House, Landis, & Umberson, 1988). The direct effect model is typically used to describe associations between structural measures of social support and health outcomes. The model suggests that membership in a social network has direct positive effects on health outcomes irrespective of stress level (Cohen et al., 2000). This may be due to network members conforming to positive normative health behaviors, having access to a wider variety of information that may help improve health, or through positive psychological responses resulting from network participation (Cohen, 2004; Cohen et al., 2000; Cohen & Wills, 1985; Stroebe & Stroebe, 1996; P. A. Thoits, 1983; B.N. Uchino, 2004). Positive psychological responses may result in a lower likelihood of psychological despair, reductions in neuroendocrine responses, and improvements in immune functioning (Cohen, 1988; P.A. Thoits, 1985; B. N. Uchino et al., 1996).

An alternative explanation for the relationship between the structural component of social support and health is that disease may be associated with social isolation instead of the degree of social integration (Cohen, 2004; Cohen et al., 2000). Social isolation may cause stress, which can result in poorer affect, feelings of alienation, and decreased

feelings of control and self-esteem. These responses may lead to negative psychological states that yield unhealthy behaviors, increased neuroendocrine responses, and suppressed immune functioning (Brissette et al., 2000; Cohen, 2004).

### *Functional Social Support*

The functional component of social support describes the functions provided by social relationships (B.N. Uchino, 2004). The positive functions of social support include informational, instrumental and emotional support. Informational support is information or advice provided to an individual to help them cope with a stressful situation. Support that is tangible, such as financial aid or assistance with daily tasks, is considered instrumental support. Emotional support includes expressions of empathy, caring, and reassurance for a person who is encountering a difficult or stressful situation (Cohen, 2004). Functional social support can be assessed by measuring perceived social support, the perception that support is available when needed, or by measuring received social support, the actual support an individual receives (B.N. Uchino, 2004).

The stress buffering model is often used to describe relationships between positive social support functions and health outcomes. The model posits that social support acts as a buffer to the deleterious effects of stress on mental and physical health. The model best describes the relationship between perceived rather than received social support and health outcomes (Cohen & Wills, 1985). In prior research, the perception of social support availability has been more strongly and consistently related to health outcomes than the actual support received (Cohen & Wills, 1985; Turner & Brown, 2010). Perceived social support may thwart the negative effects of stress on health by



either preventing a situation from being appraised as stressful or reducing negative emotional, physiological, and behavioral responses to the situation (Cohen et al., 2000).

Social relationships may also function in ways that negatively influence health outcomes. Relationships may increase levels of interpersonal conflict, which is associated with negative cognitive, affective, and biological responses (Cohen, 2004; Cohen et al., 1998). Social conflict may also be related to poorer health outcomes because individuals may participate in negative health behaviors in order to cope with the stress associated with conflict (Cohen, 2004).

#### *Gender and Social Support*

Variations in social support by gender are likely influenced by societal gender expectations. For instance, women are expected to be the primary providers of social support (J. House et al., 1988). Women have, in fact, been found to provide social support to others more frequently and more effectively (Belle, 1987; Neff & Karney, 2005; Umberson et al., 1996). Women are also more likely to assume caregiving roles, such as care for children or impaired adults (Umberson et al., 1996).

Women tend to have larger social support networks and are more likely than men to maintain emotionally intimate relationships (Antonucci & Akiyama, 1987; Belle, 1987; Shumaker & Hill, 1991; Umberson et al., 1996). However, larger networks and more intimate relationships may expose women to greater stress and interpersonal conflict (J. House et al., 1988; Kawachi & Berkman, 2001; Shumaker & Hill, 1991). Women typically receive support from multiple sources, while men rely heavily on their spouses for support (Antonucci & Akiyama, 1987; Umberson et al., 1996). Women also tend to mobilize more social support during times of stress than men (Belle, 1987).

### *Race and Social Support*

Differences in social support by race have been identified. For example, Black individuals have smaller social networks than Whites. For Black individuals, experiences with discrimination may result in stricter criteria for network member selection; network size may be reduced as a result (Ajrouch et al., 2001). Racism and discrimination may also increase Black individuals' exposure to anger, stressful situations, and interpersonal conflict (Consedine et al., 2002).

Social networks of Black individuals are more likely to include extended family, friends, or church members than those of Whites (Ajrouch et al., 2001). Family members are an important part of Black individuals' social networks. Compared to Whites, Blacks have a higher proportion of family members in their social network (Ajrouch et al., 2001). In addition, Black individuals tend to rely more on support from family members than Whites (Neighbors & Jackson, 1984). The church is often an important source of social support for Blacks. Involvement in the church can provide access to emotional and tangible support (Williams, 2002).

Due to strong societal expectations around gender and persisting racial divisions, the influence of gender and race on social support are likely exacerbated in the Deep South. The high level of poverty found in this region may also have a negative effect on social support by reducing network size and support availability and increasing interpersonal conflict (J. House et al., 1988; Turner & Turner, 1999).

### **Study Purpose**

The purpose of this study was to describe the structural and functional social support of individuals living with HIV in the Deep South and to examine associations between

gender, race, and social support. It was hypothesized that men would be more likely to be socially isolated than women; women would be more likely to experience social conflict than men; and the likelihood of experiencing social conflict would be higher for Blacks than Whites.

An adapted version of the Commission on Social Determinants of Health Conceptual Framework was used to guide this research (Figure 2.1). According to the framework, social position has an effect on an individual's life circumstances. Gender and race are two characteristics that identify an individual's position in the social hierarchy. Material circumstances, psychosocial factors, behaviors, and biological factors are considered life circumstances. Social support is identified as a psychosocial factor.

## **Methods**

### *Study Design and Data*

The data used in this study are from the Coping with HIV/AIDS in the Southeast (CHASE) Study. This prospective cohort study collected demographic, psychosocial, and clinical data from individuals receiving care at one of eight infectious disease clinics in the Deep South from 2001-2005. Participants were recruited using consecutive sampling at study sites in North Carolina, South Carolina, Georgia, Alabama, and Louisiana. Individuals were eligible for participation if they 1) were HIV-positive; 2) were English-speaking; and 3) passed a brief test which screened for cognitive impairment. There were 789 individuals recruited for the study. Sixteen were excluded because they failed the cognitive impairment test. Of the 773 eligible subjects, 611 (79%) enrolled in the CHASE study. The sample was reflective of individuals seeking HIV care outside of the region's three largest metropolitan statistical areas (MSAs)

(Charlotte, NC; Atlanta, GA; and New Orleans, LA) by gender, race, mode of HIV acquisition, and disease stage.

Data were collected every nine months during approximately two hour long interviews conducted by field certified interviewers. In addition, trained health care providers recorded clinical information from clients' medical records on standardized chart abstraction forms. Informed consent was obtained from all participants. The CHASE study was approved by the Institutional Review Boards at Duke University and at all study sites. This study reports on baseline data collected from 611 participants from 2001-2002.

### *Measures*

#### Gender and Race

Self-reported gender categories included male and female. Race categories included Black, White, and other. A dichotomous race variable that included Black and White categories was also created.

#### Structural Social Support

The structural social support measures used in this study were social integration and social isolation. Role-based social integration measures consider the range of relationships in which a person participates (Brissette et al., 2000). In this study, it was measured as the sum of the number of the following roles an individual reported holding (range 0-6): employee/student/job training, parent, partner, having two or more friends/family, having a close friend with HIV, and/or support group participation. This scale is adapted from the Identity Accumulation Scale created by Thoits (1983). Brissette and colleagues (2000) recommend that researchers include items to assess roles that may

be important for the population of interest. To measure social roles that may be important to individuals living with HIV, the social integration measure included items assessing friendship with another person with HIV and participation in a support group. This approach to measuring social integration suggests a linear relationship where more integration predicts better health outcomes.

The measure of social isolation categorizes individuals as isolated or not isolated based on social integration measures. Study participants were classified as socially isolated if social integration was equal to zero or one.

### Functional Social Support

The functional social support measures used in this study were perceived social support and social conflict. Perceived social support was measured using the Medical Outcomes Study Social Support Survey (MOS-SSS). The MOS-SSS has high internal reliability (Cronbach's alpha 0.91-0.97) and stability (0.72-0.78) (CD Sherbourne & Stewart, 1991). Items from the Life Experiences Survey (LES) were used to identify social conflict (Sarason, Johnson, & Siegel, 1978). The LES measures recent stressful life events and includes specific items about partner divorce, separation, or break-up due to conflict; increase in partner conflict without a break-up; and change in closeness to a family member due to conflict. A dichotomous social conflict variable was created. Participants who experienced any of the three LES conflict measure were considered exposed to social conflict.

### Potential Confounders

Social position variables considered as potential confounders were self-reported income and education. Income was calculated as the sum of income in the last month

from multiple sources including employment, unemployment benefits, public assistance, child support, pensions or Social Security, friends or family, and illegal activities.

Income was log transformed to reduce positive skew. Education was categorized into less than a high school diploma, a high school diploma, and more than a high school diploma.

Self-reported age and HIV disease status were considered as potential biological confounding variables. Disease status was calculated from chart abstracted CD4 counts. A CD4 count below 200 meets the criteria for an AIDS diagnosis (Centers for Disease Control and Prevention, 1992), therefore, this cutoff value was used to dichotomize disease status.

Housing stability was included as a material circumstance. An individual was considered to have unstable housing if they spent at least one night in the last 90 days in a shelter for homeless persons; on the street; in an emergency housing program; in jail, prison, halfway house with no place else to live; drug treatment with no place else to live; or temporarily doubled up in someone else's home.

Behavioral factors included severity of drug use and severity of alcohol use. The Drug Composite Score and the Alcohol Composite Score from the Addiction Severity Index (ASI) were used to measure severity of use in the last 30 days. Composite score values range from 0-1 with a higher score indicating more use (McLellan et al., 1992).

Psychosocial variables other than social support included severe stress and incident trauma. Severe stress was measured using items from the LES (Sarason et al., 1978) which were associated with physical functioning in prior studies (Leserman et al., 2005). Severe stress was calculated as the sum of 16 different severe stressors such as

the death of a parent or sibling, hospitalization unrelated to HIV, major financial difficulties, and more than a week in prison in the last 9 months. An item about separation or divorce due to arguments was excluded because the item was used to assess social conflict. Three other severe stressors that satisfy the criterion A(1) of the definition of post-traumatic stress disorder were used to define incident trauma (American Psychiatric Association, 1990). A dichotomous incident trauma variable was created and participants who had experienced the death of a spouse/partner or child, sexual assault, or physical assault in the last 9 months were considered exposed.

### *Statistical Analysis*

Data were analyzed using StataIC 10 (StataCorp, 2007). Descriptive statistics were calculated for all study variables. Chi-square tests and t-tests were used to identify bivariable differences in social support variables by gender and race. Pearson's correlation coefficient ( $r$ ) was calculated to examine the associations between social integration, social isolation, perceived social support, and social conflict.

Multiple linear regression was used to examine associations between gender and race and continuous social support outcomes (social integration, perceived social support) while controlling for potential confounders. Logistic regression was used to examine associations between gender and race and dichotomous social support outcomes (social isolation, social conflict) while controlling for potential confounders. Based on the conceptual framework, a full model for each social support outcome was constructed that included gender and race as the independent variables of interest. Potential confounders included other social position variables (log income, education), biological factors (age, disease status), material circumstances (unstable housing), behaviors (severity of illicit

drug use, severity of alcohol use), and psychosocial factors other than social support (incident trauma, severe stress). Reduced models were developed for each outcome using backward elimination. The potential confounder with the largest  $p$ -value was removed and regressions repeated until all remaining potential confounders had a  $p$ -value  $\leq 0.10$ . Regression diagnostics appropriate for multiple linear regression or logistic regression were performed. Observations with missing data were not included in the analyses. The significance levels used for bivariable and multivariable analyses were  $p < 0.01$  and  $p < 0.05$ .

## **Results**

### *Description of the Sample*

The study sample consisted of 611 individuals (Table 2.1). The majority of study participants were male (68.7%). Non-Hispanic Blacks were 64.1% of the sample and 31.6% were non-Hispanic Whites (henceforth referred to as Black or White). The remaining 4.4% of participants were Latino, Asian, or Native American. Approximately 80% of the participants had at least a high school diploma; 42.1% of the participants were either employed or students. At the time of data collection, 77.5% of participants had a CD4 count equal to or greater than or 200.

### *Social Support Variables*

The proportion of participants who were married or partnered was 30.1%; 52.9% were the parent or guardian of a child (Table 2.2). The average number of close friends and family members reported was 7, with 86% having 2 or more. Approximately 36.5% had a close friend with HIV and 27.8% participated in some type of support group. The proportion of those who experienced partner conflict resulting in divorce or separation



was 13.8%, while 15.1% experienced conflict without divorce or separation. Nearly 17% reported a change in closeness with a family member due to conflict.

#### *Differences in Social Support Variables by Gender and Race*

A greater proportion of men reported having a close friend with HIV (42.5%) than women (22.7%) ( $p<0.01$ ) (Table 2.2). Compared to men, women were more likely to be a parent (86.4% vs. 37.7%;  $p<0.01$ ) and more likely to report familial conflict (22.1% vs. 14.6%;  $p=0.02$ ). Black individuals were less likely to have a partner than Whites (23.6% vs. 45.0%;  $p<0.01$ ), more likely to report being a parent or guardian (61.4% vs. 36.0%;  $p<0.01$ ), and less likely to be employed or students (37.3% vs. 51.6%;  $p<0.01$ ). The proportion of individuals reporting conflict without divorce or separation was higher among Blacks (17.2%) compared to Whites (10.1%) ( $p=0.02$ ).

#### *Social Support Measures*

The mean value of the social integration measure, the number of social roles occupied, was 2.7 (Table 2.2). Perceived social support values ranged from 0-100 with a larger number reflecting more support. The mean value of perceived social support was 72.7. Twelve percent of individuals had 0-1 roles and were considered socially isolated. Slightly more than 32% of participants reported experiencing at least one type of social conflict in the last 9 months. Perceived social support was positively correlated with social integration (0.29,  $p<0.01$ ) and negatively associated with social isolation (-0.25,  $p<0.01$ ) and social conflict (-0.11,  $p<0.05$ ) (Table 2.3).

#### *Differences in Social Support Measures by Gender and Race*

A greater percentage of men were socially isolated (14.0%) than women (6.9%) ( $p=0.02$ ) (Table 2.2). The proportion of individuals experiencing any social conflict was

higher among women (40.5%) compared to men (28.5%) ( $p<0.01$ ). Reports of any social conflict were more common among Blacks than Whites (34.4% vs. 26.1%;  $p<0.01$ ).

#### *Multivariable Associations between Gender, Race, and Social Support Outcomes*

Gender was associated with social integration in multivariable analysis. The value of social integration was 0.25 lower for men compared to women ( $p=0.03$ ). Log income was also associated with greater social integration ( $\beta=0.13$ ,  $p=0.01$ ) (Table 2.4). Neither gender nor race was associated with perceived social support scores. Unstable housing, higher drug use severity, and more severe stress were associated with lower perceived social support (Table 2.5). Gender was significantly related to social isolation; men were more likely to be socially isolated than women (OR=2.37; 95% CI= 1.05, 5.35). A CD4 count equal to or less than 200 was also associated with a higher likelihood of social isolation (Table 2.6). Race was associated with social conflict. Black individuals were more likely to experience conflict than Whites (OR=2.21; 95% CI= 1.31, 3.73). Gender was not associated with conflict. Higher income and incident trauma were related to an increased likelihood of social conflict, while older age and CD4<200 were associated with a reduced likelihood of conflict (Table 2.7).

#### **Discussion**

The results of this study provide a greater understanding of social support among individuals living with HIV/AIDS in the Deep South. In prior research with HIV-positive individuals, social support measures have often been limited to a single item or a scale designed to measure perceived social support. While perceived social support has been associated with health outcomes for the general population and for HIV-positive individuals (Burgoyne & Renwick, 2004; Jia et al., 2004; Ruiz Perez et al., 2005), its

measurement captures only the positive and functional components of social support. In this study, participants had a perceived social support score (72.7) similar to that of individuals with chronic illnesses such as heart disease, hypertension, diabetes, and depression (70.1) (CD Sherbourne & Stewart, 1991). This is a notable finding because it may indicate that the stigma often associated with HIV/AIDS may not diminish individuals' perception of having social support.

The examination of social support challenges provides unique insights into the social lives of HIV-positive individuals in the Deep South. A low proportion of individuals were married or in a partnership (30.1%). However, a relationship with a spouse is one of the most important relationships for adults, often one of the greatest sources of support (B.N. Uchino, 2004). The spousal relationship has been found to be a more important source of support for men than for women (Antonucci & Akiyama, 1987). Although there were no significant differences in the percentage of men and women who had partners ( $p=0.19$ ), the lack of a partner may be more problematic for men.

Nearly 12% of study participants were socially isolated. Studies conducted with the general population have found poorer health outcomes among individuals who were socially isolated (Berkman & Syme, 1979; J. S. House et al., 1988). In this study, social isolation was related to the absence of social roles such as partner, parent, relationships with friends and family, employment or student status, having a friend with HIV, and participation in a support group. Individuals who had one or fewer of these social roles were considered isolated. With the exception of being a parent, each of these roles could be affected by the stigma and discrimination associated with HIV. Stigma surrounding

sexually transmitted diseases remains high in the South (Lichtenstein, Hook, & Sharma, 2005) so individuals may choose not to engage in relationships in order to avoid stigmatization.

In this study, men were more likely than women to be socially isolated and were less socially integrated than women. In the general population, social isolation and social integration have been found to be more strongly related to health outcomes for men (J. House et al., 1988; Melchior, Berkman, Niedhammer, Chea, & Goldberg, 2003). If these associations are also stronger for HIV-positive men, a greater likelihood of social isolation and a lower level of social integration found among men in this study may be particularly problematic.

Although there is substantial evidence that social support affects mental and physical health outcomes positively (Burgoyne & Renwick, 2004; Friedland et al., 1996; Lee & Rotheram-Borus, 2001; McDowell & Serovich, 2007; Serovich et al., 2001; Swindells et al., 1999; Viswanathan et al., 2005), health effects of conflict in social relationships are understudied. However, there is evidence suggesting that social conflict is a strong predictor of health outcomes (O'Brien, Wortman, Kessler, & Joseph, 1993; Rook, 1984; C Sherbourne et al., 2003). Individuals living with HIV may experience higher levels of conflict because of the highly stigmatizing nature of the disease.

In this study, nearly one-third of study participants had experienced severe conflict in partner or family relationships in the last 9 months. As hypothesized, Blacks were more likely to experience social conflict than Whites. Racism and discrimination may contribute to greater interpersonal conflict among Blacks. Blacks often rely strongly on family for social support (Ajrouch et al., 2001; Neighbors & Jackson, 1984). For

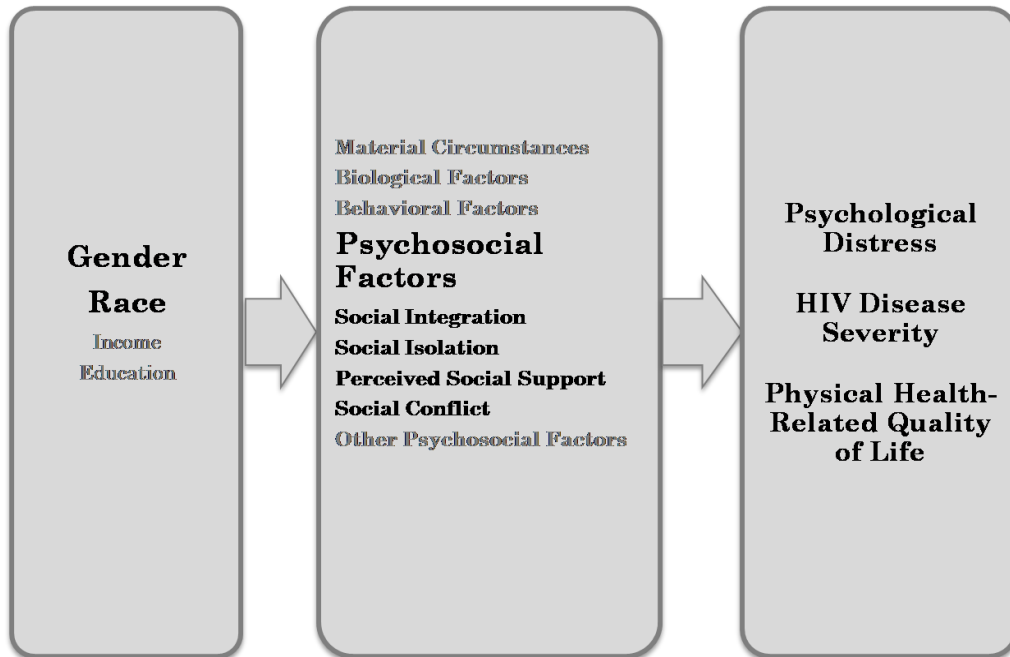
Black individuals living with HIV, it may be difficult to cope with conflict in relationships with close partners and family if support sources outside of these relationships are limited.

Although the results from this study may contribute to a greater understanding of social support among HIV-positive individuals in the Deep South, there are some limitations. The cross-sectional nature of the data used in this study does not allow conclusions to be drawn regarding causality. In addition, the data available for this study was limited to data collected in the CHASE Study. The number of social support items measured was limited because of the broad scope of the CHASE Study. A reliable and valid scale measuring perceived social support was included in the instrument but specific social integration, social isolation, and social conflict scales were not included. Social integration scales from prior research were used to guide the selection of items for the social integration measurement developed for this study. Some researchers have included church membership as a role in social integration scales. Although there were two religion and spirituality items collected in CHASE, neither measure church membership. The importance of church membership may be particularly important in the Deep South; therefore, the social integration scale may have been more accurate with its inclusion. The criteria used to determine social isolation in this study may result in misclassification. An individual is considered to be social isolated if they identified one or zero social roles. However, individuals with one of the measured social roles may not be socially isolated. The social conflict variable included partner and family conflict items but the availability of additional items that measured other types of conflict, such as conflict with friends, might have increased scale accuracy.

The methods of data collection used in the CHASE Study may have affected the results of the study. Social support measures were based on self-reported responses. Individuals may have had difficulty recalling information needed to accurately answer these questions or they may have responded to items in a socially desirable way. In addition, the ability to understand some of the complexities of social relationships may be limited by quantitative data collection and analysis.

Finally, although the CHASE sample was representative of the demographic and disease characteristics of individuals receiving medical care for HIV in the Deep South, the results may not be generalizable to HIV-positive individuals who are not receiving HIV medical care or to those living in other regions of the country.

In this study, findings related to the negative structural and functional components of social support are most notable. Social isolation and social conflict may be associated with health outcomes for individuals living with HIV in the Deep South. Therefore, it may be important to design interventions that reduce social isolation and social conflict in this population. Further, attention to the associations of gender and race with social support may help create interventions that address the specific social support needs of each group.



Adapted from: Closing the Gap in a generation: Health equity through action on the social determinants of health: Final report of the Commission on Social Determinants of Health, 2008.

FIGURE 2.1: Study conceptual framework

TABLE 2.1: CHASE sample characteristics

	<b>n</b>	<b>% Mean (SD)</b>
	611	
<b>Social Position</b>		
Gender		
Male	419	68.7
Female	191	31.3
Race		
Black	383	67.0
White	189	33.0
Log Income (ln)	546	6.6 (1.0)
Education		
Less than high school	121	19.9
High school diploma	209	34.4
More than high school	278	45.7
<b>Biological Factors</b>		
Age	611	40.2 (8.7)
Disease status		
CD4 count $\geq$ 200	358	77.5
CD4 count < 200	104	22.5
<b>Material Circumstances</b>		
Unstable shelter		
Yes	106	17.4
No	503	82.6
<b>Behavior Variables</b>		
Drug Composite Score	580	0.02 (0.05)
Alcohol Composite Score	545	0.02 (0.08)
<b>Other Psychosocial Variables</b>		
Incident trauma		
Yes	67	11.0
No	544	89.0
Other severe stressors	609	1.0 (1.1)

---

Categorical variables recorded as frequency (%)

Continuous variables recorded as mean (SD)

Data source: Coping with HIV/AIDS in the Southeast (CHASE) Study



TABLE 2.2: Social support variables and measures overall, by gender, and by race

	Overall	Male	Female	<i>p</i> value	Black	White	<i>p</i> value
Partner							
Yes	30.1	28.5	33.7	0.19	23.6	45.0	<0.01
No (referent)							
Parent							
Yes	52.9	37.7	86.4	<0.01	61.4	36.0	<0.01
No (referent)							
Employed or student							
Yes	42.1	44.3	37.7	0.13	37.3	51.6	<0.01
No (referent)							
Close friends and family $\geq 2$							
Yes	86.0	86.7	84.3	0.44	86.3	85.7	0.85
No (referent)							
Close friend with HIV							
Yes	36.5	42.5	22.7	<0.01	36.6	36.7	0.99
No (referent)							
Participates in support group							
Yes	27.8	29.8	23.0	0.08	27.2	28.6	0.72
No (referent)							
Conflict with divorce/separation							
Yes	13.8	12.4	16.8	0.15	15.4	10.1	0.08
No (referent)							
Conflict without divorce/separation							
Yes	15.1	13.6	18.3	0.13	17.2	10.1	0.02
No (referent)							
Conflict family							
Yes	16.9	14.6	22.1	0.02	17.3	13.8	0.29
No (referent)							
Social integration	2.7 (1.1)	2.7 (1.1)	2.9 (1.0)	0.08	2.7 (1.1)	2.8 (1.1)	0.21
Social isolation							
Yes	11.8	14.0	6.9	0.02	12.2	11.2	0.74
No (referent)							
Perceived social support overall	72.7 (23.6)	71.5 (24.3)	75.2 (21.7)	0.08	72.7 (23.4)	74.5 (22.6)	0.39

TABLE 2.2: (continued)

Social conflict							
Yes	32.2	28.5	40.5	<0.01	34.4	26.1	0.05
No (referent)							

---

Categorical variables recorded as %

Continuous variables recorded as mean (SD)

Social integration ranges 0-6 with a larger number indicating greater social integration

Perceived social support ranges from 0-100 with a larger number indicating more perceived social support

Data source: Coping with HIV/AIDS in the Southeast (CHASE) Study

TABLE 2.3: Correlations between social support measures

	Social Integration	Social Isolation	Perceived Social Support	Social Conflict
Social Integration	1.00			
	577			
Social Isolation	-0.62	1.00		
	<0.01			
	577	577		
Perceived Social Support	0.29	-0.25	1.00	
	<0.01	<0.01		
	561	561	590	
Social Conflict	0.06	-0.07	-0.11	1.00
	0.19	0.09	0.01	
	57	575	588	608

---

Column values include correlation, *p*-value, and correlation *n*.

Data source: Coping with HIV/AIDS in the Southeast (CHASE) Study

TABLE 2.4: Multivariable associations with social integration

	$\beta$	95% Confidence Interval		<i>p</i> value
Gender				
Male	-0.25	-0.46	-0.03	0.03
Female (referent)				
Race				
Black	-0.11	-0.32	0.11	0.32
White (referent)				
Log Income	0.13	0.03	0.23	0.01

Data source: Coping with HIV/AIDS in the Southeast (CHASE) Study  
Only variables included in the reduced model are reported

TABLE 2.5: Multivariable associations with perceived social support

	$\beta$	95% Confidence Interval		<i>p</i> value
Gender				
Male	-3.33	-7.55	0.88	0.12
Female (referent)				
Race				
Black	-1.72	-5.84	2.40	0.41
White (referent)				
Unstable shelter				
Yes	-6.11	-11.39	-0.84	0.02
No (referent)				
Alcohol Composite Score	-39.70	-77.66	-1.74	0.04
Severe Stress	-4.35	-6.21	-2.50	<0.01

Data source: Coping with HIV/AIDS in the Southeast (CHASE) Study  
Only variables included in the reduced model are reported

TABLE 2.6: Multivariable associations with social isolation

	Odds Ratio	95% Confidence Interval		<i>p</i> value
Gender				
Male	2.37	1.05	5.35	0.04
Female (referent)				
Race				
Black	1.65	0.82	3.32	0.16
White (referent)				
Disease Status				
CD4 count $\geq$ 200 (referent)				
CD4 count < 200	2.15	1.11	4.19	0.02

Data source: Coping with HIV/AIDS in the Southeast (CHASE) Study  
Only variables included in the reduced model are reported

TABLE 2.7: Multivariable associations with social conflict

	Odds Ratio	95% Confidence Interval		<i>p</i> value
Gender				
Male	0.71	0.43	1.17	0.18
Female (referent)				
Race				
Black	2.21	1.31	3.73	<0.01
White (referent)				
Log income	1.33	1.04	1.70	0.02
Age	0.97	0.94	0.99	0.01
Disease status				
CD4 count $\geq$ 200 (referent)				
CD4 count < 200	0.55	0.30	1.01	0.05
Incident trauma				
Yes	2.32	1.16	4.66	0.02
No (referent)				
Severe stress	1.83	1.45	2.31	<0.01

Data source: Coping with HIV/AIDS in the Southeast (CHASE) Study  
Only variables included in the reduced model are reported

## CHAPTER THREE: STRUCTURAL AND FUNCTIONAL SOCIAL SUPPORT AS PREDICTORS OF MENTAL, PHYSICAL, AND QUALITY OF LIFE OUTCOMES AMONG INDIVIDUALS LIVING WITH HIV IN THE DEEP SOUTH

### **Introduction**

There are approximately 1.1 million people living with HIV/AIDS in the United States (Centers for Disease Control and Prevention, 2008). Advancements in HIV medical treatments have led to precipitous declines in HIV-related mortality rates since the mid-1990s (Kaiser Family Foundation, 2009). Because individuals are living longer with HIV, it has become increasingly important to consider mental health and quality of life outcomes in addition to HIV disease outcomes. Mental health and quality of life are also important to measure because of their known associations with HIV outcomes (Leserman, 2008; Leserman et al., 2005; Weinfurt, Willke, Glick, Freimuth, & Schulman, 2000).

Understanding what factors predict these various health outcomes may reveal areas for intervention. In prior studies, social support has been associated with various psychological, HIV disease, and quality of life outcomes among those living with HIV (Burgoyne & Renwick, 2004; Friedland et al., 1996; Lam, Sylvie, & Wright, 2007; Mavandadi, Zanjani, Ten Have, & Oslin, 2009; McDowell & Serovich, 2007; Serovich et al., 2001; C Sherbourne et al., 2003; Swindells et al., 1999; Viswanathan et al., 2005). Most studies were conducted in large cities in the North or Midwest, therefore, little is

known about the association between social support and mental and physical health outcomes among those living with HIV in the Deep South.

The Deep South, which includes North Carolina, South Carolina, Georgia, Alabama, Mississippi, and Louisiana, has experienced more rapid growth in AIDS cases than any other region in the United States. Between 2000 and 2003, the number of newly reported AIDS cases rose by 36% in the Deep South states compared to a 6% decrease for all other states (Reif, Geonnotti et al., 2006; K Whetten & Reif, 2006).

Characteristics of the Deep South such as poorer health status, higher rates of unemployment and poverty, lower rates of high school and college completion (Reif, Geonnotti et al., 2006), and greater HIV stigma (Heckman et al., 1998) may negatively affect social support. Individuals living with HIV in this region are more likely to be female and non-Hispanic Black than in other areas (Reif, Whetten et al., 2006), both of which are characteristics that may affect social support (Ajrouch et al., 2001; Antonucci & Akiyama, 1987; Belle, 1987; Consedine et al., 2002; J. House et al., 1988; Kawachi & Berkman, 2001; Kiecolt-Glaser & Newton, 2001; Neff & Karney, 2005; Neighbors & Jackson, 1984; Stansfield, 2006; Umberson et al., 1996).

The purpose of this study was to examine the associations between social support and mental health, HIV disease, and quality of life outcomes among individuals living with HIV in the Deep South. An increased understanding of these relationships may inform the development of social support interventions that result in health improvements among HIV-positive individuals in this region.

## **Literature Review**

### *Models of Social Support and Health Outcomes*

Social support is generally described as a multifactorial construct which includes the structures of relationships and the functions they provide (B.N. Uchino, 2004).

Structural social support has been defined by characteristics such as social integration, social isolation, network size, and network density (Turner & Turner, 1999). Functional social support includes informational, instrumental, and emotional support as well as social conflict (Cohen, 2004).

Structural and functional support are believed to have an impact on health through different processes (Cohen, 2004). The direct effect model is typically used to describe associations between structural measures of social support and health outcomes. The model suggests that membership in a social network has direct positive effects on health outcomes irrespective of stress level (Cohen et al., 2000). This may be due to network members conforming to positive normative health behaviors, having access to a wider variety of information that may help improve health, or through positive psychological responses resulting from network participation (Cohen, 2004; Cohen et al., 2000; Cohen & Wills, 1985; Stroebe & Stroebe, 1996; P. A. Thoits, 1983; B.N. Uchino, 2004). Positive psychological responses may result in reductions in psychological despair, reductions in neuroendocrine responses, and improvements in immune functioning (Cohen, 1988; P.A. Thoits, 1985; B. N. Uchino et al., 1996).

An alternative explanation for the relationship between the structural component of social support and health is that disease may be associated with social isolation instead of the degree of social integration (Cohen, 2004; Cohen et al., 2000). Social isolation

may cause stress which can result in poorer affect, feelings of alienation, and decreased feelings of control and self-esteem. These responses may lead to negative psychological states that yield unhealthy behaviors, increased neuroendocrine responses, and suppressed immune functioning (Brissette et al., 2000; Cohen, 2004).

The stress buffering model is often used to describe the relationship between positive functional support and health outcomes. The stress buffering model posits that social support acts as a buffer to the deleterious effects of stress on mental and physical health. The model best describes the relationship between health outcomes and perceived rather than received social support (Cohen & Wills, 1985). Perceived social support may thwart the negative effects of stress on health by either preventing a situation from being appraised as stressful or by reducing the negative emotional, physiological, and behavioral responses to the situation (Cohen et al., 2000).

Social relationships may also function in ways that negatively influence health outcomes. Relationships may increase levels of interpersonal conflict which is associated with negative cognitive, affective, and biological responses (Cohen, 2004; Cohen et al., 1998). Social conflict may also be related to poorer health outcomes because individuals may participate in negative health behaviors in order to cope with the stress associated with conflict (Cohen, 2004)

#### *Social Support and Health Outcomes among HIV-positive Individuals*

Many studies have examined the associations between social support and health outcomes among individuals living with HIV. The majority has focused on the relationship between perceived or received social support and psychological distress, quality of life, and HIV disease outcomes such as CD4 count, viral load, and mortality



(Burgoyne & Renwick, 2004; Ironson et al., 2005; McDowell & Serovich, 2007; Serovich et al., 2001; Theorell et al., 1995; Vyavaharkar et al., 2009). Other components of social relationships such as social conflict and structural social support have been examined as predictors of health outcomes (Leserman et al., 1994; C Sherbourne et al., 2003; Young et al., 2004), but with far less frequency.

The direct effect and stress buffering models have both been used to examine the associations between social support and health outcomes among HIV-positive individuals. Because most studies have focused on the relationship between perceived or received social support and health, use of the stress buffering model is more common. Stress can be particularly acute for individuals living with HIV. In addition to dealing with the stress of a chronic illness, HIV-positive individuals may face additional stressors related to discrimination due to HIV status, loss of loved ones to HIV/AIDS, loss of relationships, unsupportive relationships, decisions about disclosure of HIV status, and, for those who are on antiretroviral therapy, the stress of maintaining an extremely high level of medication adherence (Folkman, Chesney, & Christopher-Richards, 1994; Friedland et al., 1996). In the Deep South, high levels of poverty and unemployment, poorer overall health, and heightened HIV stigma, particularly in rural areas (Heckman et al., 1998; Reif, Geonnotti et al., 2006), may further increase stress. As with the general population, social support may help minimize the negative effects of stress on health among individuals living with HIV. However social conflict and social isolation, which can be exacerbated by HIV infection, may increase stress levels (Cohen, 2004; Cohen et al., 1998; Cohen et al., 2000; Leserman et al., 1994; McDowell & Serovich, 2007; Serovich et al., 2001; C Sherbourne et al., 2003).

Psychosocial factors such as social support and stress are believed to influence HIV outcomes through biological and behavioral mechanisms. Biologically, psychosocial factors influence neural and endocrine activity within the hypothalamic-pituitary-adrenal axis and sympathetic nervous system. For those with HIV-infection, the molecules released by these systems can increase viral replication and impair immune responses (Cole, 2008). Social support and stress also affect behaviors related to HIV outcomes such as HIV medication adherence and substance abuse (Gore-Felton & Koopman, 2008).

*Social Support and Mental Health Outcomes among HIV-positive Individuals*

Mental health problems are known to negatively impact health behaviors and HIV outcomes. HIV-positive individuals with mental health disorders or mental health service needs are less likely to be adherent to antiretroviral medications (Mugavero et al., 2006; Reif, Whetten et al., 2006) which can result in viral mutation and treatment failure (Paterson et al., 2000; Wainberg & Friedland, 1998). Additionally, medical providers have been found to delay initiation of antiretroviral therapy for those with mental illness (Fairfield, Libman, Davis, Eisenberg, & Phillips, 1999). Mental health problems are also associated with poorer quality of life, faster disease progression, lower CD4 counts, and increases in viral load and mortality among individuals living with HIV (Leserman, 2008; Leserman et al., 2005).

There is a high prevalence of mental illness among HIV-positive individuals in the Deep South. In a North Carolina study, Whetten and colleagues (2005) found that 60% of HIV-positive study participants had symptoms of mental illness, 32% had substance abuse symptoms, and 23% had co-occurring symptoms. In another North

Carolina study, Pence et al. (2006) estimated that 39% of study participants met the criteria for a mood/anxiety diagnosis, 21% for a substance abuse diagnosis, and 8% for both diagnoses. According to Pence and colleagues (2006), these numbers were significantly higher than the general United States population and may also indicate that these disorders are more common among people with HIV in the Southeast than in other regions.

Numerous studies have found an association between social support and mental health symptoms and disorders for HIV-positive individuals. Most studies have examined the influence of perceived and received social support on mental health. Increases in perceived social support have been associated with decreased psychological distress, loneliness, and depressive symptoms (Blaney et al., 1997; McDowell & Serovich, 2007; Serovich et al., 2001). Received social support has also been found to improve mental health outcomes among HIV-positive individuals (Lam et al., 2007; Mavandadi et al., 2009).

Although social conflict may be especially relevant for individuals living with a highly stigmatized disease like HIV, only a limited number of studies have examined the relationship between social conflict and mental health problems among this population. A study of HIV-positive and HIV-negative gay men examined the associations between social conflict, satisfaction with social support, and mental health outcomes over time (Leserman et al., 1994). For both groups, social conflict and satisfaction with social support were associated with mental health at baseline, with conflict as the stronger predictor. When changes over a one-year period were examined, increased social conflict explained 21-27% of the change in depression, depressed mood, and anger. Satisfaction

with social support was not significant when social conflict was included in the model (Leserman et al., 1994). Using data from a national probability study, Sherbourne and colleagues (2003) found that increased social conflict was associated with a probable psychiatric disorder among women with HIV.

With the exception of the study on social conflict among HIV-positive and HIV-negative gay men, all of these studies were conducted in large cities, mostly in the North or Midwest. Few studies have focused on the relationship between social support and psychological health outcomes among individuals living with HIV in the Deep South. Studies conducted in this region have found associations between perceived social support, number of social support sources, and satisfaction with social support and mental health problems among HIV-positive African American women (Catz, Gore-Felton, & McClure, 2002; Moneyham et al., 2005; Vyavaharkar et al., 2009).

#### *Social Support and HIV Outcomes*

Studies examining the relationships between social support and HIV disease outcomes such as CD4 count, viral load, AIDS diagnosis, and AIDS mortality have produced mixed findings. Studies that included functional measures such as perceived or received social support resulted in particularly disparate findings. In a longitudinal study of HIV-positive hemophiliac men, low perceived availability of social support at baseline predicted greater CD4 count declines in subsequent years. However, social support was not associated with AIDS mortality (Theorell et al., 1995). Miller and Cole (1998) concluded that supportive social relationships had health protective effects for HIV-positive men later in the disease process but were a risk factor for faster disease progression for those in an early stage of infection. A study of ethnically diverse HIV-

positive men and women found that received social support did not predict changes in viral load or CD4 counts over time. There was a nonsignificant trend for higher baseline social support predicting more rapid declines in CD4 counts (Ironson et al., 2005).

Studies that examined structural measures of social support had slightly more uniform results. Stable partnership was associated with a slower rate of progression to either an AIDS diagnosis or death or to death alone. Partnership was also related to an increase in the rate of progression to CD4 counts of 50 and 100 greater than those at baseline (Young et al., 2004). Among HIV-positive parents, having a sexual partnership was associated with longer survival. In addition, a greater number of children was significantly related to increased survival time (Lee & Rotheram-Borus, 2001). In a study conducted by Patterson and colleagues (1996), larger social network size was significantly associated with longer survival time. However, network size was not related to CD4 counts or time to AIDS diagnosis. Larger network size was associated with a shorter symptom-free period for those who were asymptomatic at baseline (Patterson et al., 1996).

Varying findings were reported in reviews of studies that included functional support measures, structural support measures, or both in HIV disease outcome models. A review of the relationship between psychosocial factors and disease progression by Ironson and Hayward (2008) found a positive association between social support and HIV outcomes in 5 studies, no association in 6, and a negative association in 1 study. A meta-analysis of adverse psychosocial factors found no association between poor social support and HIV disease progression. However, the diversity in conceptualization of social support in the included studies was noted as a study limitation (Chida & Vedhara,

2009). No studies that examined the effect of social conflict or social isolation on HIV outcomes were identified. Additionally, no studies were found that examined the relationship between social support and HIV outcomes in the Deep South.

### *Social Support and Physical Health Related Quality of Life*

Examination of quality of life has become increasingly important because advancements in HIV treatment have led to longer life spans among individuals living with HIV (Jia et al., 2004). Physical health-related quality of life (HRQOL) measures subjective physical health and has frequently been used as an outcome variable in research with HIV-positive individuals (Burgoyne & Renwick, 2004; Jia et al., 2004; Ruiz Perez et al., 2005; Viswanathan et al., 2005). Physical HRQOL measurements provide information about the impact of disease and disease treatment which may not be captured through assessments of HIV outcomes. For example, the physical side effects of HIV medications can range from mild to debilitating (Stankov & Behrens, 2007; Wilcox & Saag, 2008). Physical challenges due to medication side effects may not be evident in objective measures of disease status, but could have a substantial impact on an individual's perception of their physical health. For example, bodily pain was attributed to antiretroviral medications in one study (Aversa, Kimberlin, & Segal, 1998). Measurements of physical HRQOL often include items that assess physical functioning, role limitations, and physical pain (Friedland et al., 1996; Jia et al., 2004; Swindells et al., 1999). Unlike objective measures of HIV outcomes, physical HRQOL is influenced by both physical and mental health status (Jia et al., 2004).

Studies that examine the relationship between social support and physical health related quality of life most commonly include functional measures of social support such

as perceived, received, or satisfaction with support. Increases in perceived support have been associated with higher HRQOL physical summary scores and less days of disability (Burgoyne & Renwick, 2004; Jia et al., 2004; Viswanathan et al., 2005). However, Jia and colleagues (2004) found that perceived social support was not related to physical functioning, role limitations, or pain. Received social support and satisfaction with social support have been associated with physical HRQOL. Increases in received social support were associated with higher HRQOL physical summary scores (Ruiz Perez et al., 2005) while satisfaction with social support was associated with better physical functioning and less physical pain (Swindells et al., 1999).

The relationship between network size and HRQOL has been explored, but with less frequency. Friend network size and overall network size were associated with overall quality of life (Clingerman, 2004; Gielen, McDonnell, Wu, O'Campo, & Faden, 2001). However, network size was not associated with measures of physical HRQOL alone (Cederfjall, Langius-Eklöf, Lidman, & Wredling, 2001; Gielen et al., 2001). No studies that included other measures of structural social support were found.

A limited number of studies have examined the effect of social support on HRQOL among individuals living with HIV in the Southeast. Perceived social support was associated with general HRQOL among individuals participating in a buddy program in a southern state (Burrage & Demi, 2003). However, in other studies conducted in the Southeast, perceived support was not associated with physical HRQOL measures (Sowell et al., 1997; Stewart, Cianfrini, & Walker, 2005). No studies conducted in the Deep South were identified that included measures of social conflict, social integration, or social isolation in models predicting physical HRQOL.

## **Study Purpose**

The purpose of this study was to examine relationships between social support and health outcomes among HIV-positive individuals living in the Deep South. Although there is evidence that the structures of social relationships and the functions they provide affect health outcomes for individuals living with HIV, few studies have included measures of both. Additionally, few studies examining the association between social support and health outcomes have been conducted in the Deep South despite unique contextual and cultural differences that may influence social support and its relationship with health outcomes.

This research was guided by the Commission on Social Determinants of Health Conceptual Framework. The framework describes the relationships between social position, life circumstance factors, and health outcomes (Commission on Social Determinants of Health, 2008). Based on the framework, this study examined the influence of social support on health outcomes while controlling for social position, material circumstances, behaviors, biological factors, and psychosocial factors (Figure 3.1). The types of social support that are related to different health outcomes may vary, therefore, multiple measures of social support were included. Health outcomes included mental health, HIV disease progression, and physical health-related quality of life.

It was hypothesized that perceived social support would be negatively associated with psychological distress as perceived social support is believed to buffer the negative effects of stress on mental health among individuals living with HIV (McDowell & Serovich, 2007; Serovich et al., 2001). A positive relationship between social conflict and psychological distress was hypothesized because conflict may negatively impact



mental health by increasing stress levels (Cohen, 2004; Leserman et al., 1994; C Sherbourne et al., 2003). It was further hypothesized that social integration would be positively associated with CD4 counts through direct effects such as adherence to positive normative health behaviors, improved health information access, and reductions in neuroendocrine responses and improvements in immune functioning resulting from positive psychological responses associated with participation in social relationships (Cohen, 1988; Cohen, 2004; Cohen et al., 2000; Cohen & Wills, 1985; Stroebe & Stroebe, 1996; P. A. Thoits, 1983; P.A. Thoits, 1985; B.N. Uchino, 2004; B. N. Uchino et al., 1996). Lastly, a negative relationship between social isolation and physical HRQOL was hypothesized. Negative psychological, neuroendocrine, and immune responses caused by the stress of social isolation (Brissette et al., 2000; Cohen, 2004) may be related to physical HRQOL.

## **Materials and Methods**

### *Procedures*

Coping with HIV/AIDS in the Southeast (CHASE), a prospective cohort study which collected demographic, psychosocial, and clinical data from individuals receiving care at one of eight infectious disease clinics in the Deep South, was conducted from 2001-2005. Potential participants were recruited using consecutive sampling at study sites in North Carolina, South Carolina, Georgia, Alabama, and Louisiana and were eligible for participation if they 1) were HIV-positive; 2) were English-speaking; and 3) passed a brief test which screened for cognitive impairment. There were 789 patients recruited for study participation. Sixteen were excluded because they failed the cognitive impairment test. Of the 773 eligible subjects, 611 (79%) enrolled in the CHASE study.

The sample was reflective of individuals seeking HIV care outside of the region's three largest metropolitan statistical areas by gender, race, mode of HIV acquisition, and disease stage.

Data were collected by field certified staff every nine months in interviews lasting approximately two hours that were conducted in a private place chosen by the participant. Trained health care providers recorded clinical information from participant medical records using a standardized chart abstraction form. Informed consent was obtained from all participants. The CHASE study was approved by the Institutional Review Boards at Duke University and at all study sites.

### *Participants*

This study reports on baseline data from 611 participants collected from 2001-2002 (Table 3.1). Sixty-nine percent of the sample were males. The majority was non-Hispanic Black (64%) followed by non-Hispanic White (32%) (henceforth referred to as Black and White, respectively). The remaining 4% of participants were Latino, Asian, or Native American. The average participant age was  $40.2 \pm 8.7$  years and most (80%) had received at least a high school diploma.

### *Study Variables*

#### Structural Social Support

The structural measures of social support used in this study were social integration and social isolation. Social integration was a continuous variable calculated as the sum of social roles (0-6) including: 1) employee/student/job training, 2) parent, 3) partner, 4) two or more close friends or family, 5) close friend with HIV, and 6) support group participant. This scale is adapted from the Identify Accumulation Scale created by

Thoits (1983). Social isolation categorizes individuals as isolated or not isolated based on the measure of social integration. Those who had 0-1 social roles were classified as socially isolated.

### Functional Social Support

Perceived social support and social conflict were the functional social support measures used in this study. Perceived social support was measured using the Medical Outcomes Study Social Support Survey (MOS-SSS) which has high internal reliability (Cronbach's alpha 0.91-0.97) and stability (0.72-0.78) (CD Sherbourne & Stewart, 1991). The 19 Likert scale items about perception of emotional/informational, tangible, affectionate, and belonging support availability were used to calculate the overall perceived social support scale. Perceived social support scale values range from 0-100 with higher values indicating greater levels of support. Items from the Life Experiences Survey (LES) were used to measure social conflict (Sarason et al., 1978). The LES measures recent stressful life events and includes specific items about partner divorce, separation, or break-up due to conflict; increase in partner conflict without a break-up; and change in closeness to a family member due to conflict. A dichotomous social conflict variable was created. If a participant experienced any of the three LES conflict measures they were considered exposed to social conflict.

### Psychological Distress

The Brief Symptom Inventory (BSI) is a 53-item instrument that measures nine dimensions of psychological symptoms and three global measures of distress. The BSI has high internal reliability (0.71-0.85) and stability (0.68-0.91). The Global Severity Index (GSI), which is considered the best BSI indicator of individual psychological

distress (Derogatis & Melisaratos, 1983), was used as the mental health outcome in this study. The GSI is the average of the 53 symptom ratings converted to a T score. Higher GSI scores indicate greater psychological distress (Derogatis & Melisaratos, 1983).

#### CD4 Counts

The most recent CD4 lymphocyte count collected within the 6 months prior to the baseline interview was used as a continuous HIV outcome measure. CD4 counts have been used in other studies as indicators of HIV/AIDS disease severity (Cole, 2008; Ironson et al., 2005; Mellors et al., 1997). CD4 cells are a critical component of the immune response because they signal other immune system cells to activate. CD4 cells are targeted and destroyed by HIV which results in compromises to the immune system. The CD4 count of a healthy individual ranges from 800 to 1200 CD4 cells per cubic millimeter ( $\text{mm}^3$ ) of blood (Klimas, O'Brien, & Fletcher, 2008). A CD4 count below 200 meets the criteria for an AIDS diagnosis (Centers for Disease Control and Prevention, 1992).

#### Physical Health-Related Quality of Life

Health-related quality of life was measured using the Short Form-36 (SF-36) (version 2.0) which measures physical functioning, role-physical, bodily pain, general health, vitality, social functioning, role-emotional, and mental health (McHorney, Ware, Lu, & Sherbourne, 1994; McHorney, Ware, & Raczek, 1993). The SF-36 has been highly reliable and valid in studies of many different patient populations (Ware & Sherbourne, 2003) and has frequently been used in studies of individuals living with HIV (Burgoyne & Renwick, 2004; Hays et al., 2000; Swindells et al., 1999). The Physical Component Score (PCS) was used as a continuous physical health-related quality of life outcome in

this study. PCS includes physical functioning, role-physical, bodily pain, and general health scales and is standardized with a mean of 50 and standard deviation of 10. A higher PCS score indicates better functioning and well-being. Values above 50 can be interpreted as physical HRQOL better than the general United States population (McHorney et al., 1994; McHorney et al., 1993).

### Potential Confounders

Social position variables included gender, race, income, and education, which were all self-reported. Gender categories included male and female and race categories included Black, White, and other. A dichotomous race variable that included Black and White categories was also created. Income was calculated as the sum of income in the last month from multiple sources including employment, unemployment benefits, public assistance, child support, pensions or Social Security, friends or family, and illegal activities. Income was log transformed to reduce positive skew. Education was categorized into less than a high school diploma, a high school diploma, and more than a high school diploma.

Self-reported age was considered as a potential biological confounding variable. Disease status was calculated from chart abstracted CD4 counts. Because a CD4 count below 200 meets the criteria for an AIDS diagnosis (Centers for Disease Control and Prevention, 1992), this cutoff value was used to dichotomize disease status. Disease status was not included in the model for CD4 counts.

Material circumstances were measured using housing stability. An individual was considered to have unstable housing if they spent at least one night in the last 90 days in a shelter for homeless persons; on the street; in an emergency housing program; in jail,

prison, halfway house with no place else to live; drug treatment with no place else to live; or temporarily doubled up in someone else's home.

Behavioral factors included adherence to antiretroviral medications, severity of drug use, and severity of alcohol use. To assess medication adherence, participants were asked to identify the HIV medications they were taking. Picture cards were used to facilitate recall. Participants were then asked to share the last time they skipped any HIV medications. A person was considered nonadherent if they missed any HIV medication doses in the last 7 days. This single item measure was used by the Adherence Working Group of the Outcomes Committee of the Adult AIDS Clinical Trial Group (AACTG) to measure adherence when evaluating adherence instruments (Chesney et al., 2000).

Additionally, self-reported adherence and 1-week adherence are validated measures that have been shown to predict HIV virologic and immunologic outcomes (Godin, Gagne, & Naccache, 2003; Mannheimer, Friedland, Matts, Child, & Chesney, 2002). The Drug Composite Score and the Alcohol Composite Score from the Addiction Severity Index (ASI) were used to measure severity of use in the last 30 days. Composite score values range from 0-1 with a higher score indicating more use (McLellan et al., 1992).

Psychosocial variables other than social support included severe stress and incident trauma. Severe stress was measured using items from the LES (Sarason et al., 1978) which were associated with physical functioning in prior studies (Leserman et al., 2005). Severe stress was calculated as the sum of 16 different severe stressors such as the death of a parent or sibling, hospitalization, major financial difficulties, and more than a week in prison in the last 9 months. An item about separation or divorce due to arguments was excluded because the item was used to assess social conflict. Three other

severe stressors that satisfy the criterion A(1) of the definition of post-traumatic stress disorder were used to define incident trauma (American Psychiatric Association, 1990). A dichotomous incident trauma variable was created and participants who had experienced the death of a spouse/partner or child, sexual assault, or physical assault in the last 9 months were considered exposed.

### *Statistical Analyses*

CHASE baseline data were analyzed using StataIC 10 (StataCorp, 2007). Descriptive statistics were calculated for all study variables. Pearson's correlation coefficient ( $r$ ) was calculated to examine the associations between social integration, social isolation, perceived social support, and social conflict. Pairwise correlations were conducted to test associations between outcome, social support, and potential confounding variables. Potential confounding variables included social position (gender, race, log income, education), biological factors (age, disease status [disease status excluded from CD4 count model]), material circumstances (unstable housing), behaviors (nonadherence to HIV medication, severity of illicit drug use, severity of alcohol use), and psychosocial factors other than social support (severe stress, incident trauma). Simple linear regression was conducted with each outcome and social integration and social isolation separately. The predictor with the lowest p-value for each outcome was selected as the structural social support predictor for multivariable analysis.

Blocked linear regression was used to determine the additive effects of the social support variables to each health outcome model while controlling for potential confounders. Independent variables were grouped into blocks based on the conceptual model and prior research. Social position, biological, material circumstances, behavioral,

and psychosocial factors other than social support were entered into the model consecutively. The social support block was entered last and included social integration or social isolation, perceived social support, and social conflict. Reduced models were developed for each outcome. All social support variables were included in the reduced models. Backward elimination was used to drop other predictor variables with high  $p$ -values. The predictor variable with the largest  $p$ -value was removed and the blocked regressions were repeated until all remaining variables had a  $p$ -value  $\leq 0.10$ . Based on the stress-buffering and direct effect models of social support and health outcomes, interactions between social support and severe stress were investigated. Observations with missing data were not included in the analyses.

Standardized beta coefficients were calculated to allow for comparisons of the strength of predictor variables. Regression diagnostics were performed to detect potential departures from normality and heteroskedasticity. Multicollinearity problems were assessed using variance inflation factors.

## **Results**

### *Descriptive Analyses*

#### Social Support

The proportion of participants who were married or partnered was 30.1% while 52.9% were the parent or guardian of a child (Table 3.1). Forty-two percent were currently employed, in school, or receiving job training and 86% had 2 or more close friends and family members. Approximately 36.5% had a close friend with HIV and 27.8% participated in some type of support group. The proportion of those who experienced partner conflict which resulted in divorce or separation was 13.8%, while



15.1% experienced conflict without divorce or separation. Nearly 17% reported a change in closeness with a family member due to conflict.

Social integration, the average number of social roles occupied, was 2.7. Twelve percent of individuals occupied 0-1 roles and were considered socially isolated.

Perceived social support values ranged from 0-100 with a mean of 72.7. Slightly more than 32% of participants reported experiencing at least one type of social conflict in the last 9 months.

### Health Outcomes

The average score on the Global Severity Index of the Brief Symptom Inventory was 58.7 with a standard deviation of 12.9 (Table 3.1). The mean CD4 count was 410.5 (SD=279.4). The average Physical Component Score of the SF-36 was 45.7 (SD= 11.2).

### Potential Confounders

The average log income among participants was 6.6 (SD=1.0) (Table 3.1). Approximately 17.4% of participants were unstably housed. The proportion of those who were not adherent to their HIV medication regime was 22.6%. The mean Drug and Alcohol Composite Scores were 0.02 (SD=0.05) and 0.02 (SD=0.08), respectively. The average number of severe stressors was 1.0 (SD=1.1) and the percentage of those experiencing incident trauma was 11.0%.

### *Bivariable Analyses*

#### Correlations between Social Support Variables

Perceived social support was positively correlated with social integration (0.29,  $p<0.01$ ) and negatively associated with social isolation (-0.25,  $p<0.01$ ) and social conflict (-0.11,  $p<0.05$ ) (Table 3.2).

### Social Support and Psychological Distress

Increased perceived social support was associated with less psychological distress (-0.19,  $p < 0.01$ ) (Table 3.3). The experience of any social conflict was related to higher levels of psychological distress (7.70,  $p < 0.01$ ). There was no significant association between social isolation and psychological distress. Other variables significantly associated with psychological distress included race, log income, less than high school education, age, shelter stability, medication adherence, incident trauma, and severe stress.

### Social Support and CD4 Counts

Social integration was positively associated with CD4 counts (39.06,  $p < 0.01$ ) while perceived social support and social conflict were not significantly correlated (Table 3.4). Male gender and non-Hispanic Black race were negatively associated with CD4 counts. Larger Drug Composite Scores were associated with higher CD4 counts.

### Social Support and Physical Health-related Quality of Life

Social isolation was significantly related to the Physical Component Score of the SF-36 (Table 3.5). On average, those who were socially isolated had a PCS score reduction of 4.3 ( $p < 0.01$ ). Perceived social support and social conflict were not significantly associated with PCS scores. Interaction terms for perceived social support by severe stress ( $p < 0.01$ ) and social isolation by severe stress ( $p < 0.01$ ) were significant. Log income, age, Drug Composite Score, and severe stress were significantly related to PCS scores.

### *Multivariable analyses*

#### Social Support and Psychological Distress

The reduced model explained 41.4% of the variance in psychological distress ( $F(13, 370) = 20.12, p < 0.01$ ). Perceived social support was the strongest predictor of psychological distress (standardized  $\beta = -0.24$ ). On average, an increase in perceived social support resulted in a reduction in psychological distress ( $\beta = -0.13, p < 0.01$ ). Social conflict was positively associated with psychological distress ( $\beta = 5.00, p < 0.01$ ) and was the third strongest predictor variable (standardized  $\beta = 0.18$ ). The addition of the social support variables to the model yielded an 8.3% increase in  $R^2$ .

#### Social Support and CD4 Counts

The CD4 count model included gender, race, Drug Composite Score, social integration, perceived social support, and social conflict (Table 3.7). Social integration was positively associated with CD4 counts ( $\beta = 34.1, p = 0.01$ ). Male gender and non-Hispanic Black race were associated with lower CD4 counts while a higher Drug Composite Score value was associated with increased CD4 counts. The addition of the social support variables to the model resulted in an  $R^2$  increase of 2.0%. The model explained 11.1% of the variance in CD4 counts ( $F(6, 362) = 7.54, p < 0.01$ ).

#### Social Support and Physical Health-related Quality of Life

The SF-36 Physical Component Score model included significant interaction terms (Table 3.8). The relationship between perceived social support and PCS was moderated by severe stress ( $\beta = -0.07, p < 0.01$ ). Increases in perceived social support resulted in decreases in PCS for individuals with a severe stress value greater than 1 standard deviation from the mean. Higher perceived social support was related to

increases in PCS for individuals with a severe stress value 1 standard deviation lower than the average value. Severe stress moderated the relationship between social isolation and PCS ( $\beta=-3.66$ ,  $p=0.01$ ). The negative relationship between social isolation and PCS was stronger for those had high levels of severe stress. Other significant variables were log income, less than high school education, and age.

## **Discussion**

The purpose of this study was to examine associations between structural and functional social support and mental health, HIV disease, and quality of life outcomes among a sample of HIV-positive individuals living in the Deep South. In prior studies of individuals living with HIV in the Deep South, the prevalence of mental illness symptoms and probable mental illness diagnosis was high (Pence et al., 2006; K Whetten et al., 2005). Similarly, the prevalence of mental health problems was high among CHASE study participants with 54% classified as having a probable mental disorder (B. Pence et al., 2007). As hypothesized, greater perceived social support was associated with lower psychological distress. This finding is consistent with studies conducted in other regions and with African American women in the Deep South (Blaney et al., 1997; Catz et al., 2002; McDowell & Serovich, 2007; Moneyham et al., 2005; Serovich et al., 2001; Vyavaharkar et al., 2009). Perceived social support likely buffers the deleterious effects of stress on mental health by influencing stress appraisals or minimizing negative responses to stress (Cohen et al., 2000; Cohen & Wills, 1985).

Functional measures of social support such as perceived, received and satisfaction with support have typically been the primary, and often the only, measures of social support in studies of individuals with HIV. Social conflict, also a function of

relationships, has rarely been examined (Leserman et al., 1994; C Sherbourne et al., 2003). The inclusion of measures of social conflict is particularly important for HIV-positive individuals in the Deep South where people are often impoverished, reside in rural areas, have co-occurring mental and/or substance abuse disorders, have experienced traumatic events, and encounter greater stigma than those living in other regions of the country (Pence et al., 2006; B. W. Pence et al., 2007; Reif, Geonnotti et al., 2006; K Whetten et al., 2005; K. Whetten, Reif, Whetten, & Murphy-McMillan, 2008). These factors may increase stress in interpersonal relationships and result in greater social conflict. As hypothesized, social conflict was significantly associated with greater psychological distress and was among the strongest predictors of psychological distress in the model. Although perceived social support was a stronger predictor, this finding does support assertions made by other researchers about the importance of measuring both the positive and negative aspects of social relationships (Cohen, 2004; Leserman et al., 1994; O'Brien et al., 1993). The inclusion of perceived social support and social conflict in the final model suggests that the relationship between social relationships and psychological health is complex and that positive and negative aspects of social relationships exist simultaneously.

The model for CD4 counts included a small number of predictor variables and social integration was the only social support variable that was significant. On average, occupation of a greater number of social roles was associated with higher CD4 counts. Few studies that examined the relationship between social support and HIV outcomes included structural social support measures. Among those that did, social network size was used (Ironson & Hayward, 2008; Patterson et al., 1996). In one study, social

network size was associated with longer survival time but not with changes in CD4 counts or time to AIDS diagnosis (Patterson et al., 1996). However, reviews from the general social support literature conclude that network size is a relatively weak predictor of health outcomes (Cohen & Wills, 1985; B. N. Uchino et al., 1996). In contrast, some of the strongest findings linking social relationships to longitudinal health outcomes in the general population were from studies that measured social integration (Berkman & Syme, 1979; J. S. House et al., 1988). No other studies of HIV-positive individuals were identified that measured social integration as a sum of different social roles occupied. However, improved HIV outcomes have been associated with partnership and parenthood, both social roles included as part of the social integration measure in this study (Lee & Rotheram-Borus, 2001; Young et al., 2004).

The results from the multivariable analysis of CD4 counts provide support for the direct effect model which posits that structural social support is associated with health outcomes regardless of stress level (Cohen et al., 2000). Potential stressors such as severe stress, incident trauma, and lack of shelter had *p* values above 0.10 in the full model and were not included in the final model. The relationship between social integration and CD4 counts may be due to access to health information from a wider variety of sources or the result of pressure to conform to positive social network health norms. The social integration measure included roles that may be important for individuals with HIV such as having a friend with HIV or participating in a support group. These social roles may provide important opportunities for HIV-positive individuals to get health information that could improve HIV outcomes. Participation in these roles may also result in increased pressure to conform to peer behavioral norms

related to medication adherence and abstinence from substance use. Other than the social support variables, only gender, race, and severity drug use were included in the CD4 count model. Unlike other studies, adherence to HIV medications was not associated with CD4 counts (Kitahata et al., 2004; Mannheimer et al., 2002).

It was hypothesized that social isolation would be negatively associated with physical health-related quality of life values. However, social isolation was not significant when interaction terms were added to the model. The interaction between perceived social support and severe stress was significant. Contrary to the stress-buffering model which suggests that perceived social support is more beneficial for individuals experiencing stress (Wills & Shinar, 2000), greater perceived support was associated with poorer PCS values for those with higher than average numbers of severe stressors. In times of high severe stress, an individual's social network may try to provide extra social support. While the individual under stress may feel more supported, the perception of social support may not enough to buffer the negative effects of severe stress on health.

The interaction between social isolation and severe stress was also significant. The negative effects of social isolation on PCS were stronger among those with higher than average levels of severe stress. Social isolation is believed to negatively impact health outcomes by increasing levels of stress (Cohen, 2004). The findings from this study suggest that the addition of high levels of severe stress to the stress associated with social isolation may be particularly damaging to subjective physical health.

A contribution of this study was the inclusion of functional and structural measures of social support in health outcome models for HIV-positive individuals in the

Deep South. It is notable that all three health outcome models were associated with different combinations of the social support variables. This suggests that using only one measure of support may mask important associations between social support and health outcomes. In prior studies with HIV-positive individuals, perceived social support has commonly been used as a measure of social support (Burgoyne & Renwick, 2004; Serovich et al., 2001; Vyavaharkar et al., 2009). In this study, perceived social support was a significant predictor of psychological distress and of physical HRQOL though an interaction with severe stress. However, in both cases, another social support variable was significant in the model. Few studies have included negative measures of social relationships in health outcome models for individuals living with HIV (Leserman et al., 1994; C Sherbourne et al., 2003). However, HIV-positive individuals may be especially vulnerable to social isolation and social conflict. They may be socially isolated if friends, family members, or community members limit or withdraw support. Isolation may also occur if individuals living with HIV limit participation in social relationships and activities due to fear of rejection. Conflict in relationships may be elevated because of the stress of living with a highly stigmatized disease. Further, social isolation and social conflict may be particularly pronounced in the Deep South where there are high levels of poverty, rural-living, and mental health and substance abuse problems. The significance of social isolation and social conflict in this study support the inclusion of these items in research with individuals living with HIV.

#### *Study Limitations and Strengths*

Although the results from this study may contribute to a greater understanding of the relationships between social support and health outcomes among HIV-positive



individuals in the Deep South, there are some limitations. The data used for this study are limited to data collected in the CHASE Study. The cross-sectional nature of the data used in this study does not allow conclusions to be drawn regarding causality.

The number of social support items measured was limited because of the broad scope of the CHASE Study. A reliable and valid scale measuring perceived social support was included in the instrument but specific social integration, social isolation, and social conflict scales were not included. Social integration scales from prior research were used to guide the selection of items for the social integration measurement developed for this study. Some researchers have included church membership as a role in social integration scales. Although there were two religion and spirituality items collected in CHASE, neither measure church membership. The importance of church membership may be particularly important in the Deep South; therefore, the social integration scale may have been more accurate with its inclusion. The criteria used to determine social isolation in this study may result in misclassification. An individual is considered to be social isolated if they identified one or zero social roles. However, individuals with one of the measured social roles may not be socially isolated. The social conflict variable included partner and family conflict items but the availability of additional items that measured other types of conflict, such as conflict with friends, might have increased scale accuracy.

The methods of data collection used in the CHASE Study may have affected the results of the study. Social support measures were based on self-reported responses. Individuals may have had difficulty recalling information needed to accurately answer these questions or they may have responded to items in a socially desirable way. In

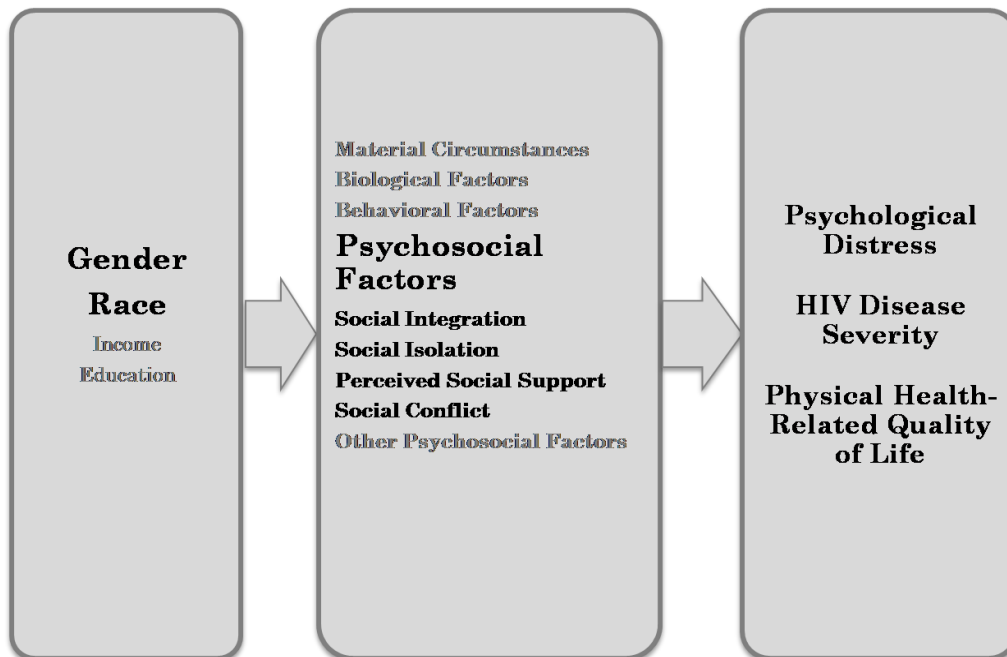
addition, the ability to understand some of the complexities of social relationships may be limited by quantitative data collection and analysis. Finally, although the CHASE sample was representative of the demographic and disease characteristics of individuals receiving medical care for HIV in the Deep South, the results may not be generalizable to HIV-positive individuals who are not receiving HIV medical care or to those living in other regions of the country.

Although the results may not be generalizable to HIV-positive individuals in other regions, conducting the study exclusively in the Deep South allowed for an increased understanding of the relationships between social support and health outcomes specifically for this region. Few studies have examined these relationships in the Deep South and prior studies were often limited to a specific demographic group and a particular state. The collection of data from various demographic groups in multiple Deep South states was a strength of this study. In addition, the inclusion of several types of social support and multiple health outcomes were also study strengths.

#### *Implications for intervention*

This study expands knowledge about the relationships between multiple components of social support and psychological, HIV disease, and quality of life outcomes among HIV positive individuals living in the Deep South. An increased understanding of these relationships can be used to make more informed policy decisions about social support intervention strategies. An increasing focus on medical treatment and the reduction of federal spending on support services necessitate the development of effective and efficient interventions which address social support components most important in predicting health outcomes. To further improve intervention effectiveness

and efficiency, future research should focus on differences in the relationships between social support and health outcomes for various populations of individuals living with HIV in the Deep South. Conducting qualitative research in addition to quantitative research may result in an even greater understanding of these differences.



Adapted from: Closing the Gap in a generation: Health equity through action on the social determinants of health: Final report of the Commission on Social Determinants of Health, 2008.

FIGURE 3.1: Study conceptual framework

TABLE 3.1: Sample characteristics

	<b>n</b>	<b>% Mean (SD)</b>
	611	
<b>Outcome Variables</b>		
Global Severity Index Score	611	58.7 (12.9)
CD4 count	462	410.5 (279.4)
SF-36 Physical Composite Score	610	45.7 (11.2)
<b>Social Position</b>		
Gender		
Male	419	68.7
Female	191	31.3
Race		
Non-Hispanic Black	383	67.0
White	189	33.0
Log Income (ln)	546	6.6 (1.0)
Education		
Less than high school	121	19.9
High school diploma	209	34.4
More than high school	278	45.7
<b>Biological Factors</b>		
Age	611	40.2 (8.7)
Disease status		
CD4 count $\geq$ 200	358	77.5
CD4 count < 200	104	22.5
<b>Material Circumstances</b>		
Unstable shelter		
Yes	106	17.4
No	503	82.6
<b>Behavior Variables</b>		
Medication adherence		
Yes	393	77.4
No	115	22.6
Drug Composite Score	580	0.02 (0.05)
Alcohol Composite Score	545	0.02 (0.08)
<b>Other Psychosocial Variables</b>		
Incident trauma		
Yes	67	11.0
No	544	89.0
Other severe stressors	609	1.0 (1.1)

TABLE 3.1: (continued)

**Social Support Variables**

Partner status		
Partner	183	30.1
No partner	426	70.0
Parent		
Yes	323	52.9
No	288	47.1
Employment or student status		
Employed or student	257	42.1
Unemployed and not student	353	57.9
Number of close friends and family ≥ 2		
Yes	516	86.0
No	84	14.0
Close friend with HIV		
Yes	215	36.5
No	374	63.5
Participates in a support group		
Yes	170	27.8
No	441	72.2
Conflict with divorce/separation		
Yes	84	13.8
No	527	86.3
Conflict without divorce/separation		
Yes	92	15.1
No	519	84.9
Conflict family		
Yes	103	16.9
No	505	83.1
<b>Social Support Measures</b>		
Social integration	577	2.7 (1.1)
Social isolation		
Yes	68	11.8
No	509	88.2
Perceived social support overall	590	72.7 (23.6)

TABLE 3.1: (continued)

## Social conflict

Yes	196	32.2
No	412	67.8

Categorical variables recorded as frequency (%).

Continuous variables recorded as mean (SD).

Data source: Coping with HIV/AIDS in the Southeast (CHASE) Study

TABLE 3.2: Correlations between social support measures

	Social Integration	Social Isolation	Perceived Social Support	Social Conflict
Social Integration	1.00			
	577			
Social Isolation	-0.62 <0.01	1.00		
	577	577		
Perceived Social Support	0.29 <0.01	-0.25 <0.01	1.00	
	561	561	590	
Social Conflict	0.06 0.19	-0.07 0.09	-0.11 0.01	1.00
	575	575	588	608

Column values include correlation, *p*-value, and correlation n.

Data source: Coping with HIV/AIDS in the Southeast (CHASE) Study

TABLE 3.3: Bivariable associations with the Global Severity Index of the Brief Symptom Inventory

	$\beta$	95% Confidence Interval		<i>p</i> value
Gender				
Male	1.91	-0.31	4.13	0.09
Female (referent)				
Race				
Non-Hispanic Black	-2.55	-4.80	-0.30	0.03
White (referent)				
Log Income	-3.15	-4.18	-2.13	<0.01
Education				
Less than high school	4.67	1.92	7.43	<0.01
High school diploma	1.74	-0.58	4.05	0.14
More than high school (referent)				
Age	-0.21	-0.32	-0.09	<0.01
Unstable shelter				
Yes	8.10	5.46	10.74	<0.01
No (referent)				
Medication adherence				
Yes (referent)				
No	4.89	2.28	7.50	<0.01
Incident trauma				
Yes	8.71	5.49	11.93	<0.01
No (referent)				
Severe stress	4.59	3.68	5.50	<0.01
Social isolation				
Yes	2.53	-0.76	5.81	0.13
No (referent)				
Perceived social support	-0.19	-0.23	-0.14	<0.01
Social conflict				
Yes	7.70	5.59	9.82	<0.01
No (referent)				

Data source: Coping with HIV/AIDS in the Southeast (CHASE) Study  
 Only predictor variables included in the reduced model are reported



TABLE 3.4: Bivariable associations with CD4 counts

	$\beta$	95% Confidence Interval		<i>p</i> value
Gender				
Male	-57.75	-112.56	-2.95	0.04
Female (referent)				
Race				
Non-Hispanic Black	-105.04	-160.53	-49.55	<0.01
White (referent)				
Drug Composite Score	731.76	245.73	1217.78	<0.01
Social integration	39.06	16.23	61.89	<0.01
Perceived social support	0.87	-0.20	1.94	0.11
Social conflict				
Yes	18.86	-35.38	73.09	0.50
No (referent)				

Data source: Coping with HIV/AIDS in the Southeast (CHASE) Study  
 Only predictor variables included in the reduced model are reported

TABLE 3.5: Bivariable associations with the Physical Component Score of the SF-36

	$\beta$	95% Confidence Interval		<i>p</i> value
Race				
Non-Hispanic Black	0.83	-1.13	2.78	0.41
White (referent)				
Log Income	3.09	2.21	3.98	<0.01
Education				
Less than high school	-2.17	-4.58	0.24	0.08
High school diploma	-1.15	-3.17	0.87	0.27
More than high school (referent)				
Age	-0.22	-0.32	-0.12	<0.01
Alcohol Composite Score	7.04	-4.68	18.76	0.24
Drug Composite Score	-30.93	-49.18	-12.68	<0.01
Severe stressors	-3.05	-3.86	-2.23	<0.01
Social isolation				
Yes	-4.30	-7.13	-1.47	<0.01
No (referent)				
Perceived social support overall	0.03	0.00	0.07	0.08
Social conflict				
Yes	-0.35	-2.26	1.57	0.72
No (referent)				
Perceived social support x severe stress	-0.04	-0.06	-0.03	<0.01
Social isolation x severe stress	-4.14	-5.92	-2.36	<0.01

Data source: Coping with HIV/AIDS in the Southeast (CHASE) Study  
 Only predictor variables included in the reduced model are reported

TABLE 3.6: Multivariable associations with the Global Severity Index of the Brief Symptom Inventory

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Male	0.13*	0.14*	0.11*	0.11*	0.12*	0.11*
Non-Hispanic Black	-0.20**	-0.20**	-0.21**	-0.19**	-0.18**	-0.19**
Log Income Less than high school	-0.28**	-0.26**	-0.24**	-0.23**	-0.17**	-0.17**
High school diploma	0.18**	0.17**	0.13*	0.12*	0.14**	0.14**
Age	0.04	0.02	0.00	0.00	-0.01	0.00
No shelter		-0.14**	-0.12*	-0.11*	-0.12*	-0.09*
Nonadherence Incident trauma			0.19**	0.19**	0.13*	0.10*
Other severe stressors				0.12*	0.13**	0.12**
Social isolation					0.15**	0.10*
Perceived social support					0.31**	0.22**
Social Conflict						-0.04
R <sup>2</sup>	0.144	0.164	0.198	0.212	0.331	0.414

Data source: Coping with HIV/AIDS in the Southeast (CHASE) Study

Values reported are standardized betas

n = 384

\*p<..05, \*\*p<..01

TABLE 3.7: Multivariable associations with CD4 counts

	Model 1	Model 2	Model 3
Male	-0.20**	-0.20**	-0.18**
Non-Hispanic Black	-0.21**	-0.20**	-0.19**
Drug Composite Score		0.15**	0.15**
Social integration			0.14*
Perceived social support			0.02
Social conflict			0.00
R <sup>2</sup>	0.070	0.091	0.111

Data source: Coping with HIV/AIDS in the Southeast (CHASE) Study

Values reported are standardized betas

n = 369

\*p<..05, \*\*p<..01

TABLE 3.8: Multivariable associations with the Physical Composite Score of the SF-36

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Non-Hispanic Black	0.10	0.10	0.08	0.08	0.08	0.09
Log income	0.26**	0.28**	0.26**	0.21**	0.19**	0.19**
Less than high school	-0.07	-0.08	-0.07	-0.09	-0.11*	-0.11*
High school diploma	0.02	0.00	-0.01	-0.02	-0.03	-0.05
Age		-0.19**	-0.19**	-0.17**	-0.17**	-0.18**
Alcohol Composite Score			0.10	0.12*	0.11*	0.10*
Drug Composite Score			-0.14*	-0.13*	-0.16**	-0.16**
Severe stress				-0.25**	-0.28**	0.21
Social isolation					-0.18**	-0.08
Perceived social support					-0.13*	0.01
Social conflict					-0.02	-0.02
Perceived social support x severe stress						-0.46**
Social isolation x severe stress						-0.16*
R <sup>2</sup>	0.08	0.11	0.13	0.19	0.22	0.25

Data source: Coping with HIV/AIDS in the Southeast (CHASE) Study

Values reported are standardized betas

n = 412

\*p<.05, \*\*p<.01

## CHAPTER FOUR: GENDER AND RACIAL DIFFERENCES BETWEEN SOCIAL SUPPORT AND MENTAL, PHYSICAL, AND QUALITY OF LIFE OUTCOMES AMONG INDIVIDUALS LIVING WITH HIV IN THE DEEP SOUTH

### **Introduction**

There are an estimated 1.1 million people living with HIV in the United States. Men continue to be most affected, representing 75% of HIV cases. The disease disproportionately impacts racial and ethnic minorities (Centers for Disease Control and Prevention, 2008). Although non-Hispanic Blacks represent only 12% of the United States population, they account for 46% of individuals living with HIV (Centers for Disease Control and Prevention, 2008; Kaiser Family Foundation, 2009).

HIV-positive individuals are living longer due to advancements in HIV treatments (Kaiser Family Foundation, 2009). As a result of markedly increased survival times, it has become important to consider mental health and quality of life in addition to HIV outcomes in health assessments of individuals living with HIV. A greater understanding of the factors that influence these outcomes may help identify areas for intervention. Social support is one factor that has been associated with health outcomes among HIV-positive individuals (Burgoyne & Renwick, 2004; Friedland et al., 1996; Lee & Rotheram-Borus, 2001; McDowell & Serovich, 2007; Serovich et al., 2001; Swindells et al., 1999; Viswanathan et al., 2005). Although gender and race may alter social support

(Ajrouch et al., 2001; Antonucci & Akiyama, 1987; Consedine et al., 2002; J. House et al., 1988; Kawachi & Berkman, 2001; Neighbors & Jackson, 1984; Shumaker & Hill, 1991; Williams, 2002), little is known about gender and racial differences in the associations between social support and health outcomes among HIV-positive individuals. In the Deep South, where there are more new AIDS cases than any other region, individuals living with HIV are more likely to be female and non-Hispanic Black than in other areas (Reif, Geonnotti et al., 2006; Reif, Whetten et al., 2006; K Whetten & Reif, 2006). As a result, it is important to examine how gender and race may modify the relationships between social support and health outcomes among HIV-positive individuals living in this region.

The purpose of this study was to examine gender and racial differences in the associations between social support and mental health, HIV severity, and quality of life outcomes among HIV-positive individuals living in the Deep South. Identification of differences may result in the development of interventions tailored to meet the unique social support needs of women, men, non-Hispanic Blacks, and non-Hispanic Whites living in this region. Interventions targeting the specific needs of each group are more likely to be successful in improving health outcomes.

#### *Social Support Definitions*

The social support construct includes relationship structures and functions (B.N. Uchino, 2004). The structural component of social support is often defined by degree of social integration, social isolation, or social network characteristics (Turner & Turner, 1999). Social relationship functions include informational, instrumental, and emotional support and social conflict (Cohen, 2004).

*Differences in Social Support by Gender and Race*

Women are expected to be the primary providers of social support (J. House et al., 1988). Compared to men, women provide social support more effectively and more often and are more likely to assume caregiving roles, have emotionally intimate relationships, and have larger social support networks (Antonucci & Akiyama, 1987; Belle, 1987; Neff & Karney, 2005; Shumaker & Hill, 1991; Umberson et al., 1996). Greater support provision and broader support networks may contribute to increases in stress and social conflict for women (J. House et al., 1988; Kawachi & Berkman, 2001; Shumaker & Hill, 1991). Larger social networks may also be beneficial for women as they tend to rely on multiple relationships for social support. In contrast, men receive most of their support from their spouse (Antonucci & Akiyama, 1987; Kiecolt-Glaser & Newton, 2001; Stansfield, 2006).

Racial differences in social support have also been identified. Black individuals have smaller social networks than Whites and are more likely to include extended family, friends, or church members (Ajrouch et al., 2001). In addition, family members represent a higher proportion of social network membership and are a greater source of support for Blacks (Ajrouch et al., 2001; Neighbors & Jackson, 1984). Church members are also more likely to be included as part of social networks and are often a key source of instrumental and emotional support for Black individuals (Ajrouch et al., 2001; Williams, 2002). Lastly, exposure to interpersonal conflict may be greater for Blacks as the result of stress associated with racism and discrimination (Consedine et al., 2002).

### *Models of Social Support and Health Outcomes*

The direct effect model is often used to explain the association between social integration and health outcomes. In this model, social support directly affects health outcomes through adherence to positive social network health behavior norms, access to more sources of health information, or positive psychological responses associated with network membership (Cohen, 2004; Cohen et al., 2000; Cohen & Wills, 1985; Stroebe & Stroebe, 1996; P.A. Thoits, 1985; B. N. Uchino et al., 1996). Social isolation is believed to have a negative effect on health outcomes by increasing levels of stress (Brissette et al., 2000; Cohen, 2004).

The stress-buffering model is frequently used to explain the association between the supportive functions of social relationships and health outcomes. Informational, instrumental, and emotional support are believed to buffer the negative effects of stress on health (Cohen & Wills, 1985). In contrast, the relationship between social conflict and poorer health outcomes is likely due to increased stress resulting from social conflict (Cohen, 2004).

### *Social Support and Health Outcomes among Individuals Living with HIV*

The associations between social support and mental health, HIV disease outcomes, and quality of life among HIV-positive individuals have been examined in prior research (Burgoyne & Renwick, 2004; Burrage & Demi, 2003; Gielen et al., 2001; Jia et al., 2004; Lam et al., 2007; Leserman et al., 1994; Mavandadi et al., 2009; McDowell & Serovich, 2007; Ruiz Perez et al., 2005; C Sherbourne et al., 2003; Stewart et al., 2005; Swindells et al., 1999). Most studies have focused on the influence of positive functional aspects of social support such as perceived informational,



instrumental, and emotional support on health outcomes (Burgoyne & Renwick, 2004; Ironson et al., 2005; McDowell & Serovich, 2007; Serovich et al., 2001; Theorell et al., 1995; Vyavaharkar et al., 2009), while few studies have included measures of social conflict or structural support (Leserman et al., 1994; C Sherbourne et al., 2003; Young et al., 2004). Several studies have focused on the relationship between social support and health outcomes among specific groups such as non-Hispanic Black women, but a limited number have explored differences in these associations by gender and race (Catz et al., 2002; McDowell & Serovich, 2007; Vyavaharkar et al., 2009).

*Social Support and Mental Health Outcomes among Individuals Living with HIV by Gender*

Relationships between perceived social support and mental health outcomes have been identified for HIV-positive men. For example, greater perceived social support was associated with lower psychological distress (Blaney et al., 1997) and lower perceived support predicted higher levels of depression (Kelly et al., 1993). In addition, social conflict was associated with depression, depressed mood, and anger among men with HIV (Leserman et al., 1994).

Perceived and received social support have also been associated with mental health outcomes among women (Catz et al., 2002; Moneyham et al., 2005; Serovich et al., 2001; Vyavaharkar et al., 2009). Serovich and colleagues (2001) examined the importance of family and friend support on emotional distress for women. Although friends were perceived to be more supportive than family members, support from family members was a more important predictor of lower psychological distress. Social conflict

has also been associated with poorer mental health outcomes among HIV-positive women (C Sherbourne et al., 2003).

McDowell and Serovich (2007) examined differences in the effect of social support on mental health among women, gay men, and bisexual and straight men. In general, women had more family members than friends in their social networks, while gay men had more friend than family representation. There was no difference in the amount of friends and family available for support for bisexual and straight men. For women, only perceived social support from family members was related to lower levels of depression. Perceived social support from friends and actual social support from family were associated with less depression among gay men. For bisexual and straight men, the only predictor of depression was perceived social support from family (McDowell & Serovich, 2007).

#### *Social Support and HIV Outcomes among Individuals Living with HIV by Gender*

The relationship between social support and HIV outcomes among males has been examined in prior studies. In a longitudinal study of HIV-positive hemophiliac men, low perceived availability of social support at baseline predicted greater CD4 count declines in subsequent years. However, social support was not associated with AIDS mortality (Theorell et al., 1995). Based on their research, Miller and Cole (1998) concluded that supportive social relationships had health protective effects for HIV-positive men later in the disease process but were a risk factor for faster disease progression for those in an early stage of infection.

No studies were identified that exclusively examined the association between social support and HIV outcomes among females. In their meta-analysis of adverse

psychosocial factors and HIV progression, Chida and Vedhara (2009) noted the dearth of studies examining the relationship between social support and HIV outcomes among women. Although they found no association between poor social support and HIV progression, the authors suggested that the inability to stratify by gender in their analysis may have masked a relationship between social support and HIV progression among women. Other psychosocial factors such as coping styles, psychological distress, and stress stimuli were more strongly associated with disease progression for women. According to Chida and Vedhara (2009), these findings suggest that women may generally be more vulnerable to the effects of negative psychosocial factors on HIV progression.

*Social Support and Physical Health-related Quality of Life among Individuals Living with HIV by Gender*

In studies of HIV-positive men, associations between perceived social support and health-related quality of life have been identified. Jia and colleagues (2004) found that perceived support was a predictor of physical health-related quality of life for men. Another study of HIV-positive men found that emotional and tangible social support were related to health-related quality of life (Friedland et al., 1996). Partners were the greatest source of emotional and instrumental support while community and self-help groups were the most common source of informational support. In nearly all support categories, family was seen as providing the least or next-to-least amount of support (Friedland et al., 1996).

Research examining the relationship between social support and health-related quality of life among women is limited and has produced conflicting findings. In one

study, larger social networks predicted better overall health-related quality of life among women (Gielen et al., 2001). However, another study found no association between received social support and assessments of daily functioning limitations for women (Sowell et al., 1997).

#### *Social Support and Health Outcomes among Individuals Living with HIV by Race*

No studies were identified that explored racial differences in the association between between social support and mental health outcomes. However, in a study that examined the effects of social support on psychological well-being, White HIV-positive individuals reported significantly greater subjective support than African Americans. Satisfaction with support from friends and family, as well as feeling understood and listened to were included in the measurement of subjective support. There were no racial differences in the amount of instrumental support from or frequency of social interaction with friends and family (Mavandadi et al., 2009). No studies that investigated racial differences in the association between social support and disease progression or social support and physical health-related quality of life were found.

#### *Study Purpose*

The purpose of this study was to examine gender and racial differences in the associations between social support and health outcomes among HIV-positive individuals living in the Deep South. The Commission on Social Determinants of Health Conceptual Framework was used to guide this research. The framework describes the relationships between social position, life circumstance factors, and health outcomes (Commission on Social Determinants of Health, 2008). Based on the framework, this study examined the influence of social support on health outcomes stratified by the social position variables,

gender and race, while controlling for other social position variables, material circumstances, behaviors, biological factors, and other psychosocial factors (Figure 4.1). Because the types of social support that are related to health outcomes may vary by gender and race, multiple measures of social support were included. Health outcomes included mental health, HIV disease progression, and physical health-related quality of life.

## **Methods**

### *Procedures*

The Coping with HIV/AIDS in the Southeast (CHASE) study collected demographic, psychosocial, and clinical data from individuals receiving care at one of eight infectious disease clinics in the Deep South from 2001-2005. Consecutive sampling was used to recruit potential participants at study sites in North Carolina, South Carolina, Georgia, Alabama, and Louisiana. Individuals were eligible for participation if they 1) were HIV-positive; 2) English-speaking; and 3) passed a brief test screening for cognitive impairment. Demographic and psychosocial data were collected every 9 months through approximately two-hour long interviews conducted by field trained interviewers in a private place chosen by the participant. Clinical data were abstracted from participant medical charts by trained health care providers. Informed consent was obtained from all participants. The CHASE study was approved by the Institutional Review Board at Duke University and at all study sites. This study reports on baseline data from 611 participants collected from 2001-2002.

## *Measures*

### Structural social support

Social integration and social isolation were included as structural measures of social support. Social integration was calculated as the sum of social roles (0-6) including: 1) employee/student/job training, 2) parent, 3) partner, 4) two or more close friends or family, 5) close friend with HIV, and 6) support group participant. This scale was adapted from the Identify Accumulation Scale created by Thoits (1983). Individuals were categorized as isolated or not isolated based on the measure of social integration. Those who had 0-1 social roles were classified as socially isolated.

### Functional social support

Perceived social support and social conflict were the functional social support measures used in this study. Perceived social support was measured using the Medical Outcomes Study Social Support Survey (MOS-SSS) which has high internal reliability (Cronbach's alpha 0.91-0.97) and stability (0.72-0.78) (CD Sherbourne & Stewart, 1991). The 19 Likert scale items about perception of emotional/informational, tangible, affectionate, and belonging support availability were used to calculate the overall perceived social support scale. Values range from 0-100 with higher scores indicating greater levels of support.

Items from the Life Experiences Survey (LES) were used to measure social conflict (Sarason et al., 1978). The LES measures recent stressful life events and includes specific items about partner divorce, separation, or break-up due to conflict; increase in partner conflict without a break-up; and change in closeness to a family member due to conflict. A dichotomous social conflict variable was created. An individual was

considered exposed to social conflict if they experienced any of the three LES conflict measures in the last nine months.

#### Psychological distress

The Global Severity Index (GSI) of the Brief Symptom Inventory (BSI) was used to measure psychological distress. The BSI is a 53-item instrument that measures nine dimensions of psychological symptoms and has high internal reliability (0.71-0.85) and stability (0.68-0.91). The Global Severity Index (GSI), considered the best BSI indicator of individual psychological distress (Derogatis & Melisaratos, 1983), is the average of the 53 symptom ratings converted to a T score. Higher GSI scores indicate greater psychological distress (Derogatis & Melisaratos, 1983).

#### CD4 counts

CD4 lymphocyte counts collected from medical chart abstractions were used as the HIV outcome measure. The CD4 count of a healthy individual ranges from 800 to 1200 CD4 cells per cubic millimeter ( $\text{mm}^3$ ) of blood. A CD4 count less than 200 results in an AIDS diagnosis (Klimas et al., 2008).

#### Physical health-related quality of life

The Physical Component Score (PCS) of the Short Form-36 (SF-36) (version 2.0) was used to measure physical health-related quality of life (McHorney et al., 1994; MCHorney et al., 1993). PCS includes physical functioning, role-physical, bodily pain, and general health scales and is standardized with a mean of 50 and standard deviation of 10. A higher PCS score indicates better functioning and well-being (McHorney et al., 1994; MCHorney et al., 1993). The SF-36 has been highly reliable and valid in studies of many different patient populations (Ware & Sherbourne, 2003) and has frequently been

used in studies of individuals living with HIV (Burgoyne & Renwick, 2004; Hays et al., 2000; Swindells et al., 1999).

#### Potential confounders

Self-reported social position variables included gender, race, income, and education. Gender categories included male and female and race categories included non-Hispanic Black and non-Hispanic White (henceforth referred to as Black and White). Income was calculated as the sum of income in the last month from multiple sources including employment, unemployment benefits, public assistance, child support, pensions or Social Security, friends or family, and illegal activities. Income was log transformed to reduce positive skew. Education was categorized as less than a high school diploma, a high school diploma, and more than a high school diploma.

Continuous self-reported age was considered as a potential biological confounding variable. Disease status was calculated from chart abstracted CD4 counts. A CD4 count below 200 meets the criteria for an AIDS diagnosis (Centers for Disease Control and Prevention, 1992) and this cutoff value was used to dichotomize disease status. Material circumstances were measured by assessing housing stability. An individual was considered to have unstable housing if she/he spent at least one night in the last 90 days in a shelter for homeless persons; on the street; in an emergency housing program; in jail, prison, halfway house with no place else to live; drug treatment with no place else to live; or temporarily doubled up in someone else's home.

Behavioral variables included adherence to antiretroviral medications, severity of drug use, and severity of alcohol use. To assess medication adherence, participants were asked to share the last time they skipped any HIV medications. A person was considered



nonadherent if any doses of HIV medication were missed in the last 7 days. This single item measure was used by the Adherence Working Group of the Outcomes Committee of the Adult AIDS Clinical Trial Group (AACTG) to measure adherence when evaluating adherence instruments (Chesney et al., 2000). Additionally, self-reported adherence and 1-week adherence are validated measures that have been shown to predict HIV virologic and immunologic outcomes (Godin et al., 2003; Mannheimer et al., 2002). The Drug Composite Score and the Alcohol Composite Score from the Addiction Severity Index (ASI) were used to measure severity of use in the last 30 days. Composite score values ranged from 0-100 with a higher score indicating more use (McLellan et al., 1992).

Psychosocial variables other than social support included severe stress and incident trauma. Severe stress was measured using items from the LES (Sarason et al., 1978) which were associated with physical functioning in prior studies (Leserman et al., 2005). Severe stress was calculated as the sum of 16 different severe stressors such as the death of a parent or sibling, hospitalization, major financial difficulties, and more than a week in prison in the last 9 months. An item about separation or divorce due to arguments was excluded because it was used to assess social conflict. Three other severe stressors that satisfy the criterion A(1) of the definition of post-traumatic stress disorder were used to define incident trauma (American Psychiatric Association, 1990). A dichotomous incident trauma variable was created. An individual was considered exposed to incident trauma if they had experienced the death of a spouse/partner or child, sexual assault, or physical assault in the last 9 months.

*Statistical analyses*

Data were analyzed using StataIC 10 (StataCorp, 2007). Differences in study variables by gender and race were calculated using t-tests and Chi-square tests. Using the entire study sample, blocked linear regression was used to determine the additive effects of the social support variables to each health outcome model while controlling for potential confounders. Based on the conceptual model, social position variables (gender or race, log income, education), biological factors (age, disease status), material circumstances (unstable shelter), behaviors (nonadherence to HIV medication, severity of illicit drug use, severity of alcohol use), and psychosocial factors other than social support (severe stress, incident trauma) were entered into the model consecutively. The social support block was entered last and included social integration or social isolation, perceived social support, and social conflict. Selection of social integration or social isolation was based on simple linear regressions with each health outcome. The predictor with the lowest *p*-value for each outcome was selected as the structural social support predictor for multivariable analysis.

Reduced models were developed for each outcome using backward elimination. With the exception of the social support variables, the predictor variable with the largest *p*-value was removed and the blocked regressions were repeated until all remaining variables had a *p*-value  $\leq 0.10$  (Kleinbaum, Kupper, Muller, & Nizam, 1998). Residuals-based regression diagnostics were performed to detect potential departures from normality and potential heteroskedasticity. Multicollinearity problems were assessed using variance inflation factors.

Analyses stratified by gender and race were then conducted with the reduced models for each health outcome. Chow tests were used to test for differences in the associations between social support and health outcomes by gender and race.

## **Results**

### *Sample characteristics*

The study sample consisted of 611 individuals (Table 4.1). The majority of study participants were male (68.7%). Blacks represented 64.1% of the sample, 31.6% were White and 4.4% were of other races. The average participant age was  $40.2 \pm 8.7$  years and approximately 80% had at least a high school diploma. At the time of data collection, 77.5% of participants had a CD4 count greater than or equal to 200.

### *Differences in social support, health outcomes, and potential confounders by gender*

Male participants were less likely to be a parent than their female counterparts (38% vs. 86%;  $p < 0.01$ ). Men were more likely to report having a close friend with HIV (42.5%) than women (22.7%) ( $p < 0.01$ ). Women had a higher proportion of familial conflict than men (22.1% to 14.6%,  $p = 0.02$ ). Conflict in partnerships was also more common among women but the difference was not statistically significant. The percentage of individuals reporting any type of social conflict was significantly higher among women (40.5%) than men (28.5%) ( $p < 0.01$ ). A higher proportion of men were socially isolated (14.0%) than women (6.9%) ( $p = 0.02$ ). There were no differences in perceived social support or social integration between males and females.

There were no significant differences in the Global Severity Index or the SF-36 Physical Composite Score between males and females (Table 4.2). However, CD4

counts were significantly lower for men (391.8, SD=271.7) compared to women (449.6, SD=292.7) ( $p=0.04$ ).

A larger proportion of females were Black than males. Eighty-one percent of females were Black compared to 60.4% of males ( $p<0.01$ ). A greater proportion of men (50.7%) had an education beyond high school than women (34.9%) ( $p<0.01$ ). Men were more likely to be unstably housed ( $p=0.02$ ) and have a higher average Alcohol Composite Score ( $p=0.02$ ). There were no significant differences between men and women in income, age, disease status, medication adherence, Drug Composite Score, incident trauma, or severe stress.

*Correlates of psychosocial distress stratified by gender*

Among men, increased perceived social support was associated with less psychological distress ( $\beta= -0.19, p=<0.01$ ) and any social conflict was related to greater psychological distress ( $\beta= 7.11, p=<0.01$ ) (Table 4.3). Higher log income and older age were associated with lower distress and less than a high school diploma, unstable housing, medication nonadherence, incident trauma, and more severe stressors were associated with greater psychological distress for men. Among women, perceived social support ( $\beta= -0.15, p=<0.01$ ) and social conflict ( $\beta= 9.74, p=<0.01$ ) were also related to psychological distress. Other significant variables for women included log income, unstable housing, incident trauma, and severe stressors.

*Correlates of CD4 count stratified by gender*

Social integration was associated with CD4 counts among men ( $\beta=27.10, p=0.04$ ), while perceived social support and social conflict were unrelated (Table 4.4). Black race was associated with lower CD4 counts for men while higher Drug Composite

Scores were associated with higher CD4 counts. Social integration ( $\beta= 64.08, p=0.01$ ), Black race, and Drug Composite Scores were also associated with CD4 counts for women.

*Correlates of physical health-related quality of life stratified by gender*

Social isolation was related to lower SF-36 Physical Component Scores (PCS) among men ( $\beta= -3.30, p=0.04$ ) (Table 4.5). Log income was positively related to PCS while less than a high school diploma, older age, and more severe stressors were related to a lower PCS score for men. Among women, social isolation ( $\beta= -9.72, p<0.01$ ) and social conflict ( $\beta= -4.66, p=0.01$ ) were associated with PCS. Additionally, log income was positively related to PCS while age, Drug Composite Scores, and severe stressors were negatively related to PCS for women.

*Multivariable associations with psychosocial distress stratified by gender*

Among males, the strongest predictor of psychological distress was perceived social support (std.  $\beta= -0.24, p<0.01$ ) (Table 4.6). Social conflict was also significant (std.  $\beta= 0.15, p<0.01$ ). Black race and higher log income were related to lower psychological distress and less than a high school diploma, unstable housing, medication nonadherence, incident trauma, and a higher number of severe stressors were associated with greater distress. The model explained 43.7% of the variation in psychological distress for men.

Social conflict was the strongest predictor of distress for women (std.  $\beta= 0.35, p<0.01$ ). Perceived social support was the only other significant variable (std.  $\beta= -0.19, p=0.03$ ). The model explained 40% of the variation in psychological distress for women.

*Multivariable associations with CD4 count stratified by gender*

The social support variables were not associated with CD4 counts for men (Table 4.7). Black race was related to lower CD4 counts and was the only significant variable in the model for men. Among women, social integration was associated with CD4 counts (std.  $\beta = 0.24$ ,  $p = 0.01$ ). Drug Composite Score was also positively related to CD4 counts for women.

*Multivariable associations with physical health-related quality of life stratified by gender*

For men, physical health-related quality of life was predicted by social isolation (std.  $\beta = -0.12$ ,  $p = 0.04$ ), perceived social support (std.  $\beta = -0.14$ ,  $p = 0.02$ ) and social conflict (std.  $\beta = 0.12$ ,  $p = 0.02$ ) (Table 4.8). Log income, less than a high school diploma, age, Drug Composite Score, and severe stressors were also significantly associated with PCS. The model explained 23.6% of the variance in PCS for men.

Social conflict was the strongest predictor of PCS among women (std.  $\beta = -0.26$ ,  $p < 0.01$ ). Social isolation was also significant (std.  $\beta = -0.22$ ,  $p < 0.01$ ). Other predictors included log income, age, unstable housing, and Drug Composite Score. The value of  $R^2$  for the model for women was 33.9%. There was a significant difference in the relationship between social conflict and PCS for men and women.

*Differences in social support, health outcomes, and potential confounders by race*

Black individuals were less likely to have a partner than Whites (23.6%, 45.0%;  $p < 0.01$ ), more likely to report being a parent or guardian (61.4%, 36.0%;  $p < 0.01$ ), and less likely to be employed or students (37.3%, 51.6%;  $p < 0.01$ ). Slightly more than 17% of Black participants experienced partner conflict without divorce or separation, significantly greater than the 10.1% of Whites reporting such conflict ( $p = 0.02$ ). There

were no differences in social integration, social isolation, perceived social support, or any social conflict by race.

Psychological distress was lower among Blacks (57.6, SD=12.6) compared to Whites (60.1, SD=13.5) ( $p=0.03$ ) (Table 4.9). In addition, CD4 counts were lower for Blacks (377.5, SD=273.7) than Whites (482.6, SD=286.1) ( $p<0.01$ ). There were no significant differences in SF-36 PCS by race.

Approximately 62% of Blacks were male compared to 82% of Whites ( $p<0.01$ ). Blacks had a lower log income (6.5, SD=1.0) than Whites (6.9, SD=1.0) ( $p<0.01$ ) and a higher proportion of Blacks (24.5%) had received less than a high school diploma compared to Whites (11.1%) ( $p<0.01$ ). More Blacks (27%) had CD4 counts<200 than Whites (13.4%) ( $p<0.01$ ) and a higher proportion of Blacks than Whites were unstably housed (20%, 11.1%) ( $p=0.01$ ). Drug Composite Scores were significantly lower among Blacks (0.01, SD=0.04) than Whites (0.02, SD=0.06) ( $p=0.01$ ).

#### *Correlates of psychosocial distress stratified by race*

Psychological distress was associated with perceived social support ( $\beta= -0.15$ ,  $p<0.01$ ) and social conflict ( $\beta= 7.14$ ,  $p<0.01$ ) among Blacks (Table 4.10). Higher log income and older age were associated with lower distress. Less than a high school diploma, unstable shelter, medication nonadherence, incident trauma, and increased severe stressors were related to greater psychological distress. Social isolation ( $\beta= 5.96$ ,  $p=0.03$ ), perceived social support ( $\beta= -0.24$ ,  $p<0.01$ ), and social conflict ( $\beta= 9.07$ ,  $p<0.01$ ) were related to psychological distress among Whites. Other variables significantly associated with psychological distress among Whites were log income, age, less than a high school diploma, unstable housing, incident trauma, and severe stressors.

*Correlates of CD4 count stratified by race*

Social integration was positively associated with CD4 counts among Blacks ( $\beta=37.16, p=0.01$ ) (Table 4.11). In addition, male gender was associated with lower CD4 counts ( $\beta= -64.68, p=0.04$ ). Drug Composite Score was the only significant variable in the model for CD4 counts for Whites ( $\beta= 1064.56, p<0.01$ ).

*Correlates of physical health-related quality of life stratified by race*

None of the social support variables were related to PCS among Blacks (Table 4.12). Log income was positively associated with PCS while age and severe stressors were negatively associated with PCS for Blacks. Among Whites, PCS was associated with social isolation ( $\beta= -6.86, p<0.01$ ) and perceived social support ( $\beta= 0.07, p=0.03$ ). Increased log income was related to higher PCS while less than a high school diploma, unstable housing, larger Drug Composite Scores, and a greater number of severe stressors were associated with lower PCS for Whites.

*Multivariable associations with psychosocial distress stratified by race*

Among Blacks, perceived social support was the strongest predictor of psychological distress (std.  $\beta= -0.22, p<0.01$ ) (Table 4.13). Social conflict was also significant, but with less predictive strength (std.  $\beta= 0.13, p=0.02$ ). The addition of the social support variables to the model increased  $R^2$  by 6.3%. Other variables associated with psychological distress for Blacks were male gender, log income, less than a high school diploma, age, unstable housing medication nonadherence, incident trauma, and severe stressors. The model accounted for 35.8% of the variance in psychological distress.



Among Whites, perceived social support was also the strongest predictor of psychological distress (std.  $\beta = -0.33, p < 0.01$ ) and social conflict was significant (std.  $\beta = 0.14, p = 0.04$ ). An 11.1% increase in  $R^2$  resulted from the inclusion of the social support variables in the model for Whites. Other variables associated with psychological distress included age, incident trauma, and severe stressors. The variance explained by the model of psychological distress among Whites was 40.2%.

*Multivariable associations with CD4 count stratified by race*

Social integration was a predictor of CD4 counts among Black individuals (std.  $\beta = 0.13, p = 0.04$ ) (Table 4.14). In addition, male gender was associated with lower CD4 counts for Blacks. Among Whites, Drug Composite Score was the only variable related to CD4 counts (std.  $\beta = 0.26, p < 0.01$ ).

*Multivariable associations with physical health-related quality of life stratified by race*

The social support variables were not associated with PCS among Black individuals (Table 4.15). Log income, age, and severe stressors were significantly related. Among Whites, social isolation (std.  $\beta = -0.23, p < 0.01$ ) was associated with PCS. Log income, Drug Composite Score, and severe stressors were also significant. There was a significant difference in the relationship between social isolation and PCS for Blacks and Whites.

## **Discussion**

The purpose of this study was to identify gender and racial differences in the relationships between social support and health outcomes among individuals living with HIV in the Deep South and to determine the relative strength of social support predictors within each group. There were several notable social support findings by gender.

Women were significantly more likely to be parents than men. Other studies of HIV-positive individuals have also found that parenthood was more common among women (Lee & Rotheram-Borus, 2001; Lichtenstein et al., 2002). Although being a parent is often viewed as a positive experience by HIV-positive women and has been associated with improved health outcomes, parenting can result in considerable stress (Lee & Rotheram-Borus, 2001; Lichtenstein et al., 2002). Women have reported stress associated with stigmatization of their children and fears about their children's future upon their death (Lichtenstein et al., 2002). In addition, as primary caregivers, women may neglect their own psychological, social, and health needs to take care of their children (Lichtenstein et al., 2002; C Sherbourne et al., 2003). In sum, parenthood is an important role in the lives of most HIV-positive women and is likely to have a strong impact on health outcomes. Differences in the proportion of females and males who are parents may contribute to diverging social support experiences and health outcomes by gender.

In this study, women experienced more familial social conflict than men. Unlike the social networks of HIV-positive men, the networks of HIV-positive women often include more family members than friends (McDowell & Serovich, 2007). With fewer social contacts outside of the family structure, increases in stress may heighten tension and conflict in relationships with family members.

Similar to findings from prior studies (Leserman et al., 1994; C Sherbourne et al., 2003), social conflict was associated with poorer mental health for men and women. In this study, social conflict was the strongest predictor of psychological distress among females. Social conflict may have a strong impact on mental health for women because

they may have few opportunities to cope with conflict. The high demands of caring for children and other adults along with the stress of managing a stigmatized illness are likely to decrease the time and energy available to reduce the psychological impact of conflict in relationships. Further, the concentration of close relationships within the family may leave women with few external resources for coping with conflict when it occurs in these relationships.

Although social conflict was significantly associated with psychological distress for men, it was not the strongest social support predictor. A more diverse social network may lessen the impact of partner or family conflict on psychological distress. In this study, men were more likely to have a close friend with HIV than women. A relationship with another HIV-positive individual who can relate to the stress associated with the disease may help minimize the effects of social conflict in relationships with partners or family members.

CD4 counts were predicted by social integration for women only. While a greater percentage of women were parents or had a partner, a higher proportion of men were employed or students, had more than 2 close friends or family members, had a close friend with HIV, or participated in a support group. Although only the differences between parenthood and friendship with a person with HIV were significant, these findings suggest broader social networks among men. Increases in social integration among women may be important because greater social network diversity may improve access to health information, increase pressure to conform to positive health norms of the social network, or result in positive psychological responses due to network membership

(Cohen, 2004; Cohen et al., 2000; Cohen & Wills, 1985; Stroebe & Stroebe, 1996; P.A. Thoits, 1985; B. N. Uchino et al., 1996).

Although the importance of social conflict in predicting poorer mental health outcomes among women was supported by prior research with HIV-positive women (C Sherbourne et al., 2003), no studies were identified that examined the association between social conflict and physical health-related quality of life. In this study, social conflict was the strongest predictor of PCS for women. The relationship between social conflict and PCS found in this study suggests that, for women, the stress from social conflict may cause cognitive, affective, and biological responses that are detrimental to PCS.

In summary, there were notable differences in the significance and strength of social support variables in health outcome models for men and women. Unlike men, social conflict was the strongest predictor of greater psychological distress and poorer physical health-related quality of life among women. This finding suggests that social conflict may be more detrimental for the health of women than men. Unique stressors associated with caregiving and HIV stigma along with and fewer social outlets may contribute to this difference.

Differences in social support by race were also identified in this study. The proportion of individuals experiencing partner conflict with divorce or separation, partner conflict without divorce or separation, and conflict with family was higher for Blacks, although only conflict without divorce or separation was significant. Additionally, a greater proportion of Blacks experienced any type of social conflict than Whites with the difference approaching significance. For both Blacks and Whites, perceived social

support was the strongest predictor of psychosocial distress; social conflict was also significant. However, the addition of the social support variables to the model of distress resulted in a greater increase in  $R^2$  for Whites (11.1%) than Blacks (6.3%). This finding suggests that social support was a more important predictor of psychological distress for White HIV-positive individuals.

None of the social support variables were significantly related to CD4 counts among Whites, however, social integration was a predictor of CD4 counts among Blacks. Studies examining social support among the general population found that Black individuals rely on close friends and family for social support (Neighbors & Jackson, 1984). If this is true for HIV-positive Blacks, then social integration beyond relationships with friends and family could result in improved HIV outcomes through increased access to health information and pressure to conform to a wider range of positive health norms (Cohen, 2004; Cohen et al., 2000; Cohen & Wills, 1985; Stroebe & Stroebe, 1996; P.A. Thoits, 1985; B. N. Uchino et al., 1996).

Racial differences in the composition of social networks may also contribute to variations in the association between social support and PCS between Whites and Blacks. The association between social isolation and poorer PCS was significantly stronger for Whites than Blacks. Because Whites tend to seek support from a broader social network (Neighbors & Jackson, 1984), social isolation may have more adverse effects on PCS.

Although the social support variables that were significantly associated with CD4 counts and PCS varied for Blacks and Whites, explanations for these differences in the general or HIV social support literature were lacking. The identified differences warrant

further attention because interventions tailored to address specific social support needs may be more effective in improving these health outcomes.

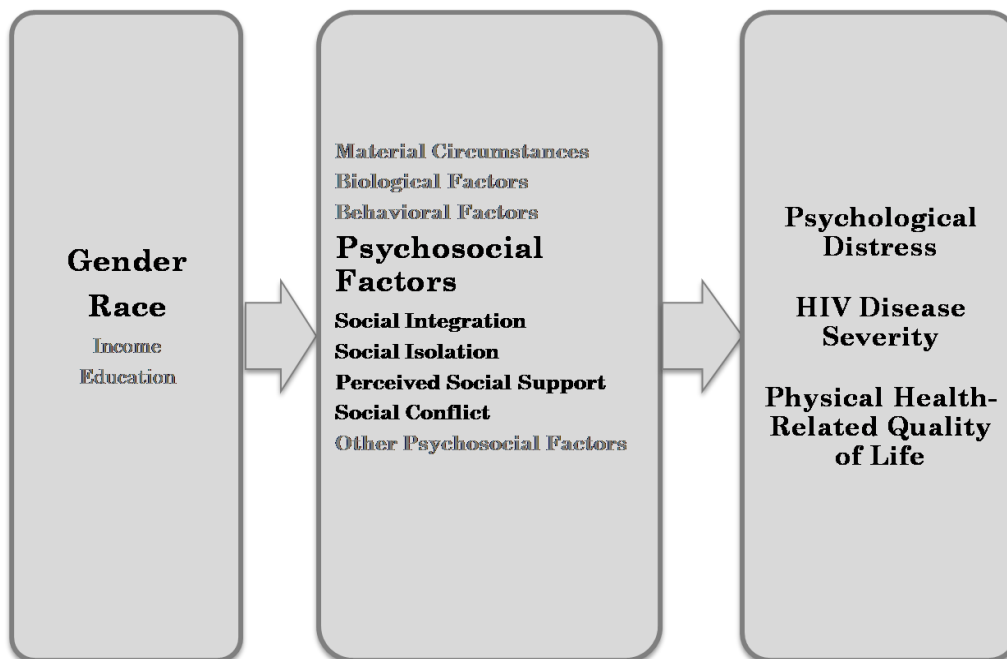
While the results from this study may contribute to a greater understanding of the relationships between social support and health outcomes by gender and race among individuals living with HIV in the Deep South, there are some limitations. The cross-sectional nature of the data used in this study does not allow conclusions to be drawn regarding causality.

The number of social support items measured was limited. Perceived social support was measured using a valid and reliable scale, but social integration, social isolation, and social conflict measures were created based on similar measures used in prior research. Social integration scales from other studies were used to guide the selection of items for the social integration measurement. Church membership has been included as a role in social integration scales by some researchers, however, church membership was not measured in the CHASE Study. The social integration scale may have been more accurate with its inclusion. In this study, dichotomization of social isolation may have resulted in misclassification. An individual was considered socially isolated if they had one or zero social roles, however, individuals with one of the measured social roles may not be socially isolated. The social conflict variable included partner and family conflict items but the availability of additional items that measure other types of conflict may have increased accuracy.

There may also be limitations due to the methods of data collection. Social support measures, psychological distress, and physical health-related quality of life were all based on self-reported responses. Recall of information may have been challenging

for participants and some may have answered in a socially desirable way. The ability to understand some of the complexities of social relationships may be limited by quantitative data collection. Finally, although the CHASE sample was representative of the demographic and disease characteristics of individuals receiving medical care for HIV in the Deep South, the results may not be generalizable to HIV-positive individuals who are not receiving HIV medical care.

In spite of its limitations, this study expands knowledge about the relationship between social support and health outcomes among individuals living with HIV by assessing the effects of multiple measures of social support on mental, HIV, and physical health-related quality of life outcomes by gender and race. These findings may be especially important as medical treatment has increasingly become the central focus of HIV care in federal legislation. Because there are limitations in federal funding available for social support interventions, those that are funded must achieve optimal effectiveness and efficiency. Interventions designed to address the specific components of social support that most impact health outcomes for different genders and races are more likely to be effective and efficient.



Adapted from: Closing the Gap in a generation: Health equity through action on the social determinants of health: Final report of the Commission on Social Determinants of Health, 2008.

Figure 4.1: Study conceptual framework



TABLE 4.1: Demographic and clinical characteristics of the CHASE sample

	<b>n</b>	<b>% Mean (SD)</b>
	611	
Gender		
Male	419	68.7
Female	191	31.3
Race		
Black	383	64.1
White	189	31.6
Other	26	4.4
Age	611	40.2 (8.7)
Income	569	1231.5 (2996.9)
Education		
Less than high school	121	19.9
High school diploma	209	34.4
More than high school	278	45.7
Disease status		
CD4 count $\geq$ 200	358	77.5
CD4 count < 200	104	22.5

Categorical variables recorded as frequency (%).

Continuous variables recorded as mean (SD).

Data source: Coping with HIV/AIDS in the Southeast (CHASE) Study

TABLE 4.2: Study variables by gender

	Male	Female	<i>p</i> value
<b>Health Outcomes</b>			
Global Severity Index Score	59.3 (13.5)	57.4 (11.7)	0.09
CD4 count	391.8 (271.7)	449.6 (292.7)	<b>0.04</b>
SF-36 Physical Composite Score	46.0 (11.2)	45.1 (11.3)	0.36
<b>Social Support</b>			
Partner			
Yes	28.5	33.7	0.19
No (referent)			
Parent			
Yes	37.7	86.4	<b>&lt;0.01</b>
Employed or student			
Yes	44.3	37.7	0.13
No (referent)			
Close friends and family $\geq 2$			
Yes	86.7	84.3	0.44
No (referent)			
Close friend with HIV			
Yes	42.5	22.7	<b>&lt;0.01</b>
No (referent)			
Participates in support group			
Yes	29.8	23.0	0.08
No (referent)			
Conflict with divorce/separation			
Yes	12.4	16.8	0.15
No (referent)			
Conflict without divorce/separation			
Yes	13.6	18.3	0.13
No (referent)			
Conflict family			
Yes	14.6	22.1	<b>0.02</b>
No (referent)			
Social integration	2.7 (1.1)	2.9 (1.0)	0.08
Social isolation			
Yes	14.0	6.9	0.02
No (referent)			

TABLE 4.2: (continued)

Perceived social support overall	71.5 (24.3)	75.2 (21.7)	0.08
Social conflict			
Yes	28.5	40.5	<b>&lt;0.01</b>
No (referent)			
<b>Potential Confounders</b>			
Race			
Black	60.4	81.1	<b>&lt;0.01</b>
White (referent)			
Log Income	6.7 (1.0)	6.5 (1.1)	0.07
Education			
Less than high school	16.0	28.6	<b>&lt;0.01</b>
High school diploma	36.5	33.3	<b>&lt;0.01</b>
More than high school (referent)	34.9	50.7	
Age	40.7 (8.5)	39.2 (9.3)	0.05
Disease Status			
CD4 count $\geq$ 200 (referent)			
CD4 count < 200	24.8	17.8	0.10
Unstable shelter			
Yes	19.6	12.1	<b>0.02</b>
No (referent)			
Medication adherence			
Yes (referent)			
No	22.6	22.7	0.98
Drug Composite Score	0.02 (0.04)	0.02 (0.06)	0.47
Alcohol Composite Score	0.03 (0.09)	0.01 (0.05)	<b>0.02</b>
Incident trauma			
Yes	9.3	14.7	0.05
No (referent)			
Other severe stressors	1.0 (1.1)	0.9 (1.0)	0.27

---

Categorical variables recorded as %

Continuous variables recorded as mean (SD)

Social integration ranges 0-6 with a larger number indicating greater social integration

Perceived social support ranges from 0-100 with a larger number indicating more perceived social support

Data source: Coping with HIV/AIDS in the Southeast (CHASE) Study

TABLE 4.3: Bivariable associations with the Global Severity Index of the Brief Symptom Inventory among males and females

	Males		Females	
	$\beta$	<i>p</i> value	$\beta$	<i>p</i> value
Race				
Black	-1.95	0.16	-3.41	0.12
White (referent)				
Log Income	-3.89	<0.01	-2.05	0.01
Education				
Less than high school	6.11	<0.01	1.75	0.35
High school diploma	-0.33	0.82	1.88	0.29
More than high school (referent)				
Age	-0.27	<0.01	-0.11	0.23
Unstable shelter				
Yes	8.02	<0.01	7.49	<0.01
No (referent)				
Medication adherence				
Yes (referent)				
No	5.29	<0.01	3.99	0.07
Incident trauma				
Yes	10.75	<0.01	6.39	0.01
No (referent)				
Severe stress	5.06	<0.01	3.26	<0.01
Social isolation				
Yes	3.11	0.11	-1.27	0.72
No (referent)				
Perceived social support	-0.19	<0.01	-0.15	<0.01
Social conflict				
Yes	7.11	<0.01	9.74	<0.01
No (referent)				

Data source: Coping with HIV/AIDS in the Southeast (CHASE) Study  
 Only predictor variables included in the reduced model are reported

TABLE 4.4: Bivariable associations with CD4 counts among males and females

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	Males		Females	
	$\beta$	<i>p</i> value	$\beta$	<i>p</i> value
Race				
Black	-110.50	0.00	-171.81	0.01
White (referent)				
Drug Composite Score	645.85	0.04	827.46	0.04
Social integration	27.10	0.04	64.08	0.01
Perceived social support	1.00	0.10	-0.10	0.94
Social conflict				
Yes	29.22	0.39	-22.45	0.65
No (referent)				

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Data source: Coping with HIV/AIDS in the Southeast (CHASE) Study  
 Only predictor variables included in the reduced model are reported

TABLE 4.5: Bivariable associations with the Physical Component Score of the SF-36 among males and females

	Males		Females	
	$\beta$	<i>p</i> value	$\beta$	<i>p</i> value
Log Income	3.21	<0.01	2.84	<0.01
Education				
Less than high school	-3.34	0.04	0.20	0.92
High school diploma	-1.33	0.27	-0.04	0.99
More than high school (referent)				
Age	-0.22	<0.01	-0.24	0.01
Unstable shelter				
Yes	-2.46	0.08	1.75	0.48
No (referent)				
Alcohol Composite Score	9.70	0.13	-13.35	0.40
Drug Composite Score	-16.60	0.18	-49.09	<0.01
Severe stressors	-2.79	<0.01	-3.69	<0.01
Social isolation				
Yes	-3.30	0.04	-9.72	<0.01
No (referent)				
Perceived social support overall	0.03	0.20	0.05	0.17
Social conflict				
Yes	2.08	0.09	-4.66	0.01
No (referent)				

Data source: Coping with HIV/AIDS in the Southeast (CHASE) Study  
Only predictor variables included in the reduced model are reported

TABLE 4.6: Multivariable associations with the Global Severity Index of the Brief Symptom Inventory among males and females

	Male (n=272)	Female (n=112)
Black	-0.22**	-0.15
Log Income	-0.23**	-0.10
Less than high school	0.13*	0.17
High school diploma	-0.02	0.04
Age	-0.07	-0.10
No shelter	0.11*	0.07
Nonadherence	0.13**	0.11
Incident trauma	0.11*	0.12
Other severe stressors	0.26**	0.02
Social isolation	-0.04	-0.03
Perceived social support	-0.24**	-0.19*
Social Conflict	0.15**	0.35**
R <sup>2</sup>	0.437	0.400

Data source: Coping with HIV/AIDS in the Southeast (CHASE) Study

Values reported are standardized betas

\*p<..05, \*\*p<..01

TABLE 4.7: Multivariable associations with CD4 counts among males and females

	Male (n=259)	Female (n=112)
Black	-0.20**	-0.15
Drug Composite Score	0.12	0.21*
Social integration	0.08	0.24*
Perceived social support	0.05	-0.04
Social conflict	0.05	-0.07
R <sup>2</sup>	0.075	0.138

Data source: Coping with HIV/AIDS in the Southeast (CHASE) Study

Values reported are standardized betas

\*p<..05, \*\*p<..01

TABLE 4.8: Multivariable associations with the Physical Composite Score of the SF-36 among males and females

	Males (n=303)	Females (n=140)
Log income	0.21**	0.23*
Less than high school	-0.15*	0.01
High school diploma	0.00	-0.01
Age	-0.17**	-0.18*
Unstable shelter	0.03	0.19*
Alcohol Composite Score	0.12	0.07
Drug Composite Score	-0.15*	-0.20*
Severe stress	-0.31**	-0.15
Social isolation	-0.12*	-0.22**
Perceived social support	-0.14*	-0.02
Social conflict	0.12*	-0.26**
R <sup>2</sup>	0.236	0.339

Data source: Coping with HIV/AIDS in the Southeast (CHASE) Study

Values reported are standardized betas

\*p<..05, \*\*p<..01



TABLE 4.9: Study variables by race

	Black	White	<i>p</i> value
<b>Health Outcomes</b>			
Global Severity Index Score	57.6 (12.6)	60.1 (13.5)	<b>0.03</b>
CD4 count	377.5 (273.7)	482.6 (286.1)	<b>&lt;0.01</b>
SF-36 Physical Composite Score	46.2 (11.1)	45.3 (11.3)	0.41
<b>Social Support</b>			
Partner			
Yes	23.6	45.0	<b>&lt;0.01</b>
No (referent)			
Parent			
Yes	61.4	36.0	<b>&lt;0.01</b>
No (referent)			
Employed or student			
Yes	37.3	51.6	<b>&lt;0.01</b>
No (referent)			
Close friends and family $\geq 2$			
Yes	86.3	85.7	0.85
No (referent)			
Close friend with HIV			
Yes	36.6	36.7	0.99
No (referent)			
Participates in support group			
Yes	27.2	28.6	0.72
No (referent)			
Conflict with divorce/separation			
Yes	15.4	10.1	0.08
No (referent)			
Conflict without divorce/separation			
Yes	17.2	10.1	<b>0.02</b>
No (referent)			
Conflict family			
Yes	17.3	13.8	0.29
No (referent)			
Social integration	2.7 (1.1)	2.8 (1.1)	0.21

TABLE 4.9: (continued)

Social isolation			
Yes	12.2	11.2	0.74
No (referent)			
Perceived social support overall			
	72.7 (23.4)	74.5 (22.6)	0.39
Social conflict			
Yes	34.4	26.1	0.05
No (referent)			
<b>Potential Confounders</b>			
Gender			
Male	61.8	82.0	<b>&lt;0.01</b>
Female (referent)	38.2	18.0	
Log Income			
	6.5 (1.0)	6.9 (1.0)	<b>&lt;0.01</b>
Education			
Less than high school	24.5	11.1	<b>&lt;0.01</b>
High school diploma	39.5	24.3	
More than high school (referent)	36.1	64.6	
Age			
	40.0 (8.8)	40.2 (8.6)	0.77
Disease Status			
CD4 count $\geq$ 200 (referent)			
CD4 count < 200	27.0	13.4	<b>&lt;0.01</b>
Unstable shelter			
Yes	20.0	11.1	<b>0.01</b>
No (referent)			
Medication adherence			
Yes (referent)			
No	21.0	28.6	0.07
Drug Composite Score			
	0.01 (0.04)	0.02 (0.06)	<b>0.01</b>
Alcohol Composite Score			
	0.02 (0.02)	0.03 (0.10)	0.11
Incident trauma			
Yes	12.3	7.9	0.12
No (referent)			
Other severe stressors			
	0.9 (1.0)	0.9 (1.1)	0.73

Categorical variables recorded as %

Continuous variables recorded as mean (SD)

Social integration ranges 0-6 with a larger number indicating greater social integration

Perceived social support ranges from 0-100 with a larger number indicating more perceived social support

Data source: Coping with HIV/AIDS in the Southeast (CHASE) Study

TABLE 4.10: Bivariable associations with the Global Severity Index of the Brief Symptom Inventory among Blacks and Whites

	Black		White	
	$\beta$	<i>p</i> value	$\beta$	<i>p</i> value
Gender				
Male	1.98	0.12	0.59	0.79
Female (referent)				
Log Income	-3.08	<0.01	-3.73	<0.01
Education				
Less than high school	3.57	0.01	7.67	<0.01
High school diploma	0.12	0.92	1.60	0.43
More than high school (referent)				
Age	-0.16	0.02	-0.33	<0.01
Unstable shelter				
Yes	7.98	<0.01	9.45	<0.01
No (referent)				
Medication adherence				
Yes (referent)				
No	5.76	<0.01	3.41	0.10
Incident trauma				
Yes	7.74	<0.01	13.62	<0.01
No (referent)				
Severe stress	4.01	<0.01	5.02	<0.01
Social isolation				
Yes	0.30	0.88	5.96	0.03
No (referent)				
Perceived social support	-0.15	<0.01	-0.24	<0.01
Social conflict				
Yes	7.14	<0.01	9.07	<0.01
No (referent)				

Data source: Coping with HIV/AIDS in the Southeast (CHASE) Study  
 Only predictor variables included in the reduced model are reported

TABLE 4.11: Bivariable associations with CD4 counts among Blacks and Whites

	Black		White	
	$\beta$	<i>p</i> value	$\beta$	<i>p</i> value
Gender				
Male	-64.68	0.04	-72.62	0.16
Females (referent)				
Drug Composite Score	146.61	0.68	1064.56	0.00
Social integration	37.16	0.01	26.18	0.17
Perceived social support	0.78	0.22	1.18	0.17
Social conflict				
Yes	45.47	0.15	-11.86	0.80
No (referent)				

Data source: Coping with HIV/AIDS in the Southeast (CHASE) Study  
 Only predictor variables included in the reduced model are reported

TABLE 4.12: Bivariable associations with the Physical Component Score of the SF-36 among Blacks and Whites

	Black		White	
	$\beta$	<i>p</i> value	$\beta$	<i>p</i> value
Log Income	2.93	<0.01	3.79	<0.01
Education				
Less than high school	-1.30	0.37	-5.01	0.03
High school diploma	-1.12	0.37	-1.19	0.50
More than high school (referent)				
Age	-0.30	<0.01	-0.09	0.31
Unstable shelter				
Yes	-0.81	0.56	-4.86	0.03
No (referent)				
Alcohol Composite Score	7.18	0.38	7.71	0.38
Drug Composite Score	-22.61	0.10	-38.25	<0.01
Severe stressors	-3.16	<0.01	-2.80	<0.01
Social isolation				
Yes	-2.52	0.15	-6.86	<0.01
No (referent)				
Perceived social support overall	0.02	0.32	0.07	0.03
Social conflict				
Yes	-0.02	0.99	-0.60	0.72
No (referent)				

Data source: Coping with HIV/AIDS in the Southeast (CHASE) Study  
Only predictor variables included in the reduced model are reported

TABLE 4.13: Multivariable associations with the Global Severity Index of the Brief Symptom Inventory among Blacks and Whites

	Black (n=272)	White (n=178)
Male	0.11*	0.07
Log Income	-0.19**	-0.12
Less than high school	0.18**	0.04
High school diploma	0.00	-0.05
Age	-0.13*	-0.18**
No shelter	0.12*	-0.03
Nonadherence	0.15**	0.06
Incident trauma	0.13**	0.15*
Other severe stressors	0.18**	0.20**
Social isolation	-0.10	-0.02
Perceived social support	-0.22**	-0.33**
Social Conflict	0.13*	0.14*
R <sup>2</sup>	0.358	0.402

Data source: Coping with HIV/AIDS in the Southeast (CHASE) Study

Values reported are standardized betas

\*p<..05, \*\*p<..01

TABLE 4.14: Multivariable associations with CD4 counts among Blacks and Whites

	Black (n=265)	White (n=170)
Male	-0.13*	-0.09
Drug Composite Score	0.04	0.26**
Social integration	0.13*	0.07
Perceived social support	0.03	0.08
Social conflict	0.04	-0.02
R <sup>2</sup>	0.048	0.091

Data source: Coping with HIV/AIDS in the Southeast (CHASE) Study

Values reported are standardized betas

\*p<..05, \*\*p<..01

TABLE 4.15: Multivariable associations with the Physical Composite Score of the SF-36 among Blacks and Whites

	Black (n=300)	White (n=172)
Log income	0.21**	0.23**
Less than high school diploma	-0.06	-0.14
High school diploma	-0.01	-0.06
Age	-0.20**	-0.13
Unstable shelter	0.09	0.04
Alcohol Composite Score	0.09	0.16
Drug Composite Score	-0.04	-0.33**
Severe stress	-0.30**	-0.23**
Social isolation	-0.07	-0.23**
Perceived social support	-0.08	-0.10
Social conflict	-0.01	0.06
R <sup>2</sup>	0.221	0.289

Data source: Coping with HIV/AIDS in the Southeast (CHASE) Study

Values reported are standardized betas

\*p<..05, \*\*p<..01

## CHAPTER 5: DISCUSSION AND CONCLUSIONS

This study described structural and functional social support among individuals living with HIV in the Deep South. Gender and racial differences in social support were assessed and gender and race were examined as predictors of social support. The study also examined relationships between social support and mental health, HIV disease severity, and quality of life outcomes. Finally, the study examined associations between social support and health outcomes stratified by gender and race. The Commission on Social Determinants of Health Theoretical Framework was used to guide the research (Commission on Social Determinants of Health, 2007, 2008).

### **Review of the Findings**

This research was conducted with baseline data from 611 participants in the CHASE Study. Demographic, psychosocial, and clinical data were collected from individuals receiving care at one of eight infectious disease clinics in North Carolina, South Carolina, Georgia, Alabama, and Louisiana between 2001 and 2002. The majority of study participants were male (68.7%). Non-Hispanic Blacks represented 64.1% of the sample, 31.6% were White and 4.4% were of other races. The average participant age was  $40.2 \pm 8.7$  years; approximately 80% had at least a high school diploma. At the time of data collection, 77.5% of participants had a CD4 count greater than or equal to 200.



*Review of Chapter Two findings*

Chapter Two described social integration, social isolation, perceived social support, and social conflict among baseline CHASE participants and tested for differences in these social support components by gender and race. In bivariable analyses, men were more likely to be socially isolated than women and women were more likely than men to report any social conflict. A higher proportion of Black individuals reported social conflict than Whites.

Chapter Two also reported on the findings from multivariable analyses that examined gender and race as predictors of social support. In these analyses, gender was associated with social integration and social isolation. Female gender was associated with a higher degree of social integration. The likelihood of social isolation was higher for men compared to women. While it was hypothesized that gender would be associated with social isolation, a relationship between gender and social integration was not expected. An association between gender and social conflict was not supported by the study findings. As hypothesized, Black individuals were more likely to experience social conflict than White individuals.

*Review of Chapter Three findings*

The associations between social support and health outcomes among baseline CHASE participants were the subject of Chapter Three. In multivariable analyses that controlled for potential confounders, perceived social support was the strongest predictor of psychological distress; social conflict was also significant. Social integration was associated with CD4 counts. Interactions between severe stress and perceived social

support and severe stress and social isolation were associated with physical health-related quality of life.

#### *Review of Chapter Four findings*

The associations between social support and health outcomes by gender and race were the subject of Chapter Four. Among males, the strongest predictor of psychological distress was perceived social support; social conflict was also significant. Social conflict was the strongest predictor of distress for women. Perceived social support was also significant. The social support variables were not associated with CD4 counts for men, but social integration was associated with CD4 counts for women. For men, physical health-related quality of life was predicted by social isolation, perceived social support, and social conflict. Social conflict was the strongest predictor of physical health-related quality of life among women; social isolation was also significant. There was a significant difference in the relationship between social conflict and physical health-related quality of life for men and women.

Perceived social support and social conflict were associated with psychological distress for both Black and White individuals. There was a significant relationship between CD4 counts for Blacks, but not for Whites. Social isolation was associated with physical health-related quality of life for Whites, but not for Blacks. The relationship between social isolation and health-related quality of life was significantly different by race.

#### **Discussion of Findings**

Although the Commission on Social Determinants of Health Conceptual Framework acknowledges the importance of medical care as a proximal determinant of

health, it extends beyond traditional medical care models to examine the effects of social and economic factors on health outcomes. For most HIV-positive individuals, medical treatment is necessary for achievement of optimal health outcomes. However, social and economic factors have also been found to influence health outcomes. In spite of the importance of social and economic factors, there is movement toward a model of HIV care that emphasizes medical care over interventions designed to address unmet social and economic needs. The shift to a medicalized model of care has been reflected in legislation that restricts the amount of federal funding that can be used to address the social needs of HIV-positive individuals. As a result, it is critical that social interventions that are funded are effective and efficient. A greater understanding of the relationships between social support and health outcomes may inform the development of more effective and efficient interventions.

By using a broad conceptualization of social support, this study provides a more comprehensive description of social support among individuals living with HIV in the Deep South. Social integration, social isolation, perceived social support, and social conflict have been recognized as important components of social support. However, most studies of HIV-positive individuals have only assessed perceived social support. Measurement of the negative components of social support, such as social isolation and social conflict, is especially important in the Deep South, where contextual factors may increase their prevalence. Assessment of the negative and positive facets of social support may result in a greater understanding of the social lives of HIV-positive individuals living in this region. This information may help improve the success of interventions designed to improve health outcomes through modifications to social support.

Studies in the general population have found variations in social support experiences by gender and race. These differences are supported by the Commission on Social Determinants of Health Theoretical Framework which suggests that social position predicts life circumstances, including social support. In this study, gender predicted social integration and social isolation. In multivariable analyses, men were more likely to be socially isolated and were less socially integrated than women. According to the general social support literature, social isolation and social integration are more strongly related to health outcomes for men. If the relationship between social isolation and/or integration and health outcomes is also strong for HIV-positive men, the higher likelihood of social isolation and lower levels of social integration found among men in this study indicate a need to address structural social support for men.

Social conflict was predicted by race in this study. Black individuals were more likely to experience social conflict than their White counterparts. A strong relationship between social conflict and health outcomes among Blacks would suggest that interventions designed to reduce social conflict may be effective in improving health outcomes of Black individuals living with HIV in the Deep South. The associations between social support and health outcomes by gender and race were the subject of Chapter Four.

Following the Commission on Social Determinants of Health Theoretical Framework, Chapter Three examined the relationships between social support and health outcomes among CHASE participants. Most studies that have explored associations between social support and health outcomes among HIV-positive individuals have used perceived social support as the only measurement of social support. In this study, social

support is measured by social integration or social isolation, perceived social support, and social conflict. Nearly all prior studies of individuals living with HIV have examined only one health outcome, most commonly psychological health. Because this study sought to understand the influence of social support on health more broadly, HIV disease severity and physical health-related quality of life were also included as health outcomes.

Associations between social support and health outcomes were identified.

Different components of social support were important for each outcome. The functional measures of social support, perceived social support and social conflict, were associated with psychological distress. This finding suggests that the stress-buffering effects of perceived support and the stress-eliciting effects of social conflict were related to psychological distress. In contrast, social integration, a structural measure of social support, was the only social support variable associated with HIV disease severity. The influence of positive health norms, access to greater health information, and improvements in affect due to greater social integration mattered for objective physical health.

Physical health-related quality of life was associated with interactions between severe stress and perceived social support and severe stress and social isolation. Physical health status and mental health status are both believed to influence physical health-related quality of life. Because functional social support was associated with mental health and structural social support was related to HIV severity, it is not surprising that physical health-related quality of life was associated with variables that represent both functional and structural social support.

As represented in the Commission on Social Determinants of Health Conceptual Framework, social support was associated with health outcomes in this component of the study. Variations in the social support variables that were associated with each health outcomes were found. Given the differences in social support predictors, some of the associations between social support and health outcomes would have been missed if only one measure of social support had been included in models. In addition, the importance of the negative social support variables suggests that social isolation and social conflict should be considered in future research and interventions.

The results from Chapter Two and Chapter Three of the study provide support for the Commission on Social Determinants of Health Conceptual Framework. Gender and race were associated with social support and social support was associated with health outcomes. Chapter Four assessed differences in the associations between social support and health outcomes by gender and race. The modifying effects of gender and race on the association between life circumstances and health outcomes were not considered in the Commission's framework. However, understanding any differences in these associations may provide important information for the development of social support interventions designed to improve health outcomes.

The findings from Chapter Four revealed some differences in the strength and significance of social support predictors by gender and race. Variations in the associations between social conflict and health outcomes for men and women were especially notable. For example, social conflict was the strongest predictor of psychological distress for women, but not for men. Social conflict was also the strongest predictor of physical health-related quality of life among women. Further, the

relationship between social conflict and subjective physical quality of life was significantly different for women and men. These findings suggest that social conflict may have a greater impact on health outcomes for women than men.

The differences in social support by gender and race found in Chapter Two are more useful when combined with the results of Chapter Four. For example, the findings from Chapter Two indicated that men were more likely to be socially isolated than women. The findings from Chapter Four showed that social isolation was the strongest predictor of physical health-related quality of life for men. A strong relationship between social isolation and physical quality of life combined with a higher likelihood of social isolation for men indicates a need for interventions designed to reduce social isolation among men.

The findings from Chapter Four showed that social conflict was significantly related to greater psychological distress for Blacks and Whites. Interventions designed to reduce social conflict for Blacks and Whites may be important in reducing psychological distress. However, the higher probability of social conflict among Blacks identified in Chapter Two of the study may make interventions designed to reduce social conflict among Blacks a higher priority.

### **Study Limitations**

While the results of this study may contribute to a greater understanding of social support and the relationships between social support and health outcomes among individuals living with HIV in the Deep South, there are some limitations. The cross-sectional nature of the data does not allow conclusions to be drawn regarding causality. In this study, social support was viewed as a predictor of health outcomes, however, the

identified associations between social support and health outcomes could be due to the effect of health outcomes on social support.

The data used for this study were limited to data collected in the CHASE Study. The number of social support items was limited because of the broad scope of the CHASE Study. A reliable and valid scale measuring perceived social support was included in the instrument but specific social integration, social isolation, and social conflict scales were not included. Social integration scales from prior research were used to guide the selection of items for the social integration measurement. Some researchers have included church membership as a role in social integration scales. Although there were two religion and spirituality items collected in CHASE, neither measured church membership. The importance of church membership may be particularly important in the Deep South; therefore, the social integration scale may have been more accurate with its inclusion. The criteria used to determine social isolation in this study may have resulted in misclassification. An individual was considered to be social isolated if they identified one or zero social roles. However, individuals with one of the measured social roles may not be socially isolated. The social conflict variable included partner and family conflict items but the availability of additional items that measured other types of conflict, such as conflict with friends, may have increased its accuracy.

The methods of data collection used in the CHASE Study may have affected the results of the study. Social support measures, psychological distress, and physical health-related quality of life were based on self-reported responses. Individuals may have had difficulty recalling information needed to accurately answer these questions or they may



have responded to the items in a socially desirable way. CD4 counts, the measure of HIV disease severity, were abstracted from medical charts. The number of participants with CD4 count data was lower than the number with data on other health outcomes. As a result, the CD4 count models may have been less precise than those of other outcomes. In addition, the ability to understand some of the complexities of social relationships may have been limited by quantitative data collection.

Although the CHASE sample was representative of the demographic and disease characteristics of individuals receiving medical care for HIV in the Deep South, the results may not be generalizable to HIV-positive individuals who are not receiving HIV medical care or to those living in other regions of the country.

### **Implications for Policy and Practice**

Although HIV care has traditionally addressed the economic and social needs of clients, medical treatment has increasingly become the focus of care. This shift has been reflected in the amount of federal funding available to address needs that are not directly related to medical treatment. However, like many other studies with HIV-positive individuals, social support was related to health outcomes in this study. The health effects of policies that reduce funding to address the social support needs of individuals living with HIV should be carefully evaluated.

The results of this study have implications for HIV care. HIV care providers may benefit from information about social support and the ways that social support may affect health outcomes for individuals living with HIV in the Deep South. For example, a HIV case manager may be more inclined to encourage a socially isolated client to participate

in a support group if they are more knowledgeable about the detrimental effects that social isolation may have on health outcomes.

In times of funding reductions for social support services, improvements in the effectiveness and efficiency of funded interventions are essential. This study's identification of the social support components that predict health outcomes for HIV-positive individuals living in the Deep South may help improve the effectiveness and efficiency of interventions implemented in this region. Further, the identified differences in these associations by gender and race may further improve interventions and may help determine which populations should receive the highest priority for intervention.

### **Recommendations for Future Research**

Future research should include longitudinal analyses of the associations between social support and health outcomes among individuals living with HIV in the Deep South. Findings from longitudinal analyses would allow conclusions to be drawn about the causal relationship between social support and health outcomes. Although data were collected from CHASE participants at multiple time points, most of the social support data were only collected at baseline. This prohibited analyses that examined the effect of changes in social support on changes in health outcomes over time. In addition, changes in health outcomes over the course of the CHASE Study were small. Future studies should measure social support and health outcomes over a longer period of time.

In this study, gender and racial differences in the associations between social support and health outcomes were examined. However, the stage of HIV infection may also affect the relationships between social support and health outcomes. In one study, larger social networks were associated with faster HIV/AIDS progression for those in the

early stages of infection while larger social networks were associated with increased survival time among those with more advanced disease (Patterson et al., 1996). Other research found that social support was not important in predicting HIV outcomes until later in the progression of the disease (Theorell et al., 1995). Future studies should consider variations in the relationships between social support and health outcomes by disease status.

Qualitative research should be considered for future studies of social support among HIV-positive individuals living in the Deep South. Qualitative research may help describe the complexities of social relationships that are not evident in quantitative research. For example, the interplay among social roles, social support, and HIV stigma may be more readily understood using qualitative methods.

Future research should consider the effects of technology on social support. HIV-positive individuals may benefit from the ability to stay in contact with friends, family, and HIV service providers using cell phones or the Internet. These tools may also help HIV-positive individuals connect with others living with HIV. Geographic isolation and the high levels of HIV stigma found in the Deep South may further increase the importance of cell phone communication, email messaging, and social media networking. However, many HIV-positive individuals living in this region have a low income. Cell phone and Internet access may be limited as a result.

## **Conclusion**

In spite of its limitations, this study contributes to the understanding of social support and the relationships between social support and health outcomes among individuals living with HIV in the Deep South. The study described structural and

functional social support and examined the effects of gender and race on these social support components. Relationships between social support and mental health, HIV disease severity, and quality of life outcomes were identified. In addition, variations in the associations between social support and health outcomes by gender and race were discovered. The relationships between social support and health outcomes identified in this study warrant stringent evaluation of policies that reduce funding for social support services. These findings may also inform the development of social support interventions that improve health outcomes among individuals living with HIV in the Deep South.

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