CONCEPTUALIZING HIV-ASSOCIATED STIGMA AND EXPLORING THE CORRELATES OF HIV TESTING BEHAVIORS FOR INCARCERATED MEN IN NORTH CAROLINA

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ABSTRACT

REBECCA DAVIS OCHTERA: Conceptualizing HIV-Associated Stigma and Exploring the
Correlates of HIV Testing Behaviors for Incarcerated Men in North Carolina
(Under the direction of Dr. Carol Golin, Chair)

National HIV testing guidelines recommend routine testing for all individuals and

annual testing for high-risk individuals. Incarcerated men are at high risk for HIV but little is

known regarding their HIV testing behaviors. Evidence suggests HIV-associated stigma may

influence HIV testing. However, the ability to assess the relationship between stigma and

HIV testing is hindered by the lack of appropriately designed stigma measures.

Study 1 presents a theoretically based conceptual model of the stigma process,

including proxies of enacted stigma, and measures developed to test conceptual model

components. Utilizing data from a sample of 1,000 inmates, Classical Test Theory and

Structural Equation Modeling determined independence, reliability, and validity of these

measures as well as accuracy of the model to illustrate the stigma process. Results also

showed empirical support for the proposed conceptual model.

Study 2 utilized nested model binary and multinomial logistic regression to explore

correlates of HIV testing, including stigmatizing attitudes and beliefs, for 819 incarcerated

men in North Carolina. History and recentness of HIV testing were assessed. Eighty percent

of the sample had ever tested for HIV and, of those, 36% reported recent testing. Results

generally indicated significantly higher odds of ever HIV testing with Black race, education

beyond high school, prison recidivism, and higher HIV knowledge. Blacks were more likely

to have ever as well as recently tested; those with higher education and greater HIV

knowledge were more likely to have non-recently tested. Overall, stigmatizing attitudes were

not found to be related to HIV testing behaviors.

These findings suggest general HIV-associated stigmatizing attitudes and beliefs may

not play an important role in inmates' decisions regarding if and when to seek testing for

HIV. Based on study results, interventions to increase HIV testing for this population should

address HIV-associated transmission knowledge, target white men, and be tailored to reach

those with lower education levels. The prison setting is an important venue for encouraging

HIV testing; more research is needed to determine the association between other structural

and contextual variables and HIV testing for this population.

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LIST OF ABBREVIATIONS

Abbreviation	Definition
ACASI	Audio Computer-Assisted Self Interview
CDC	Centers for Disease Control
CFA	Confirmatory Factor Analysis
DOC	Department of Corrections
EFA	Exploratory Factor Analysis
IDU	Injection Drug Use
NC	North Carolina
PLWHA	People Living with HIV/AIDS
PPC	Prison Processing Center
SEM	Structural Equation Model
STI	Sexually Transmitted Infection
US	United States

CHAPTER 1: INTRODUCTION

1.1 Problem Statement

Over 1.2 million Americans are currently living with HIV, and an estimated 56,000 new infections occur annually (CDC, 2008a; Hall et al., 2008). One of the greatest drivers of HIV transmission in the United States is the large number of people infected with HIV who are unaware of their infection. Currently, it is believed that between 20% and 30% of the HIV-infected population in the US remains undiagnosed (Bartlett et al., 2008; Campsmith, Rhodes, Hall, & Green, 2010; Marks, Crepaz, Senterfitt, & Janssen, 2005; Obermeyer & Osborn, 2007; Ostermann, Kumar, Pence, & Whetten, 2007; Rountree, Chen, Brown, & Pomeroy, 2009) Moreover, estimates from the Center for Disease Control and Prevention (CDC) show that this group is potentially responsible for transmitting more than 50% of all new HIV infections (Branson, 2007; Marks, Crepaz, & Janssen, 2006). In response to these figures, agencies involved in HIV policy and planning for the United States now recommend routine HIV testing for all Americans and yearly HIV testing for those deemed at high risk for infection (CDC, 2006).

Epidemiological studies in the United States show disparities in HIV infection rates, with certain groups carrying an unequal proportion of the disease burden (CDC, 2008a; Hammett, 2006; Hammett, Harmon, & Rhodes, 2002). One group known to be at particularly high-risk is incarcerated men. Men make up 74.8% of domestic HIV and AIDS cases (CDC,

2008a) and have consistently shown the highest rates of infection since the beginning of the epidemic (CDC, 2008b). Infection rates for incarcerated men nationally have been estimated to be about 2.2%, almost 6 times the rate of the total general US adult population (Gaiter & Doll, 1996; McQuillan & Kruszon-Moran, 2008; A. Spaulding et al., 2002).

Although studies have documented high levels of HIV prevalence among inmates, relatively little is known about HIV testing behaviors of people who have had involvement with the criminal justice system. Of the research that is available, studies have focused on inmate testing within the prison system itself, and few studies have examined the factors that influence inmate testing decisions (Andrinopoulos, Kerrigan, Figueroa, Reese, & Ellen, 2010; Behrendt et al., 1994; Burchell et al., 2003; Kacanek et al., 2007; Rosen et al., 2009a, 2009b; Rountree, et al., 2009; A. Spaulding, et al., 2002).

HIV-associated stigma is one factor suggested to influence HIV risk and testing behaviors. In the general population as well as studies of high-risk individuals, stigma has been associated with decisions to refuse testing and refusing to receive HIV test results (Andrinopoulos, et al., 2010; Bos, Schaalma, & Pryor, 2008; MacQuarrie, Eckhaus, & Nyblade, 2009; L. Nyblade, Stangl, Weiss, & Ashburn, 2009; Obermeyer & Osborn, 2007; Ogden & Nyblade, 2005; Pulerwitz, Michaelis, Lippman, Chinaglia, & Diaz, 2008; Spire, de Zoysa, & Himmich, 2008). Despite the elevated prevalence of HIV in the prison population, relatively little research has evaluated the prevalence of stigmatizing attitudes among prisoners or its effect on prisoners, such as on their acceptance or refusal to be HIV tested (Andrinopoulos, et al., 2010; Derlega, Winstead, & Brockington, 2008).

Understanding the barriers and facilitators to HIV-testing, including the extent and effect of HIV-associated stigma, among prisoners can provide valuable information for developing holistic interventions to improve HIV testing rates. Unfortunately, research regarding HIV-associated stigma and its public health effects is limited by gaps in defining, conceptualizing, and measuring HIV stigma constructs. Although stigma researchers often cite common theoretical sources for their work, difficulty operationalizing these theoretical ideals into practical measurement resources is a noteworthy concern. Several prominent stigma researchers point to a "lack of analytical clarity" in measuring stigma as a consequence of the complexity of the phenomenon, and suggest the need for more comprehensive models and measures that elucidate the relationships among identified stigma sub-constructs to move stigma research forward (Deacon, 2006; Deacon, Stephney, & Prosalendis, 2005; L. C. Nyblade, 2006).

Psychometric studies to enhance our understanding of the components of HIV stigma within the United States are needed to increase our ability to correctly assess the effect of stigma on US HIV prevention and intervention efforts, including for HIV testing. Increased knowledge of stigma constructs, and their relationships to each other among populations in the US, will enable us to more accurately intervene upon stigma and discrimination to reduce its negative impact on health. This is particularly important for high risk groups, such as prison populations, where better understanding of HIV-associated stigma components may offer insight into ways to increase HIV testing practices for those more likely to be affected by the disease.

1.2 Study Aims

The Aims of the proposed study are the following:

AIM 1a: Based on theoretically described concepts of stigma, develop a comprehensive conceptual model of the HIV-associated stigmatizing process.

AIM 1b: Develop measures of theoretical subconstructs of HIV-associated stigma to empirically test the proposed conceptual model.

AIM 1c: Gather evidence regarding the independence, reliability, and validity of the developed HIV-associated stigma sub-construct measures.

AIM 2: Evaluate the relationships between stigmatizing attitudes and beliefs and support for HIV-associated enacted stigma behaviors for recently incarcerated men in North Carolina.

AIM 3: Explore the correlates associated with: a) likelihood of ever testing for HIV, and b) likelihood of recent testing for recently incarcerated men in North Carolina.

I addressed the study aims by conducting secondary data analysis of data collected for Project SCREEN, a cross-sectional study supported by the National Institutes of Mental Health. Data were collected for the parent study from 1,098 inmates housed in 7 prison processing centers across North Carolina, with the aims of: 1) identifying the true population prevalence of HIV in prison facilities across the state of North Carolina; and 2) exploring barriers and facilitators to HIV testing at entry for prison inmates.

The importance of this study is four-fold, as the study 1) helps to identify and clarify intrapersonal components of the stigma process related to HIV; 2) offers the field comprehensive, theoretically based, and empirically tested measures of HIV stigmatizing attitudes/beliefs; 3) identifies important information regarding HIV testing behaviors for a

high risk population, incarcerated men in North Carolina; and 4) determines the associations between stigmatizing attitudes/beliefs and HIV testing behaviors for this population. The overarching goal of this research is to determine the need for development of prison-based HIV-associated stigma interventions as well as for informing community-based outreach and interventions to ensure routine and, when necessary, annual HIV testing for this population outside of prison.

1.3 Organization of the Dissertation

The dissertation has six chapters. In Chapter 1, I present a problem statement and outline the study aims. Chapter 2 contains a review of the relevant literature, provides a brief overview of the HIV epidemic in the United States and in incarcerated settings, reviews HIV testing studies in general and high-risk populations, and describes current HIV-stigma theories. Chapter 2 also summarizes gaps in currently published stigma definitions, conceptualization, and measurement. The chapter ends with a brief summary of the literature review and a rationale for how this study addresses current gaps in our understanding of both HIV testing and HIV-associated stigma. Chapter 3 presents the research questions, hypotheses, and conceptual models addressed in this study. Chapters 4 and 5 contain two manuscripts respectively entitled: 1) New Insights Into Defining and Measuring HIV-Associated Stigma: An Empirical Test of a Theoretically Based Conceptual Model and 2) Examining the Correlates of HIV-Associated Ever Testing and Recent Testing for Incarcerated Men in North Carolina. These two chapters present the methods and results of my dissertation work. Chapter 6 presents a synthesis of the study, summarizes key findings, strengths and limitations, provides a discussion of the practice, policy and research

implications of the study findings, and puts forth recommendations for future HIV prevention

research and practice.

CHAPTER 2: REVIEW OF THE LITERATURE

This chapter: 1) presents an overview of the HIV epidemic in the United States, including information specific to incarcerated populations and North Carolina; 2) describes the importance of HIV testing for public health; 3) examines HIV testing practices in the United States with an emphasis on high-risk populations; 4) comprehensively reviews the theoretical literature related to health-related stigma; and 5) describes the current gaps in defining, conceptualizing, and measuring HIV-associated stigma. The chapter concludes with a summary of the literature and a brief discussion of how this proposal contributes to the field of HIV research by evaluating HIV-associated stigma attitudes and beliefs as well as HIV testing behaviors in a high risk population.

2.1 Epidemiology of HIV in the United States

The Human Immunodeficiency Virus, or HIV, was first diagnosed in the United States in the early 1980's. This virus is responsible for AIDS, or Acquired Immunodeficiency Syndrome, which causes the human immune system to fail and leads to opportunistic infections that result in disability and death.

The most recent statistics published by the Centers for Disease Control estimate that more than one million people are living with HIV in the United States, and about 56,300 persons become infected with HIV each year. The cumulative number of AIDS diagnoses from the beginning of the epidemic through 2008 is estimated to 1,045,457 US residents,

with more than half a million people (576,000) having died of AIDS in the last 3 decades (1977-2007) (CDC, 2000, 2008b, 2010a).

In 1996, the first medical treatments became available to control HIV within the body. This medical breakthrough led to increased survival rates and enhanced quality of life for many persons living with HIV. In areas where treatment is widely available, the death rate from HIV/AIDS dropped by 80%, and more than doubled the life expectancy for a person newly diagnosed with HIV from 10 to 20–50 years (Knoll, Lassmann, & Temesgen, 2007; The Antiretroviral Therapy Cohort Collaboration, 2008). This increase in life expectancy, coupled with a steady rate of new infections annually, produced an increase in HIV prevalence for the United States. Current research estimates HIV prevalence in the US will continue to grow by 24-38% over the next 10 years, creating increased chance for HIV transmission and placing significant burden on the US healthcare system (Hall et al., 2010).

2.2 Demography of HIV infection in the United States

2.2.1 Men are significantly more likely to be HIV infected compared to women

According to a Centers for Disease Control Surveillance Report released in July 2010, men represent the majority of HIV cases and close to 75% of all new HIV infections annually in the United States (CDC, 2010a; Hall, et al., 2008). Similar results are reported for gender differences in AIDS cases, with 77% of domestic AIDS cases diagnosed in males (CDC, 2008a, 2010b).

2.2.2 African Americans have significantly higher probabilities of HIV infection

The CDC estimates that 1 in 16 African American men and 1 in 30 African American women will contract HIV in their lifetime. This rate of HIV infection for African American men is six times the rate of white men and three times the rate of Hispanic/Latino men. For African American women, the rate of infection is almost fifteen times the rate of infection for White women and almost four times the rate of infection for Hispanic/Latino women (CDC, 2010b). These figures demonstrate a significant health disparity in HIV infections based on race/ethnicity.

2.2.3 Sexual activity is the primary mode of HIV transmission

Male-to-male sexual contact represents the biggest proportion of HIV infections. More than half (53%) of all new US infections annually and almost half (48%) of the people living with HIV in the United States contracted the virus via male-to-male sexual contact (CDC, 2010b). Heterosexual contact accounts for 31% of total new US infections each year, and more than a quarter (28%) of the people currently living with HIV(CDC, 2010b). However, these rates vary substantially by gender. In 2007, an estimated 80% of women newly diagnosed with HIV contracted the virus through heterosexual contact with someone known to have, or be at high risk for, HIV infection throughout the United States. In contrast, only 13% of men diagnosed in 2007 contracted the virus through high risk heterosexual contact (CDC, 2008d).

The proportion of HIV cases related to intravenous drug use (IDU) has continued to decline since the beginning of the epidemic. Once thought to account for more than one third

(36%) of all US HIV infections, only 12% of all new infections were linked directly to injection drug use by 2008 (CDC, 2002, 2010a).

2.3 Epidemiology of HIV in the South and in North Carolina

2.3.1 The majority of HIV and AIDS cases are found in the Southern United States

According to the most recent statistics, the largest proportion of those diagnosed with HIV (40%) in any one region live in the Southern United States. Reports from 2007 also show that 51% of newly diagnosed HIV infections and 46% of new AIDS diagnoses occurred in the South. Death rates of persons with AIDS were also higher in the South, with 50% of the 14,110 deaths attributable to HIV/AIDS in 2007 reported from this region (CDC, 2007).

2.3.2 North Carolina has one of the highest HIV populations in the United States

CDC estimates from 2008 show North Carolina has the fifth highest estimated incidence rate of HIV infection per capita in the country at 29.8 per 100,000 residents. In addition, the most recent figures rank North Carolina 9th in the nation for the annual number of reported AIDS cases (CDC, 2010a).

State reported statistics for 2008 document the number of HIV cases in North Carolina to be somewhat lower than the number of cases reported by the CDC. According to the 2009 HIV/STD Surveillance Report distributed by the NC Department of Health and Human Services, the number of diagnosed HIV cases in North Carolina was 19.3 per 100,000 people in the population over a three year period (2007-2009) and 22.5 per 100,000

in 2009 alone. This current rate of infection per capita is higher than the national average, estimated to be 19.5 cases per 100,000 persons (CDC report). As of 2009, HIV prevalence in North Carolina was reported to be 24,248 persons with 1,710 new diagnoses of HIV and 957 new diagnoses of AIDS in 2009 (NC Department of Health and Human Services, 2009).

2.3.3 Similar to national statistics, African Americans and men in North Carolina are disproportionately affected by HIV/AIDS.

Trends in gender, race, and mode of transmission for NC reflect general trends reported in the US, but with fewer cases due to IDU and a greater proportion of heterosexually transmitted cases. Men are more likely to be infected compared to women (74% versus 26% respectively). African Americans represented the largest proportion of diagnoses (66%) in the state in 2009, with the overall highest rate of infections, 46%, occurring in African American men. According to this report, Whites represent about 24% of diagnoses (20% men, 4% women), and Hispanics represent 8% of diagnoses (7% men, 1% women) in North Carolina. Given that only 22% of North Carolina residents are African American, these percentages document a significant racial disparity in the state's rate of HIV infection (NC Department of Health and Human Services, 2009; U.S. Census Bureau, 2011).

Among men, over half (57%) of new infections were attributed to male with male sexual contact, 18% were linked to heterosexual contact, and 2% were considered to have become infected through intravenous drug use (IDU). However, 21% of men infected provided no risk information that would link them to any transmission category, and 2% of men reported both homosexual contact and IDU risk behaviors (NC Department of Health and Human Services, 2009).

2.4 HIV and Incarcerated Populations

2.4.1 The US incarceration rate is the highest of any industrialized nation

The US incarceration rate is higher than all other industrialized nations, with 1 in 138 residents serving time behind bars at some point in their lives (Kacanek, et al., 2007; A. Spaulding, et al., 2002). In 2004, the number of persons incarcerated totaled 2.1 million Americans (Kacanek, et al., 2007). Between 1980 and 2008, the number of people incarcerated at any given time point increased at a steady rate, growing from just over half a million in 1980 to over 2.3 million in 2008 (Bureau of Justice Statistics; Cooper, Sabol, & West, 2009; Glaze & Bonczar, 2009).

2.4.2 Incarcerated populations are disproportionately infected with HIV

In 1983, the first AIDS case was reported from a prison facility in the United States (Hammett, et al., 2002; Vlahov & Putnam, 2006). Since that time, documented cases of HIV and AIDS for those incarcerated have consistently been higher than rates of infection for those outside of the prison system.

Multiple studies, including national and longitudinal studies, have shown the proportion of people diagnosed with HIV infection historically in the prison population to be between 2% and 8%, considerably higher than that found in the general population which is about 0.5% (McQuillan & Kruszon-Moran, 2008; Vlahov & Putnam, 2006). Additionally, the AIDS rate for prisoners is almost 3.5 times that of the general population (Kacanek, et al., 2007). Although recent studies have shown the number of HIV-infected inmates to be modestly declining, the proportion of people with HIV infection within the incarcerated

population are still considerably higher than those for the general population (Vlahov & Putnam, 2006). Recent work by Spaulding et al. (2009) suggests about 1.7% of the incarcerated population is infected with the HIV virus, still 3 to 4 times higher than in the general population. Thus, persons involved with the correctional system continue to represent an important population to target with HIV prevention and intervention activities.

2.4.3 North Carolina prisons are known to have high HIV prevalence

A recently published study by Rosen et al. (2009b) estimated the prevalence of HIV infection in the North Carolina prison system to be around 3.4% overall, and 3.6% for men. This prevalence is about 6% higher than the general NC and US population. Rosen and colleagues also estimated the number of undetected cases of HIV in the NC prison system based on age, gender and race specific HIV prevalence. This calculation suggested that 24%-61% (N=223-1101) of HIV cases in the prison system were undetected during this timeframe (2009b).

2.4.4 Prison sentences are often short-lived, creating opportunities to have an impact on both prison and home communities through HIV-associated intervention

Almost 95% of all inmates are released from prison or jail at some point in their lifetime, with most returning to their home communities within a few years of entering prison (La Vigne, Solomon , Beckman, & Dedel Johnson, 2006; A. Spaulding, et al., 2002). The number of prisoners released from incarceration yearly is increasing in the United States. Between 1990 and 2001 there was a 46% increase in the number of offenders released from state prisons, and over half a million people were released from state and federal prisons in 2003 alone. This 2003 estimate represents a four-fold increase in releases occurring over the

past two decades (La Vigne, et al., 2006). Thus, inmate populations are increasingly bridging incarcerated communities to home communities.

It is estimated that about 15-25% of all HIV positive individuals in the US will be incarcerated annually, and 13-19% of all those infected with HIV will return to communities from correctional facilities each year (Beckwith et al., 2007; Hammett, 2006; Hammett, et al., 2002; A. C. Spaulding et al., 2009). Furthermore, studies have shown that drug use and risky sexual behavior resume to pre-incarceration rates for many of those incarcerated (Seal, Eldrige, Kacanek, Binson, & Macgowan, 2007). These statistics demonstrate the importance of HIV testing and treatment for incarcerated populations.

2.5 HIV Testing as a Public Health Intervention

2.5.1 A significant number of HIV positive persons are unaware of their HIV status

It is currently estimated that about 30% of individuals infected with HIV in the US are not aware of their status (Obermeyer & Osborn, 2007; Ostermann, et al., 2007; Rountree, et al., 2009). Studies have also estimated that between 30 and 40% of US adults have ever been tested for HIV, with only 10-15% being tested within the past year (CDC, 2008c; Ostermann, et al., 2007). These statistics indicate the importance of investment in HIV testing, and have driven HIV policy and planning leaders to highlight HIV testing as an important primary strategy for decreasing HIV transmission rates.

2.5.2 Of those infected, persons aware of their HIV status are less likely to transmit the HIV virus to others

Research has shown that most individuals, once aware of their HIV positive status, reduce transmission risk behaviors (Marks, et al., 2006; Marks, et al., 2005). One recent

meta-analysis found average unprotected sexual intercourse rates were 53% lower in HIV positive persons aware of their status when compared to HIV positive persons unaware of their status. Additionally, when looking only at HIV-infected people whose partners were HIV negative, this average was reported to be 68% lower for those who knew their HIV positive status (Marks, et al., 2005). Furthermore, research found that the likelihood of HIV transmission for HIV positive persons unaware of their status was 3.5 times the transmission rate for HIV positive persons aware of their status (Marks, et al., 2006).

Infected individuals who know their status can also receive proper medical care and antiretroviral medicines that reduce viral load and improve quality of life. Research has shown that a reduction in viral load decreases transmission risks, with reports of a controlled viral load making an HIV positive individual significantly less infectious to sexual partners and practically eliminating vertical mother to child transmission (Cohen et al., 2011; Marks, et al., 2005; Quinn et al., 2000).

Given these facts, early identification of HIV infection via HIV testing is important to ensure that those who are infected are aware of their status and receive appropriate HIV counseling and treatment. These measures can improve quality of life as well as reduce transmission risk (CDC, 2008a; Cohen, et al., 2011; Marks, et al., 2006; Marks, et al., 2005; Obermeyer & Osborn, 2007; Rountree, et al., 2009; Walensky, Freedberg, Weinstein, & Paltiel, 2007; Walensky et al., 2010).

2.5.3 At least one-third of HIV diagnoses occur during late stages of infection

According to CDC reports, about one-third (32%) of persons diagnosed with HIV in 2008 received an additional diagnosis of AIDS within 12 months of the initial HIV diagnosis (CDC, 2009). Other research has also shown late HIV diagnosis is a common event, with figures of late diagnosis as high as 50% (Walensky, et al., 2007). In North Carolina, about 25-33% of newly diagnosed cases of HIV each year receive a concurrent AIDS diagnoses (NC Department of Health and Human Services, 2009). With the average time between HIV infection and AIDS diagnosis thought to be about 10 years, these figures suggest a significant number of persons both in the US and in North Carolina receive HIV diagnoses very late in their infection. Given the above information regarding the positive health impact of being aware of one's status, this statistic demonstrates significant missed prevention and intervention opportunities due to late HIV testing.

2.5.4 Current federal guidelines support increased voluntary, routine HIV testing, particularly for high risk groups, to decrease HIV infection rates

Increasing access to, as well as engagement in, HIV testing is now one of the US Centers for Disease Control and Prevention's main strategies for advancing efforts to prevent HIV infection (CDC, 2006; Fenton, 2007). In September 2006, the CDC released new HIV testing guidelines to promote increased identification and treatment of HIV infected persons. These guidelines include voluntary, routine HIV testing for all individuals (13-64 years old) in health care settings as well as annual voluntary testing for high risk individuals (CDC, 2006; Ostermann, et al., 2007; Walensky, et al., 2007).

In addition, reducing the numbers of persons unaware of their HIV infection was named as a top prevention priority by leading HIV authorities, including representatives of the World health Organization, the Joint United Nations Program on HIV and AIDS, the CDC and others (De Wit, 2008).

2.5.5 Annual US HIV testing rates are low, particularly for voluntary testing

A recent document published by the CDC suggests only about 40% of Americans have ever been tested for HIV(CDC, 2008c). The rates of HIV testing in the United States remained relatively stable from 2000 to 2005, with a mean rate of ever testing at 37% and testing in the last year around 10-20% (CDC, 2008c; Ostermann, et al., 2007). These averages, however, vary by race and gender. According to the CDC as well as Ostermann et al.'s cross-sectional analysis of data from 146,868 US participants, men are less likely to test than women despite the increased proportion of cases among men. White men consistently report the lowest rate of annual and lifetime HIV testing (CDC, 2008c; Ostermann, et al., 2007).

Ostermann's cross-sectional study of 146, 868 people also showed the majority of persons, 44.2%, are tested during routine medical care. Almost one-third of all HIV tests were reported as required for insurance, immigration, military service, or marriage. Of those who reported HIV testing, only about 24% documented a reason for testing that suggested they voluntarily sought an HIV test.

2.5.6 Within the United States and the NC prison system, high risk persons are more likely to have been tested at least once for HIV but routine testing rates are markedly low

Ostermann found rates of testing for persons considered to be at increased risk for contracting HIV were about double the rates of those reporting no risk of contracting HIV (60% versus 36% ever tested; 20% versus 9% tested in past year). However, this study also found that the difference between planned and actual testing was greater for those with a greater number of HIV risk factors, and this difference prevailed regardless of whether only voluntary or all HIV testing behaviors were accounted for. Given the new CDC guidelines recommending annual testing for those considered most at risk for HIV, the finding that less than 25% of persons reporting medium to high risk for HIV infection reported being tested for HIV within the last year demonstrates a considerable need for public health efforts to increase annual testing rates (CDC, 2008c; Ostermann, et al., 2007).

Rosen et al.'s recent studies in the North Carolina prison system reflect this trend. This research demonstrated that between the years of 2004 and 2006 persons with known HIV-associated risk behaviors were 10% more likely to be tested for HIV at prison entry compared to those without documented risk. However, only 38% of prisoners (N=20,280) were tested for HIV at prison entry and 60% of men who reported HIV-associated risk behaviors chose not to be tested for HIV upon entry. In addition, less than 15% of male inmates were tested for HIV at entry into 4 of the 6 male-based facilities (Rosen, et al., 2009a, 2009b).

2.5.7 Understanding barriers and facilitators to HIV testing is an important step to increasing testing behaviors, particularly for incarcerated populations.

As discussed above (section 2.4), short-lived prison sentences, lack of awareness of HIV status, and documented late diagnoses in the state suggest more should be done to encourage policy recommended annual testing in both prison and community settings for individuals experiencing incarceration. While several studies have evaluated HIV testing rates and barriers/facilitators to testing within general and high risk groups, few current studies have tried to understand factors influencing lifetime and recent HIV testing practices of men who are or have been incarcerated. For the few studies that do exist, emphasis is placed on decisions to test for HIV within the prison system only (Andrinopoulos, et al., 2010; Behrendt, et al., 1994; Burchell, et al., 2003; Kacanek, et al., 2007; Rosen, et al., 2009a, 2009b). A brief review of the available HIV testing literature is provided below:

Self-reported engagement in high-risk behavior is one of the most consistent predictors of HIV testing. Rates of lifetime testing and past year testing have been highly correlated with high risk behavior engagement (IDU, sexual risk) in the general population, high risk groups, and inmate populations (Andrinopoulos, et al., 2010; Behrendt, et al., 1994; Burchell, et al., 2003; Ostermann, et al., 2007; Rosen, et al., 2009a). Perceived risk of HIV infection, however, did not show as consistent a result, particularly within the prison population. In high risk groups, higher perceived risk was reported as one of the top five reasons for ever testing and also shown to be positively correlated with prison testing within the past year when related to perceived risk of infection within the prison system (Burchell, et al., 2003; Kellerman et al., 2002). However, high perceived risk of infection was also

reported to be one of the top three reasons for refusing an HIV test at prison entry (Behrendt, et al., 1994).

Demographic variables, such as being between 25 and 50 years old and lower socio-economic status, have been reported as correlates of ever testing for HIV in the general population (Rountree, et al., 2009). Minority groups, particularly African Americans and Hispanics, have also been found to be more likely to test when compared to Whites in the general population and well as in high risk group studies (Ostermann, et al., 2007; Rountree, et al., 2009). However, in studies of incarcerated individuals, African Americans were found to be significantly less likely to have tested for HIV at entry or during the incarceration period compared to Whites (Behrendt, et al., 1994; Rosen, et al., 2009a). Studies reviewing gender variables have reported inconsistent results, with females found to be more likely to test for HIV in most studies and no association with gender in other studies (Ostermann, et al., 2007; Rountree, et al., 2009). Similar results have been reported for education level (Rountree, et al., 2009).

Knowledge and stigma have also been identified as correlates of HIV testing activities. Higher transmission knowledge has been linked to a greater likelihood of HIV testing for high risk individuals (Kellerman, et al., 2002). In the general population as well as studies of high-risk individuals, stigma has been associated with decisions to refuse testing and refusing to receive HIV test results (Andrinopoulos, et al., 2010; Bos, et al., 2008; Kalichman & Simbayi, 2003; MacQuarrie, et al., 2009; L. Nyblade, et al., 2009; Obermeyer & Osborn, 2007; Ogden & Nyblade, 2005; Pulerwitz, et al., 2008; Spire, et al., 2008). The influence of stigma on HIV testing is described in greater detail in Section 2.6 below.

Within the prison system, several studies have examined additional correlates of accepting an HIV test at time of entry or during incarceration. In addition to reporting high risk behaviors and being female; being single, reporting previous HIV testing, closely knowing someone who is HIV-positive, reporting high coping self-efficacy for HIV infection, and support for enacted stigma behaviors like mandatory disclosure of HIV status have all been positively correlated with HIV test acceptance within the prison system itself (Andrinopoulos, et al., 2010; Behrendt, et al., 1994).

An additional small qualitative study of soon to be released incarcerated men (N=105) by Kacanek et al. (2007) found several environmental factors linked to acceptance of prison HIV testing. An HIV test being free and being convenient were mentioned as important motivating factors of testing within the prison system. Additionally, some of the men thought HIV-testing was mandatory and feared repercussions by prison staff if they refused to be tested.

Kacanek et al.'s study, which included community follow-up interviews up to six months after release from prison, also included the only published information readily available regarding community based testing behaviors for incarcerated men. The most common reasons participants cited for not getting tested post-release included: 1) no time to get tested given the need to invest in more pressing concerns like finding work; 2) a lack of resources to get tested, including no medical insurance and only visiting a doctor for emergencies; 3) a fear of knowing the results and the repercussions of being HIV positive; and 4) low perceived risk of infection (don't need to test) or high perceived risk of infection (don't want to know if infected). Of the men who did report testing, primarily it was for a

non-voluntary cause such as a requirement for drug treatment, work, or blood donation. The only reported voluntary, though not routine, reason for HIV testing related to being offered an HIV test during STI screening after a partner tested positive for an STI.

Given the small amount of data available to comprehensively describe the testing practices of incarcerated men, more research is needed to better understand the correlates of HIV testing for this group. This study provides currently unavailable information describing the prior HIV testing behaviors for incarcerated men and describes as well as assesses the correlates of prior HIV testing experiences for this high-risk population.

2.6 The effect of HIV-associated stigma on HIV testing behaviors

HIV-associated stigma has been identified as one of the most detrimental phenomenon affecting public health HIV prevention and intervention efforts (Carr & Nyblade, 2007; Crandall, Glor, & Britt, 1997; Mahajan et al., 2008; L. Nyblade, et al., 2009; L. C. Nyblade, 2006; Ogden & Nyblade, 2005). In fact, the Executive Director of the Joint United Nations Program on HIV/AIDS (UNAIDS) identified reducing stigma as one of the five key imperatives for success in fighting the HIV/AIDS epidemic (Carr & Nyblade, 2007; Mahajan, et al., 2008). Recently, UNAIDS funded a comprehensive review of articles published between 2005 and 2009 related to HIV stigma and discrimination. This report, the most current of its kind, identified multiple studies that documented, qualitatively and quantitatively, the negative impact of stigma on HIV testing behavior, treatment seeking, and quality of life (MacQuarrie, et al., 2009).

For people with unknown HIV status, multiple studies have shown stigmatizing attitudes regarding HIV to be associated with lower rates of voluntary testing behavior

(Chesney, 1999; Colbert, Kim, Sereika, & Erlen, 2010; Genberg et al., 2009; Obermeyer & Osborn, 2007; Pulerwitz, et al., 2008). In particular, studies have shown that people who demonstrate higher levels of stigmatizing attitudes or have greater fears of being stigmatized are more likely to refuse HIV testing or to fail to obtain HIV test results after testing (Andrinopoulos, et al., 2010; Bos, et al., 2008; MacQuarrie, et al., 2009; L. Nyblade, et al., 2009; Obermeyer & Osborn, 2007; Ogden & Nyblade, 2005; Pulerwitz, et al., 2008; Spire, et al., 2008).

For individuals who are HIV positive, the experience of being stigmatized has been associated with seeking less medical treatment, having worse physical health, lower self esteem, and worse mental health. Lower HIV medication adherence and increased risky behavior, such as having multiple partners and not disclosing HIV status to sexual partners, have also been linked to experiencing HIV stigma (Logie & Gadalla, 2009; MacQuarrie, et al., 2009; Mahajan, et al., 2008; L. Nyblade, et al., 2009; Ogden & Nyblade, 2005).

The plethora of studies noted above show the negative impact of HIV stigma on HIV prevention and intervention in the general population. These findings suggest that understanding and reducing stigma is a critical component to successfully reduce the impact of stigma on public health (Chesney, 1999). However, less is known about the impact of stigma on testing and transmission behaviors in high risk groups in the US, particularly prisoners. Additionally, the literature that is available demonstrates inconsistent results (Andrinopoulos, et al., 2010; Fortenberry et al., 2002; Kalichman & Simbayi, 2003). For example, work by Kalichman and Simbayi (2003) found negative testing attitudes were endorsed significantly more often for those untested or unaware of test results than for those

who reported HIV testing in a high risk group in South Africa. In this study, those untested also attributed more stigmatizing feelings of shame, blame, and guilt onto persons infected with HIV than those who had previously tested. Within the Jamaican prison population, Andrinopoulos et al. (2010) found similar results in that low testing stigma was correlated with HIV testing at prison entry. However, other stigmatizing components, including internalized shame and perceived stigma by others if HIV positive, were not related to HIV testing behaviors. More research is needed to identify the extent to which the components of stigma are significant factors in HIV associated health behaviors, such as HIV testing, for high risk groups like prisoners.

2.7 Gaps in HIV-associated stigma: Definition, conceptualization, and measurement

Despite the need for greater research regarding stigma's influence on HIV testing and other behaviors, developing a comprehensive and sustainable definition, conceptual model, and measurement for HIV-associated stigma and its outcomes has proven difficult for researchers. These gaps create complications for development and evaluation of HIV-associated stigma research and interventions (Deacon, 2006; Mahajan, et al., 2008; L. C. Nyblade, 2006).

The section below describes the current gaps in stigma-associated definitions, models, and measurement that currently inhibit the ability to more thoroughly examine stigma. First, the lack of a clear and commonly accepted definition of stigma is discussed. Second, the lack of a comprehensive, theoretically based, and empirically tested conceptual model of HIV-

associated stigma is described. Third, information about the shortage of appropriate measures and psychometric testing for currently used HIV associated stigma instruments is presented.

2.7.1 A clear and commonly accepted definition of stigma has yet to be established

The origin of the word stigma dates to the 1300's. Stemming from Greek roots, stigma means "to stick" or pierce, with the implication of an actual visible mark (Herek, 2002). The current dictionary definition of stigma suggests evolvement of the word into a negative and more universal connotation, which includes non-tangible marks: "a mark of disgrace or infamy; a stain or reproach, as on one's reputation" (Link & Phelan, 2001).

The definition of stigma used for research purposes varies. At the core of health associated stigma research is the work of Irving Goffman. His book, entitled "Stigma: Notes on the Management of Spoiled Identity" (1963), is considered the leading source for researchers across disciplines when trying to define stigma. Undoubtedly, the most quoted definition of stigma comes from this work: "an attribute that is deeply discrediting which reduces the bearer from a whole and usual person to a tainted, discounted one." Goffman's definition focused on stigma as an attribute that, when assigned to a person, manifests as a negative valuation of the person. This notion of "spoiled identity" emanates from the idea that society uses difference (or "deviance") to separate and discredit individuals and groups. Once labeled, both the "stigmatizer" and the "stigmatized" view the "stigmatized" as less valuable and undesirable (Goffman, 1963; Mahajan, et al., 2008; Parker & Aggleton, 2003).

One definition of HIV-associated stigma has yet to be agreed upon. Variations in definition are considered to have occurred primarily due to the multidisciplinary theoretical

interest in the topic (Link and Phelan, 2001). Some researchers suggest the need for a fluid definition of HIV-associated stigma to account for differences in conditions and contexts (Link and Phelan, 2001). However, core commonalities of stigma do appear throughout the globe and researchers, such as Deacon and Nyblade, suggest a common understanding of stigma's definition is important to allow for effective evaluation and comparison across stigma interventions (Deacon, 2006; Deacon & Boulle, 2007; L. Nyblade & Kerry, 2006; Ogden & Nyblade, 2005).

Among the published definitions of HIV-associated stigma, similarities can be used to identify a common description that encompasses the core components of HIV-associated stigma. Herek (2002) defines stigma as "an enduring condition, status, or attribute that is negatively valued by a society and whose possession consequently discredits *and* disadvantages an individual". Link and Phelan (2001) suggest stigma is a co-occurrence of a "mark" (attribute) linking a person to undesirable characteristics (stereotypes) which create separation from others, status loss, and discrimination for the individual possessing the "mark". The UNAIDS group defines HIV/AIDS related stigma as "a process of devaluation of people either living with or associated with HIV and AIDS" (Ogden & Nyblade, 2005).

Based upon a synthesis of these definitions, Goffman's work, and articles included in this review of publications that discuss the definition of stigma, HIV-associated stigma seems to have two necessary components for invoking stigma: 1) HIV is a persistent condition; and 2) HIV is negatively evaluated within society so that the condition is deemed socially unacceptable or undesirable. A third component, however, is under debate. Whether the concept of discrimination (an enacted loss of status or power) should be included in the

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stigma definition or considered to be a separate construct is not agreed upon (Deacon, 2006; Herek, 2002; Link & Phelan, 2001; L. C. Nyblade, 2006). Some researchers argue that discriminatory action based on power inequities, such as loss of rights, is an important part of the stigma process and necessary for stigma to exist (Deacon, 2006; Link & Phelan, 2001; L. C. Nyblade, 2006; Parker & Aggleton, 2003). Others feel discrimination does not need to tangibly occur in order for stigmatization to arise. For instance, an individual may self impose loss of rights due to having a stigmatized condition, without the actual need for a majority group to engage in discriminatory practices (Deacon, 2006). Without further exploration of the sub-components of HIV-associated stigma, this debate cannot be resolved.

2.7.2 No comprehensive and theoretically based conceptual model of HIV-associated stigma has been developed and empirically tested

Public health research gives considerable weight not only to gaining theoretical understanding, but also to the related use of conceptual model building as a means to apply theory to specific public health issues. These conceptual models represent the roadmaps for researching and acting upon a health issue of interest (Earp & Ennett, 1991).

Early social and behavioral research exploring disease-associated stigma focused on understanding cognitive behavioral processes that emphasized attitudes and emotions as drivers of stigma outcomes (Herek, 2002; Herek & Glunt, 1988; Herek et al., 1998). More recently, researchers from sociology and anthropology, noting the complexity of stigma, have identified interpersonal and contextual factors that contribute to the development of stigma (Campbell & Deacon, 2006; Link & Phelan, 2001; Mahajan, et al., 2008; L. Nyblade, et al., 2009; L. C. Nyblade, 2006; Parker & Aggleton, 2003). These advances in understanding have led to recent published work demonstrating academic attempts to build conceptual

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models based on the theoretical constructs of HIV-associated stigma (Earnshaw & Chaudoir, 2009; Mahajan, et al., 2008). However, no studies published to date have attempted to empirically validate a theoretically proposed stigma construct model or to assess the relationships between stigma and enacted stigma constructs in a thorough manner (L. Nyblade & Kerry, 2006).

Although some researchers claim that environmental and contextual differences necessitate flexible conceptualization of HIV stigma, others argue that a core of stigma concepts exists that is common in all environments. Ogden, Nyblade, and colleagues (2005) and Carr & Nyblade (2007) recently published findings from extensive multinational HIV stigma research projects emphasizing the commonalities of stigma across countries. Concepts, such as judgment and social distancing (or isolation) were found to be universal across studies and study sites. These findings lend support to the idea that empirical investigation is needed to test whether a common and comprehensive model of stigma components can create a valid representation of this phenomenon.

Research is needed that attempts to test whether the components that, taken together, are theoretically purported to make up stigma are born out empirically. Findings from such research may help to forge a more accurate and acceptable construction of stigma to apply to public health efforts. Ultimately, scholarly work specifying and testing such a comprehensive conceptual model of stigma constructs will need to be conducted in both the domestic and global research arena.

2.7.3 The field lacks valid and reliable testing instruments related to HIV-associated stigma, particularly for domestic use and use with HIV negative individuals

It is not surprising given the lack of theoretical clarity, that the published literature shows current stigma measures have been developed by a wide range of researchers and are highly variable, lack comprehensive structure, and often lack assessment of their reliability or validity. These gaps in measurement challenge intervention development and evaluation as well as any true comparison of study findings (Bos, et al., 2008; Deacon, 2006; Earnshaw & Chaudoir, 2009; Fortenberry, et al., 2002; Kaplan, Scheyett, & Golin, 2005; Mahajan, et al., 2008; L. C. Nyblade, 2006; Parker & Aggleton, 2003; Pulerwitz, et al., 2008).

In a recent comprehensive literature review, Mahajan, et al., found 390 articles in the literature related to HIV/AIDS stigma but only 18 of those articles were related to psychometric assessment of stigma measures. In addition, the majority of articles (239) explored stigma related attitudes and stigma's affects on prevention and treatment using often unvalidated stigma scales and measurement tools (2003).

Other research shows that most HIV-associated stigma measures have been directed toward persons already living with HIV and/or are developed for use specifically in community settings outside of the United States (Berger, Ferrans, & Lashley, 2001; Genberg et al., 2008; Logie & Gadalla, 2009; Mahendra et al., 2007; L. C. Nyblade, 2006; Pulerwitz, et al., 2008; Stein & Li, 2008; Steward et al., 2008; Van Rie et al., 2008; Visser, Kershaw, Makin, & Forsyth, 2008; Zelaya et al., 2008). Of the 18 measurement documents reported by Mahajan et al., only about half took place in North America and Western Europe. In Earnshaw and Chaudoir's review, about half (11) of the manuscripts described measurement of HIV stigma outside of the United States, and the majority of the manuscripts (15) focused

on scales related to internalized or anticipated stigma by persons already infected with HIV. The 10 studies of HIV stigma scales to be used with people uninfected focused primarily on the HIV stigma of health care workers and 8 were validated with specific health-related populations, including nursing or university students. In addition, 6 of the 10 took place before 1996 when the advent of antiretroviral therapy changed the perception of HIV from a fatal to a chronic disease. In fact, the only scales documented for uninfected persons in the United States after 1996 were published by Herek in 2002 (AIDS Stigma Index) and 2003 (Feeling Thermometer towards PLWHA). No structural validity or content validity was reported in the literature review for these two scales, though internal consistency for the AIDS stigma index was reported to be between .77 and .79 across three time points over the span of 9 years.

The progressive debate over the true definition and subsequent constructs of stigma suggest additional concern with Herek's items. Herek created a 9 item measure focused on four constructs: negative feelings towards persons with AIDS, support for coercive AIDS-related policies, blame of persons with AIDS, and intentions to avoid persons with AIDS (Herek, 2002; Herek & Capitanio, 1993; Herek, Capitanio, & Widaman, 2002; Holzemer & Uys, 2004). Two of the concepts included in Herek's measure, support for coercive policies and intentions of avoidance, can also be thought of as representations of discrimination, or enacted stigma, which (as noted above) may be considered a unique construct separate from stigma.

Despite these issues, a review of the extensive literature surrounding HIV-associated stigma may provide evidence of core concepts in stigma that can be focused upon for

measuring stigma. Particularly for intrapersonal level stigma, commonly noted indicators, such as blame should be explored for further refinement of wording and concepts, validation in diverse populations and with larger representative samples, and standardization of items. These three activities are considered important next steps needed in stigma research (Mahajan, et al., 2008; L. C. Nyblade, 2006). Below is a review of published scholarly works that have theoretically addressed HIV-associated stigma to further elucidate core concepts to be included in a comprehensive stigma model.

2.8 Review of the HIV-associated Stigma Literature

2.8.1 Introduction to Review

Section 2.7 of the literature review discussed important gaps in defining, modeling, and measuring HIV-associated stigma. As this research seeks to identify and empirically test a theoretically based conceptual model of HIV-associated stigmatizing and discriminatory attitudes/beliefs, this section provides a description of the background literature used in the development of the conceptual model. Using Campbell and Deacon's modeling approaches to stigma (2006), the major current theories and frameworks of HIV/AIDS related stigma are described below in three categories: individual, Macro-social, and multilevel. These descriptions also point out the theories' commonly noted stigma indicators, such as *judgment* and *blame*, and the author's definition of these indicators as a prelude to describing this study's proposed conceptual model of HIV-associated stigma. This section concludes with a brief overview of how stigma evolved as an important component to this study and introduces the foundations for a newly developed conceptual model, which is described in detail in Chapters 3 and 4.

2.8.2 Attitude- and Belief-based approaches to HIV stigma: the Individual Level Theory

The individual level model represents a social psychological approach to HIV-associated stigma research. Building from Goffman's work, individual level theorists focus on an individual's construction of attitudes and beliefs, and the impact of those attitudes and beliefs on behaviors. Gregory Herek, a social psychologist writing about and researching stigma for over two decades, is at the forefront of research using this model.

Although Herek has not proposed a conceptual model for his work, his theoretical ideas have helped distinguish the possible causal pathways responsible for the creation and maintenance of HIV-associated stigma. According to Herek, HIV stigma occurs at significant rates because the virus is associated with three characteristics known to drive health-related stigmatizing beliefs and behaviors (2002):1) HIV is considered lethal and incurable, creating a *fear of fatality* if acquired; 2) HIV is considered transmissible by voluntary and/or avoidable behaviors, thus one is often considered *personally responsible* for contracting it; 3) HIV is considered transmissible and infectious, thus one with HIV is thought of as a physical, social, and/or moral *risk to others* in a society.

According to Herek, these three characteristics feed the following two main components of stigma: 1) *Instrumental stigma*, which are attitudes and behaviors that stem from fear of contracting the stigmatized disease and 2) *Symbolic stigma*, which occurs as socially held attitudes regarding who gets the stigmatized disease as well as how the disease is transmitted (2002). When these occur, persons bearing the "mark" of HIV can experience unfavorable outcomes such as isolation and discrimination. According to Herek, these

components demonstrate the importance of social psychological factors in the manifestation and maintenance of stigma (2002).

Individual Level Conceptual Diagram or Model

In 2009, Earnshaw and Chaudoir published the HIV Stigma Framework in an attempt to create a comprehensive visual representation of the individual and interpersonal level processes of HIV stigma and its impact on public health outcomes. Earnshaw and Chaudoir suggest that stigma exists via stigma "mechanisms" that are the psychological response of an individual to either carrying the stigmatized condition or not.

These mechanisms are labeled: prejudice *(negative emotions and feelings about the stigmatized condition)*, stereotyping (*group based beliefs/cognitions about the stigmatized condition applied to the individual*) and discrimination (*expressions of prejudice via behavior*). These attitude and belief mechanisms lead to a individual engaging in stigmatizing behaviors, such as distancing him or herself from the other, supporting policies that ensure knowing who the "other" is, and rejecting HIV testing to ensure one will not bare the "mark" and experience the rejection/isolation by becoming the "other".

For someone possessing the stigmatized quality, personal attitudes and beliefs of internalized stigma (*personally feeling shame or blame for contracting the condition*), anticipated stigma (*belief that others will ostracize or discriminate based on the condition*), and enacted stigma (*the experience of losing power or resources due to having the condition*) are created through both personal beliefs as well as the discriminating actions of those who don't have the condition. These stigmatizing mechanisms lead to isolation, poor mental

health outcomes, and the progression of disease symptoms for those who have HIV. These outcomes, in turn, feed the negative attitudes and beliefs of those without HIV.

2.8.3 Societal-Based approach to HIV stigma: The Macro-social Theory

Instead of considering the role that individual cognitions play, the macro-social model, according to Campbell and Deacon, focuses on stigma as a sociological process driven by power differentials and competition for society's resources. This process is perpetuated by already existing social mechanisms that support dominant groups to the exclusion of others (Campbell & Deacon, 2006).

Researchers Richard Parker and Peter Aggleton have endorsed this model, which suggests stigma serves as the main perpetuator of large scale social inequities, such as classism and racism.

According to Parker and Aggleton, one reason we have failed to adequately address stigma is the simplistic and individualized nature of the current conceptualizations of it. They suggest Goffman's seminal 1963 work has been misrepresented in subsequent publications about stigma, noting Goffman was interested in social phenomenon and intended for stigma to be described in terms of its impact on the devaluation of relationships instead of as a static individual attribute. The focus related to stigma, therefore, should shift from the conceptualization of stigma as a trait inside an individual to stigma as a description that a group attaches to an individual. In this way, stigma (and discrimination) must be addressed as a sociological process that occurs within the broader phenomenon of power (Parker & Aggleton, 2003).

Parker and Aggleton contend that, to understand stigma, we must think broadly about how individuals and groups become excluded and what creates as well as perpetuates their exclusion within society. Drawing from the writings of Irving Goffman, Michel Foucault and Pierre Bourdieu, Parker and Aggleton contend that stigma is constructed when categories of people are created through the recognizing of significant differences between people. Based on this differential marking, people are categorized into systems, or groups, with differentials in power. The dominant groups in a society use power to promote their group beliefs, attitudes, and characteristics as "truth". These truths become the accepted social norms, and in turn legitimize the dominant group's right to authority and resources. This hegemonic course is used to perpetuate the undermining of non-dominant groups as well as the acceptance of the dominant group's right to power in the social hierarchy (Parker & Aggleton, 2003). To date, no Macro-social conceptual diagram/model has been published.

2.8.4 A Mixed Approach to HIV stigma: The Multilevel Theory

The multilevel model combines the individual and macro-social models, emphasizing the associations between the individual and societal level as the perpetuator of stigma. This approach suggests that cognitive behavioral patterns, such as a fear of danger, leads to the creation of separate groups (dangerous/not dangerous) within a societal structure. From this occurrence grows a sociological context where membership in the dominant group suggests health and prosperity. This context encourages individuals to abide by social norms to maintain their status and be included in society. Stigma, therefore, becomes an accepted sociological tool for managing society and maintaining individual as well as community well being (Campbell & Deacon, 2006).

The most recognized mixed model theory of health related stigma comes from the work of Link and Phelan. Their theory identified four essential components of stigma, including individual processes as well as an emphasis on the role of power and power relationships. In their interpretation stigma is the co-occurrence of : labeling, stereotyping, separation, and status loss/ discrimination (Link & Phelan, 2001):

1. Individuals distinguish and label other individuals based on perceived differences *(labeling).* Focused on pointing out traits not shared with someone who has the "mark", these "labels" are often oversimplified categories (such as black or white skin color), and the relevance of the label is subject to change based on time and culture.

2. Based on dominant cultural beliefs, the label is associated with negative or undesirable characteristics *(stereotyping).* In this situation, the label is linked to a negative stereotype which induces cognitive judgments about the person carrying the label. Social psychologists have shown this type of reaction can occur pre-consciously and is a type of "short hand" used by the brain to allow for processing of stimuli quickly and efficiently.

3. The "other", or individuals in the labeled out-group, is seen as separate from the in-group *(blame, cognitive distancing).* The linking of labels to negative characteristics becomes the justification for describing the labeled person as fundamentally different from the labeler. This difference between the labeler and the "other" further reduces the possibility of the characteristic or mark being perceived as a possibility within the group the labeler belongs to and allows the labeler to justify separation between him/her self and the "mark".

4. This labeling as "other" leads to discrimination or loss of status which perpetuates unequal opportunities and outcomes *(examples include social distancing, and support for mandatory disclosure of HIV status).* Because the labeled persons or groups have been set apart from those without the label, it becomes

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socially acceptable to reject and devalue those with the label. These persons or groups move downward in the social hierarchy and, thus, suffer from continuing inequalities in availability of resources and life chances. This distal process, where inequity perpetuates from previous inequity instead of only directly from negative attitudes and beliefs, is an important component to this model.

In addition, Link and Phelan emphasize that stigma can only occur in situations when differentials in power are exercised. According to Link and Phelan, stigma depends upon power. People, in general, actively engage in stigmatizing attitudes and beliefs, such as stereotyping and blame, to monitor and assess others as well as their environment. However, these activities cannot be considered truly stigmatizing unless they lead to some type of inequity, devaluation, or negative consequence for the person or group by the larger society.

Deacon, a stigma researcher based in South Africa, also supports a comprehensive approach to stigma that integrates individual attitudes and beliefs with sociological processes of power to better understand the relationships between each. However, Deacon disagrees with Link and Phelan in the need to include societal discrimination as part of stigma. Instead, Deacon builds on the work of sociologist Carole Joffe (1999 in Deacon, 2006) and suggests the following definition of the stigma process (2006):

1. **The illness is seen as preventable/controllable**

2. **The "immoral" behaviors that lead to the illness are identified**

3. **The behaviors that lead to the illness are linked to "carriers" in other socially defined groups**

4. **The carriers of the illness are blamed for their own infection**

5. **Status loss is projected onto the "other", or carrier,** *which may or may not result in disadvantage to them*

Deacon contends that this type of definition of stigma allows for both the individual and the social processes to be accounted for, as stigmatization draws on existing social prejudices but is enacted by individuals due to their fear of and desire to avoid the threatening illness (2006).

Deacon does agree with social psychologists who note stigma results in "blaming, shaming, and status loss for the stigmatized person or group" (pg 424). However, she suggests that the status loss can occur in the mind of the individual and not from direct discrimination.

According to Deacon, anyone can stigmatize regardless of their own social power or position. The perception of the "other" as immoral and "not to be associated with" is psychologically helpful to a person even if they are in lower social power and, therefore, unable to actively discriminate. Deacon also points out that anticipated discrimination can lead a member of a stigmatized group to personally withdraw and create disadvantage without necessarily needing to be actively discriminated against by a more powerful group. In this way, personalized stigma can be more consequential than active power-based discrimination from those in power.

Multi-Level Conceptual Diagram or Model

After an extensive literature review regarding HIV/AIDS stigma, Mahajan noted Link and Phelan's theoretical conceptualization to be the most promising for developing a comprehensive diagram of HIV stigma. In their 2008 paper, they published a conceptual framework representing Link and Phelan's work as it relates to HIV-associated stigma, with

indirect references to theoretical concepts proposed by Parker and Aggleton as well as Deacon.

Using a pyramid design, Mahajan et al. have emphasized inequities in power as the root of stigma, and highlight this as Parker and Aggleton did in their writing (see above, Macro-social models). One step up from power are social forces which Mahajan et al. describe as overlapping and reinforcing situations that both put persons at greater risk of contracting a stigmatized condition and prevent those with the condition from getting appropriate treatment and care.

These situations create opportunities for labeling a person as either a carrier of a mark or at high risk of carrying the mark, which based on Link and Phelan's theory, leads to stereotyping, separation, and status loss. Once this separation and status loss has occurred, both direct and indirect discriminatory behaviors keep those with the stigmatized mark in a position of inequity and powerlessness. This inequity severely limits the stigmatized in their ability to overtly change their circumstances and opportunities. Notably, the interrelationships in each stage of the diagram are connected by double headed arrows, indicating the ability of each stage to both produce and reinforce the stigmatizing process.

2.8.5 Based on this prior theoretical and conceptual work, I proposed a theoretically driven, empirically testable conceptual model of HIV-associated stigma and enacted stigma attitudes and beliefs

This proposed study of the relationship between HIV-associated stigma and HIV testing for a high-risk population was conceptualized as a sub-component of a larger parent study aimed at understanding the barriers and facilitators to HIV testing for inmates. In the

attempt to identify a measure of HIV-associated stigma, I was unable to find a measurement tool or scale that adequately and comprehensively captured HIV-associated stigmatizing attitudes/beliefs for HIV negative persons in the US. Therefore, we expanded the initial parent study aims to include the development and testing of a model and measures of stigmatizing attitudes/beliefs to help address current gaps in the stigma literature.

Because this research focuses specifically on HIV-associated stigmatizing attitudes and beliefs, this model can only address the individual level components of a larger HIV-associated stigma model. However, I believe a comprehensive intrapersonal-level conceptualization of stigmatizing attitudes and beliefs is an important contribution to help further the ability of researchers and interventionists to intervene upon and evaluate stigma and its impact on HIV transmission and treatment. Similar to Deacon, Mahajan, and Earnshaw and Chaudoir, I propose that the lack of a conceptual framework is a core proponent of the inability of researchers and interventionists to understand why stigma is a barrier to HIV prevention efforts (Deacon, 2006; Earnshaw & Chaudoir, 2009; Mahajan, et al., 2008). Similar to Earnshaw and Chaudoir, I also build from Deacon's assertion (2006) that sociological models of stigmatization have helped our understanding of the creation and perpetuation of stigma via power structures and inequity, but that a theoretical and analytic framework for understanding the impact of stigma on the individual needs to be established.

As I was interested primarily in stigmatizing attitudes and beliefs for those who are HIV negative, I was able to draw on components from Herek, Earnshaw and Chaudoir, Link and Phelan, Mahajan, and Deacon in specifying the conceptual model of HIV-associated stigmatizing attitudes/beliefs. Attitudinal sub-components of "HIV stigma" were identified

based on the work of the researchers above, and measures were created for each sub-component (see Appendix A for detailed information regarding measure creation). This gave me the opportunity to identify how individual components of the stigmatizing process independently influence HIV testing behavior.

Additionally, I developed and incorporated measures of enacted stigma attitudes and beliefs into our survey to evaluate the association between stigmatizing attitudes and enacted stigma. I was also able to measure the differential associations between sub-components of stigmatizing attitudes and support for enacted stigma behaviors (see Chapter 3 for a more-in depth definition and visual construction of the conceptual model).

I also sought to create a model that could be empirically evaluated using multi-level measures. Although in this study I was only able to measure proxies of enacted stigma via support for enacted stigma measures, actual enacted stigma acts could be used in further research and evaluation of this model.

2.9 Summary

In summary, one of the biggest barriers to HIV-associated public health work is the number of persons either unaware of their HIV positive status or receiving a late diagnosis. This is of particular concern in high risk groups, like incarcerated men, where rates for HIV infection are significantly higher than the general population. Therefore, research focused on increasing HIV testing behavior is an important public health activity.

Of the small amount of research addressing barriers to HIV testing for incarcerated populations, little attention has been paid to understanding the relationship between stigma

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and HIV-testing behaviors. This is a gap that, if addressed, could inform activities to improve HIV testing rates for this population. However, to date, stigma research has been hindered by gaps in the definition, conceptualization, and measurement of stigma constructs. This study sought to address gaps in both stigma conceptualization and as well as in understanding the impact of stigma on HIV testing behavior for incarcerated individuals.

First, this project supported the ability of researchers to comprehensively assess stigmatizing attitudes/beliefs by creating and psychometrically testing subconstruct measures of HIV-associated stigmatizing attitudes /beliefs. Second, this project developed and empirically tested a theoretically derived structural model of the relationship between HIV stigmatizing attitudes/beliefs and enacted stigma. This validated model was used to examine the relationships between individual components of HIV-associated stigmatizing attitudes/beliefs and support for enacted stigma behaviors to determine if sub-components of stigma attitudes/beliefs have differential associations with enacted stigma. Third, this project explored information regarding correlates associated with HIV testing in any venue for recent inmates, adding to the literature which primarily reflects in-prison testing behaviors only. Finally, this analysis included assessment of the relationship between HIV-associated stigmatizing attitudes and testing behaviors, providing insight to further HIV testing efforts with this population.

CHAPTER 3: CONCEPTUAL MODELS, RESEARCH QUESTIONS & HYPOTHESES

This chapter presents study specific aims as well as the research questions and

hypotheses associated with each aim. It also presents the proposed conceptual models and

describes the relationships in the model that will be tested in this research.

3.1 AIMS, Research Questions, and Hypotheses

AIM 1a: Based on theoretically described concepts of stigma, develop a comprehensive model of the HIV-associated stigmatizing process.

AIM 1b: Develop measures of the subcomponents of HIV-associated stigma to empirically test the proposed conceptual model

AIM 1c: Gather evidence regarding the independence, reliability, and validity of the developed HIV-associated stigma subcomponent measures

H1c.1: The conceptually proposed domains of HIV-associated stigmatizing attitudes and beliefs and enacted stigma will be found to represent distinct and independent variables, providing evidence that HIV-associated stigma is a multidimensional concept.

H1c.2: Each domain subscale of HIV stigmatizing attitudes and beliefs and enacted stigma will demonstrate acceptable internal consistency.

H1c.3: Each domain subscale of HIV stigmatizing attitudes and beliefs and enacted stigma will demonstrate acceptable validity.

H1c.4: The proposed conceptual model will demonstrate acceptable structural model fit, lending empirical support to the theorized process of HIV-associated stigma.

AIM 2: Evaluate the relationships between stigmatizing attitudes and beliefs and support for HIV-associated enacted stigma behaviors for recently incarcerated men in North Carolina.

RQ 2.1 For recently incarcerated men in North Carolina, does each domain of stigmatizing attitude or belief show an independent association with social distancing?

For recently incarcerated men in North Carolina, there will be:

H2.1.1: be an independent positive association between labeling and social distancing.

H2.1.2: an independent positive association between stereotyping and social distancing.

H2.1.3: an independent positive association between blame and social distancing.

H2.1.4: an independent positive association between cognitive distancing and social distancing.

RQ 2.2 For recently incarcerated men in North Carolina, is each domain of stigmatizing attitude or belief show an independent association with mandatory disclosure beliefs?

For recently incarcerated men in North Carolina, there will be:

H2.2.1: an independent positive association between labeling and mandatory disclosure beliefs.

H2.2.2: an independent positive association between stereotyping and mandatory disclosure beliefs.

H2.2.3: an independent positive association between blame and mandatory disclosure beliefs.

H2.2.4: an independent positive association between cognitive distance and mandatory disclosure beliefs.

AIM 3: Explore the correlates associated with: a) likelihood of ever testing for HIV; and b) likelihood of recent testing for recently incarcerated men in North Carolina.

RQ 3.1 What is the association between stigmatizing attitudes and likelihood of ever testing for HIV for recently incarcerated men in North Carolina?

For recently incarcerated men in North Carolina:

H3.1a: Men who report ever testing for HIV will be less likely to endorse labeling when compared to men who report never testing for HIV

H3.1b: Men who report being tested for HIV in the previous 12 months will report less endorsement for labeling when compared to men who report having never testing for HIV or last testing for HIV longer than 12 months ago.

H3.2a: Men who report ever testing for HIV will be less likely to endorse stereotyping when compared to men who report never testing for HIV

H3.2b: Men who report being tested for HIV in the previous 12 months will report less endorsement for stereotyping when compared to men who report having never testing for HIV or last testing for HIV longer than 12 months ago.

H3.3a: Men who report ever testing for HIV will be less likely to endorse blame when compared to men who report never testing for HIV

H3.3b: Men who report being tested for HIV in the previous 12 months will report less endorsement for blame when compared to men who report having never testing for HIV or last testing for HIV longer than 12 months ago.

H3.4a: Men who report ever testing for HIV will be less likely to endorse cognitive distance when compared to men who report never testing for HIV

H3.4b: Men who report being tested for HIV in the previous 12 months will report less endorsement for cognitive distance when compared to men who report having never testing for HIV or last testing for HIV longer than 12 months ago.

FIGURE 3.1 Conceptual Model of the process of stigma and its relationship to enacted stigma outcomes

3.2 Description of Conceptual Model of Intrapersonal HIV Stigma (AIMS 1 & 2)

In this model, the first step in the process of developing HIV-associated stigmatizing attitudes is the identification of HIV as a "mark" or feature that is viewed as different from the status quo of general society (Link & Phelan, 2001). Once the "mark" is identified, an individual attaches socially relevant labels to the person or group carrying the mark to distinguish and highlight characteristics different from the accepted social norm (*labeling)*. During this process, the individual uses these labels to associate negative attributes, or *stereotypes*, onto those infected with HIV. Labels generally reflect socially unacceptable behaviors that are associated with obtaining the disease, like drug use or multiple sex partners. Stereotypes denote attributes associated with the labels, usually linked to a person's fear of catching the disease or beliefs about the socially undesirable attributes someone with the disease is likely to manifest as discussed by Herek (Herek, 2002). Examples of stereotypes include "unsafe to be around" and "careless".

In accordance with Link and Phelan, our conceptual model proposes that the process of labeling and stereotyping around social norms allows a person to distance and separate from HIV by: 1) supporting the belief that the HIV-positive person is responsible for his/her infection via their socially unacceptable characteristics and behaviors (*blame*); and/or 2) determining oneself unlikely to get the disease by highlighting differences in characteristics and/or behaviors between oneself and someone with HIV *(cognitive distance).*

The end result of the stigmatizing process is inequity, referred to as "enacted stigma". For our conceptual model, we chose two recognized, measurable proxies of inequity to represent

enacted stigma. We suggest stigmatizing attitudes and beliefs lead individuals to "support a desire to be physically separated from persons with HIV" (*social distance*) as well as to support policies that require persons with HIV to mandatorily disclose their HIV status to others. Through these processes, those without HIV and those with unknown HIV status endorse physical and political behaviors which help ensure they can recognize and avoid persons infected with HIV. These actions can be perceived by the "stigmatizer" as working to keep him or her "unmarked", thus avoiding personal as well as sociological and cultural consequences of being HIV positive.

Our model suggests that these stigmatizing attitudes and beliefs *(labeling, stereotyping based on threat as well as social undesirability, blame and cognitive distance),* though inter-related and occurring relatively simultaneously in human cognition, can be measured as distinct components in the stigmatizing process. In addition, our model recognizes that the independent processes of developing stigmatizing attitudes and beliefs can have differential effects on enacted stigma outcome variables. This suggests the relationship between stigma attitudes and enacted stigma can be approached as inter-relationships between the constructs themselves instead of simply "stigma" as a whole. This conceptualization offers the opportunity for better understanding of the unique and distinct characteristics of the stigma process, and the varying impact of these individual characteristics on outcomes, such as inequity. Determining the role of these unique variables in shaping outcomes can help future researchers better identify, target, and intervene upon the stigmatizing attitudes and beliefs most relevant to their work.

Figure 3.2 Structural Equation Model of Stigmatizing and Discriminatory Attitudes/Beliefs

3.3 Description of Structural Equation Model of Intrapersonal HIV Stigma (AIM 2)

This model represents the Structural Equation Model that was used to test the hypotheses listed in Aim 2. This model is the mathematical equivalent of the conceptual model presented in Aim 1.

CHAPTER 4: NEW INSIGHTS INTO DEFINING AND MEASURING HIV-ASSOCIATED STIGMA: AN EMPIRICAL TEST OF A THEORETICALLY BASED CONCEPTUAL MODEL

4.1 Introduction

Stigma has been identified as one of most obstructive and harmful phenomena affecting HIV prevention and treatment (Carr & Nyblade, 2007; Crandall, Glor, & Britt, 1997; MacQuarrie, Eckhaus, & Nyblade, 2009; Mahajan, Sayles, Patel, Remien, Sawires, Ortiz et al., 2008; L. Nyblade, Stangl, Weiss, & Ashburn, 2009; L. C. Nyblade, 2006; Ogden & Nyblade, 2005). Stigmatizing beliefs toward people living with HIV have been demonstrated throughout the world, and people living with HIV commonly report perceived as well as overt enacted stigma experiences (MacQuarrie et al., 2009).

Perceived and enacted stigma have been linked to a multitude of health concerns. Stigma can significantly deter people living with HIV from seeking and adhering to medical treatment. Those who experience stigma also have poorer physical health, lower self esteem, worse mental health, and are more likely to engage in riskier sexual practices (Chaudoir & Fisher, 2010; Logie & Gadalla, 2009; MacQuarrie et al., 2009; Mahajan et al., 2008; L. Nyblade et al., 2009; Ogden & Nyblade, 2005). Additionally, people in the general population who hold more stigmatizing attitudes toward HIV are more likely to refuse HIV testing and, of those that do test, are less likely to return for test results. (Andrinopoulos, Kerrigan, Figueroa, Reese, & Ellen, 2010; Bos, Schaalma, & Pryor, 2008; Darrow,

Montanea, & Gladwin, 2009; MacQuarrie et al., 2009; L. Nyblade et al., 2009; Obermeyer & Osborn, 2007; Ogden & Nyblade, 2005; Pulerwitz, Michaelis, Lippman, Chinaglia, & Diaz, 2008; Spire, de Zoysa, & Himmich, 2008; Turan, Bukusi, Onono, Holzemer, Miller, & Cohen, 2011). In light of this evidence, stigma reduction is recognized as a critical means to reducing the negative impact of HIV on public health (Chesney, 1999).

Although the impediment stigma poses to health and healthy behaviors is well documented, studies of stigma have been hampered by several challenges. One important challenge is that of "conceptual inflation", whereby the components of the stigma process, the outcomes the components influence, and the interrelationships among all of these are blurred under the general umbrella term "stigma". Such "conceptual inflation" occurs both in research and practice (Deacon, 2006). Consequently, existing differences in conceptualizing and measuring HIV stigma are rarely acknowledged or attended to, particularly in studies reporting results of stigma reduction interventions.

Two main issues contribute to the conceptual inflation of HIV-associated stigma: 1) a lack of empirical testing for theoretical conceptualizations driving stigma research and interventions; and 2) a dearth of valid and reliable survey tools to appropriately measure the theoretical constructs considered components of the stigma process (Bos et al., 2008; Deacon, 2006; Earnshaw & Chaudoir, 2009; Fortenberry, McFarlane, Bleakley, Bull, Fishbein, Grimley et al., 2002; Kaplan, Scheyett, & Golin, 2005; Mahajan et al., 2008; L. Nyblade & Kerry, 2006; Parker & Aggleton, 2003). To effectively address HIV-associated stigma, we must better define and measure the unique components of stigma in order to

determine what aspects of the stigma process to target in developing and delivering effective HIV-associated stigma interventions.

4.2 Background

4.2.1 Common Theory

Given the complexity of stigma, researchers have yet to agree on how best to theoretically conceptualize the HIV- associated stigma process (Deacon, 2006; Link & Phelan, 2001). This lack of agreement creates confusion regarding what components comprise stigma, how such components contribute uniquely as well as together, and what constitutes the end-points of stigma (Deacon, 2006).

Deacon suggests a sustainable and accepted theory of stigma is imperative for creating a common definition from which to base effective design, evaluation, and measurement of stigma and its effects, particularly across studies (Deacon, 2006). One current debate in attempting to adopt a theory of HIV-associated stigma is whether stigma can be conceptualized as a distinct concept with a common set of core components or whether stigma has no fundamental nature constant across cultures, implying stigma can only be defined within a given context (Deacon, 2006; Deacon & Boulle, 2007; L. Nyblade & Kerry, 2006; Ogden & Nyblade, 2005). Recently, Ogden, Nyblade, and colleagues (2005) and Carr & Nyblade (2007) reported findings from multiple international HIV stigma research projects which provided strong evidence that commonalities of stigma do exist across cultures and diseases. These findings suggest the importance of initiating empirical investigation into a common theoretical model of HIV-stigma. Such a model, if empirically supported, could

support development of stigma measures and interventions that are appropriate, comparable, and adaptable for a variety of contexts.

4.2.2 Measures of Stigma

As noted above, available measures of stigma are highly variable and often lack assessment of their reliability or validity. Moreover, most current measures of HIV-associated stigma have been designed to specifically assess the experiences of people living with HIV in international settings, leaving a gap in our ability to assess HIV-associated stigma in a general population, particularly in the United States.

 In a recent comprehensive literature review, Mahajan, et al., found 390 articles related to HIV-associated stigma. The majority of articles reviewed (n=239) assessed the effect of stigma-related attitudes on HIV prevention and treatment, and most used unvalidated stigma measures. In fact, Mahajan was only able to locate 18 articles related to stigma scale development that assessed the psychometric properties of the stigma measure created. This disproportionate focus on research without the availability of accurate measurement tools demonstrates a considerable gap in the field (2003).

In Earnshaw and Chaudoir's 2009 literature review, 17 of the 23 scales discussed were directed towards persons uninfected with HIV. However, 8 of these 17 were developed for populations outside of the United States. Of the remaining 9 measures, 6 were created prior to the advent of combination antiretroviral therapy (ART) which changed HIV from a fatal to a chronic disease. Additionally, 4 of these 6 were created specifically for use with

healthcare service workers. The remaining 2 were aimed toward, and used with, student sample populations.

Of the three measures created for domestic use after ART became available, one was developed to detect stigma attitudes towards HIV-infected heterosexual women specifically. The remaining two were published by Herek and colleagues. These measurement tools, the AIDS Stigma Index and the Feeling Thermometer, were used to measure general population stigma attitudes and beliefs in the United States at three intervals between 1991 and 1999 (Herek, Capitanio, & Widaman, 2002, 2003). In the resulting published manuscripts no structural or content validity was presented[1]. In addition, the AIDS Stigma Index incorporates items related to both stigma and enacted stigma yet does not distinguish between these concepts in the index's scoring procedures.

To address these concerns, in this paper, we aim to: 1) briefly summarize the theoretical literature regarding HIV-associated stigma; 2) propose a theoretically based conceptual model of the stigmatizing process regarding HIV for general populations 3) introduce HIV stigma and enacted HIV-stigma measures for the components proposed in the conceptual model and 4) provide empirical evidence of the validity and reliability of the these measures as well as of the proposed conceptual model of HIV-associated stigma.

4.2.3 Study Overview

The work presented in this manuscript was a sub-study of Project SCREEN, a large cross-sectional study of inmates entering the NC prison system between April 2010 and April 2011 (Wohl, 2012). This parent study was designed to explore inmate HIV prevalence, HIV

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[1] Internal consistency was reported to be between .77 and .79

testing rates, and barriers and facilitators to testing, including HIV-associated stigma. We were unable to identify HIV-associated stigma measures that adequately captured the nuances of HIV-associated stigmatizing attitudes and beliefs for persons of HIV-negative or HIV-unknown status in the United States, thus we conducted this sub-study to develop such a measure.

To achieve this goal, we completed four steps. First, we conducted an extensive review and synthesis of theoretically- and empirically-based publications that explored health-related stigma. Second, based on this synthesis, we proposed a conceptual model for delineating HIV-associated stigmatizing attitudes and beliefs of persons without HIV or of unknown HIV status (Figure 4.1). The model also served to explain the relationship between these attitudes and beliefs and endorsement of enacted stigma activities, such as social distancing and mandatory disclosure policies. Third, we used this conceptual model to inform the development of a survey instrument to empirically measure the stigma process. Fourth, we administered the developed survey items to a population of 1,000 inmates enrolled in the SCREEN study. We then used these data to test the reliability and validity of our measures as well as the structural adequacy of our conceptual model using classical test theory and structural equation modeling procedures.

4.2.4 Theoretical Approaches to Illness-related Stigma

Campbell and Deacon (2006) suggested the presence of three approaches to illness-related stigma theory: 1) individual; 2) macro; and 3) multi-level. Given the broad scope of stigma theory, below we briefly describe the prominent drivers of these three approaches as an overview of the literature and an introduction to stigma theory:

Individual approach: The individual approach to illness-related stigma emphasizes the role of a person's attitudes and beliefs in constructing the stigmatizing process and influencing subsequent behaviors. In the individual approach, researchers emphasize an individual's reactions to three aspects of a disease: 1) its lethality; 2) its infectiousness; and 3) the individual's personal responsibility for contracting it (Herek, 2002). These three disease traits feed two primary components of individual-level stigma: 1) *Instrumental stigma*, which are attitudes and behaviors that stem from fear of contracting the stigmatized disease and 2) *Symbolic stigma*, which occurs due to socially-accepted moral attitudes regarding who gets the stigmatized disease as well as how the disease is contracted (Herek, 2002). When either instrumental or symbolic stigma occurs, persons with HIV can experience perceived or enacted stigma outcomes, or both, such as social isolation and discrimination. Thus, individual-level theorists contend the psycho-social process plays a crucial role in the manifestation and maintenance of stigma's negative effects on health (Herek, 2002).

Macro-social approach**:** With little attention on the individual, the Macro-social approach views stigma as a sociological process driven by group power and competition for society's resources. Thus, conceptualizing stigma shifts from an individual trait to a group-defined trait that is then projected onto an individual based on group status (Parker & Aggleton, 2003).

The macro-social approach suggests societal processes create as well as perpetuate exclusion of individuals and groups within a society. Stigma occurs when "marked" categories of people are created through pointing out significant differences between people. Distinct hierarchical power groups are then formed based on these categories. The beliefs, attitudes, and characteristics of the dominant groups become accepted societal norms. These

norms, in turn, work to legitimize the dominant group's right to power and resources. This leads to an undermining of the rights and opportunities of non-dominant groups, tolerated because of the general acceptance of the dominant group's power status (Parker & Aggleton, 2003). Stigma, therefore, occurs as an attempt by those with power to maintain their power within the societal context.

Multi-level approach: The multi-level approach combines concepts from both the individual and Macro-social approaches, emphasizing the associations between the individual and society as the perpetuator of stigma. Multilevel theorists suggest cognitive behavioral processes, such as a fear of danger, lead individuals toward group identification within society. This identification helps create the sociological context where membership in a dominant group is desired as it is thought to provide privilege and resources that protect and support the individual. Thus, individuals strive to be included within a dominant power group. Stigma becomes a tool for determining inclusion and ensuring individuals' as well as a group's dominance in relation to rights and privilege (Campbell & Deacon, 2006).

Although all three theoretical approaches are noted throughout the literature, rarely has a conceptual model been proposed to specify the components of stigma as defined by any illness-related stigma theory (Mahajan et al., 2008). Below we explain our methodology for creating a conceptual model based on recognized illness-based stigma theory and for empirically testing the ability of the conceptualized theory to map the stigma experience.

4.3 Methods

Sample

Data collection took place in seven prison processing centers (PPC) across North Carolina that housed and conducted intake of all male and female inmates who entered the NC prison system for incarceration between the beginning of April 2010 and the end of March 2011. The study used stratified random sampling for each PPC. Overall sample sizes for each PPC were determined based on the ratio of the number of inmates that entered each PPC the previous year to the total number of NC inmates entering all PPCs that year. Eligibility criteria for Project SCREEN included: 1) being 18 years of age or older; 2) ability to complete the study in English; 3) current housing in one of the selected PPCs; 4) being housed in a regular prison population (instead of solitary confinement or segregation due to misconduct); and 5) completion of prison health processing activities.

The final SCREEN sample (N=1,000) was primarily men (N=864, 86%), African American (N=471, 49%), and aged between 19 and 64. The majority of respondents reported completing high school (N=322, 39%) or less (N=313, 38%) and being single/never married (N=554, 57%).

Survey Administration

Weekly lists of inmates eligible for screening at each PPC were drawn, and then individuals were randomly selected, from the Offender Population Unified System (OPUS). With support from Correctional Officers, inmates eligible for screening were brought to a central location within the prison to meet with a SCREEN study Research

Assistant (RA). Inmates were individually screened in private by the RA and, if interested, enrolled and completed study activities at that time. All study procedures were reviewed and approved by the University of North Carolina Internal Review Board.

Data were collected from each study participant using Audio Computer Assisted Self Interview (ACASI) on a laptop provided by the research team. The ACASI included an audio recording of a human voice reading each question and response option to the participant. The laptops utilized touch-screen technology to circumvent the need for participants to use a keyboard or mouse. Participants completed the ACASI in a private room in the administrative area of the PPC, using headphones, with only a research assistant present. Participation in the SCREEN study was voluntary; no incentives were given for study participation or survey completion.

Survey Wording

Wording and descriptive statistics for the stigma and enacted stigma items are provided in Table 4.1. To understand the effect of stigma on HIV testing both within and outside of the prison system for the SCREEN study, we administered stigma and enacted stigma questions that focused on participants' attitudes and beliefs related to *"inmates* with HIV" to about 70% of enrolled inmates (N=696) and asked the same questions, but referring to "*people* with HIV" to the additional 30% of inmates (N=304). Given the large sample size, this ensured a significant number of inmates completing each survey for separate analysis of the inmate/prison context. Factor analysis techniques were employed to determine if the surveys were analytically comparable, lending to combined data analysis, or if the wording created differences which suggested separate analysis for the two groups of respondents.

Diagnostics

In reviewing raw data for the full sample, the label and stereotype variables were found to have up to 10% missing data on each item of interest. We conducted multiple imputation using Bayesian principles to infer item scores for these specific variables. Multiple imputation of 10 datasets was completed using MPLUS software. For each survey respondent, available scores on all survey items were taken into account during the selection of imputed scores.

Exploratory Factor Analysis

First, we used Classical Test Theory procedures to identify factors and factor reliability for stigma and enacted stigma utilizing the data collected. Scree plots and parallel analysis techniques determined the number of unique factors. Once the number of factors was determined, factor analyses were performed in SAS9.2. Oblique data rotation, via PROMAX, was used to allow for factor correlation (DeVellis, 2003).

Primary factor loadings greater than or equal to 0.45 paired with secondary factor loadings less than 0.25 indicated the item was an acceptable measure of the factor. Through an iterative process, items not meeting these criteria were deleted from the dataset and the analyses repeated until a final dataset including only acceptable item factor loadings was reached. As a final step, the internal consistency of the items for each factor was assessed using Crohnbach's Alpha (see Table 4.2).

To account for survey wording differences (described above), an initial factor analysis using the steps above was completed with respondent data from questions which

used the stem "*people* with HIV" (N=304). Although this sample was smaller in size, we felt

this wording stem was more appropriate for creating scales generalizable to research with

other populations. The results of this analysis were used to identify the items used for a

subsequent factor analysis of the remaining responses (N= 696). The results of the two factor

analyses were then compared to determine their similarities and differences, and to decide if

concatenating the dataset for future analyses of the stigma variables would be appropriate

(see Table 4.2).

Confirmatory Factor Analysis and Model Testing

Using the results from Classical Test Theory procedures, we conducted Structural

Equation Modeling to test the measurement structure for each predictor variable as a type of

confirmatory factor analysis. We also we tested the structural fit of our proposed conceptual

model.

We used modification indices in an iterative process to determine the best fitted

model based on the data. Final model fit was established according to standard fit scores,

including CFI, TFI, and RMSEA[2]. CFI and TLI both measure improvements in hypothesized

model fit when compared to a baseline data model, with TLI also accounting for model

complexity via degrees of freedom. For CFI and TLI, scores above .95 are considered good

fit. The Root Mean Square Error of Approximation (RMSEA) measures fit between the

hypothesized model and actual data taking degrees of freedom into account and also

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[2] Although Chi-square statistics are usually reported as an indicator of model fit, we were unable to accurately
obtain and report chi-square statistics due to our use of imputed, stratified, and weighted data.

controlling for sample size (Hu & Bentler, 1999). RMSEA values less than .06 are considered good fit. All analyses, except for CFA for the label and stereotype variables, were performed with the weighted least squares (WLSMV) estimator. WLMSV is a robust estimate that accounts for non-independent, non-normal observations and is most appropriate when categorical variables are incorporated into the model (Muthen & Muthen, 2004). Because label and stereotype were modeled as continuous variables, MLR was the most appropriate estimator to use for their analysis. All analyses were performed using MPLUS 6.0 (Muthén, 1998-2010).

Construct Validity Testing

As an additional test of construct validity, we assessed the correlations between our newly developed scales and two variables theoretically and empirically linked to stigma. Based on the literature, we predicted HIV-transmission knowledge and knowing someone who was HIV-positive would each be significantly negatively correlated with our new measures of stigmatizing attitudes and support for enacted stigma behaviors.

4.4 Results

Exploratory Factor Analysis (EFA)

Exploratory factor analysis of the first data subset (N=304) initially suggested a five factor solution for stigma. However, using the iterative process described above for CTT, only four factors were retained. This four factor structure contained 19 of the original 38 items and represented 54% of the total variance. For enacted stigma, the expected two-factor solution emerged, retaining all 12 items and representing 66% of the total variance. With the

second data subset (N=696), exploratory factor analysis demonstrated similar factor structures and item loadings for both the stigma and enacted stigma scales (see Table 2). Given these results, we concatenated the data into one data set for all subsequent analyses. Crohnbach's Alpha scores ranged from .67 to .93. For all factors, secondary factor loadings remained small and ranged from .06 to .18 (see Table 2).

Our factor analyses generally supported the constructs identified in our conceptual model, except that we found no differentiation between the stereotype subscales. In fact, only 2 of the 7 originally proposed items representing Stereotype-threat to others were retained in the final analysis. These items, "careless" and "puts others at risk", were instead retained as part of the Label factor, with primary loadings of .72 and .55 respectively.

Confirmatory Factor Analysis (CFA)

CFA was conducted separately for each variable related to stigma and enacted stigma. Table 2 shows the identified standardized factor loading estimates for all items. These estimates represent the correlation coefficient between the item and the latent construct, which is considered a measure of item validity. Estimates greater than .50 are considered highly valid and items must be statistically significant to be retained as a valid measure of the latent construct (Bollen, 1989; Kline, 2011). All item estimates, except for two, were .50 or greater (stereotype-not nice =.48, and label-lots of sex partners =.43). All item estimates were statistically significant (p< .01).

The initial fit statistics for all measurement models demonstrated adequate levels for goodness-of-fit. However, based on modification indices and thoughtful review of the

proposed items for each variable, we included correlated error residuals between 14 items to improve measurement model fit. With these additions, goodness-of-fit improved from good to excellent for all proposed variables.

Testing of the hypothesized structural model utilizing the final measurement models found the proposed structure to be a good fit to the data (CFI =.98, TLI=, .97, RMSEA=.04). All independent stigma variables were found to be significantly related to the two proposed enacted stigma variables, except in one case. No statistically significant relationship was found between cognitive distancing and support for mandatory disclosure (p=.890). The supported structural model is illustrated in Figure 4.2.

Construct Validity Testing

As predicted a priori, all stigma and enacted stigma scales were negatively correlated with HIV-associated transmission knowledge and knowing someone HIV-positive. These correlations were all significant and ranged from -.02 to -.31 (p<.01). Thus, increased stigma and enacted stigma were significantly correlated with decreased HIV transmission knowledge and greater stigma was associated with not knowing someone with HIV. These findings add support to the validity of our proposed measures.

4.5 Discussion

Since the beginning of the epidemic, HIV-associated stigma has been recognized as a critical barrier leading to detrimental health effects for individuals infected with HIV and a deterrent to prevention efforts aimed at reducing the spread of HIV. Although considerable interest in HIV-associated stigma exists, conflation of the term "stigma" and the lack of

empirical testing for accepted stigma theory have hindered our ability to comprehensively assess and consequently reduce HIV-associated stigma.

To address these gaps, we described and empirically tested a conceptual model of HIV-associated stigma based on existing theory. Our model postulated that stigma includes the constructs of labeling, stereotyping, blame, and cognitive distancing. These constructs are differentially associated with support for enacted stigma behaviors, including social distancing and support for mandatory disclosure. In general, the measures we developed to represent these constructs were found to be valid and reliable and our proposed model was robust although not all components were fully supported.

Overall, our structural model was found to have good fit to the data collected, providing empirical evidence for individual components of Link and Phelan's proposed stigma theory. Our results support the existence of multiple sub-components of the stigma process with individualized impacts on enacted stigma outcomes. For instance, while all subcomponents of stigma were found to be significantly associated with social distancing, blame and stereotyping demonstrated a higher level of association (.32, .27 respectively) than did labeling and cognitive distancing (.19, .13 respectively). This finding suggests interventions targeting social distancing behaviors should focus on changing attitudes related to blame and stereotypes as well as include stigma measures specific to these subcomponents in their evaluation effects. Additionally, while cognitive distance was significantly associated with social distancing attitudes ($p<.001$), it showed no relationship to supporting disclosure policy ($p=.890$). This finding supports the importance of recognizing and targeting appropriate stigma sub-components in stigma intervention work.

While our overall model supported the existence of multiple subcomponents of stigma, were unable to retain both stereotyping subscales during analysis. We anticipated, as was consistent with theory, published empirical studies, and preliminary data analyses, that stereotyping would include "threat to others" as well as "socially undesirable attributes". The "threat to others" items, which focused on characteristics related to risk taking, carelessness, and cleanliness, were generally not retained. Perhaps the failure of threat-based items to produce adequate factor loadings regarding stereotyping of PLWHA occurred because of the predominance of men in our stratified sample. Gender role norm theories elucidate a societal belief that risk is a socially valued behavior for boys and men. Research has confirmed this relationship, demonstrating higher levels of risk taking and risk tolerance for men. Men are generally more likely to engage in risk behaviors as well as perceive lesser risk involved in those behaviors when compared to women (Byrnes, 1999). As such, men may be less likely to associate HIV infection with risk-taking and possibly less willing to admit feeling threatened if risk is perceived. Further research exploring the validation of stereotyping-threat to others variable items within a large female sample would be of interest for testing this hypothesis.

Additionally, even though all items in the "label" variable were found to have statistically significant validity and reliability (at the $p < 0.01$ level) and construct validity was initially supported for the label scale; individual items did not perform as well as expected in analyses. All but one item representing the label factor demonstrated low individual reliability and the Crohnbach's alpha score for this factor (0.67) was near but below the general standard of 0.70-0.80 (DeVellis, 2003). This suggests findings related to the labeling variable should be interpreted with caution. Again, a higher than average risk

tolerance and engagement in risk behavior of our sample may have influenced this result. As labeling is a process by which people attempt to distance themselves from a stigmatized condition by identifying and calling out the non-normative traits believed to be associated with the stigmatized disease, inmates may have been reluctant to consciously link the stigmatized disease to a trait they bear themselves. For instance, 68% of our sample indicated engagement in drug use within 3 months prior to prison. Almost half of the sample (47%) reported more than one sex partner within the same time frame. These associations may have differentially affected responses to items related to drug use and sexual risk, and thus the reliability of this measure within this population.

Additionally, although we support the current trend of multi-level HIV-associated stigma research, our model provides evidence for the theorized relationships between internal beliefs and attitudes and support for enacted stigma behavior. Despite the push for higher-level indicators and measures, we strongly believe in the need to create better understanding of and standardization in measuring individual-level components of the stigma process to provide a strong foundation for multi-level research. In addition, it is our hope that future research can strengthen this model by incorporating and validating community level measures of HIV-associated stigma and/or measures of actual enacted stigma behaviors rather than behavioral proxies

Figure 4.1 Conceptual Model of the process of stigma and its relationship to enacted stigma outcomes. Model is primarily adapted from theory published by Link and Phelan (2008).

STIGMA VARIABLES					
FACTOR 1: LABEL (N=980)					
On a scale of ___ to ___, people with HIV (are)...		Mean	St Dev		
L1	careful/careless	3.48	.047		
L2	heterosexual/homosexual	3.53	.040		
L3	doesn't put others at risk/ puts others at risk	3.53	.040		
L4	not drug users/drug users	3.60	.047		
L5	no sex partners/lots of sex partners	3.71	.050		
FACTOR 2: STEREOTYPE-NEGATIVE ATTRIBUTES (N=980)					
On a scale of ___ to ___, people with HIV (are)...		Mean	St Dev		
S1	caring / uncaring	2.65	.025		
S2	good people/ bad people	2.70	.037		
S3	friendly /unfriendly	2.58	.043		
S4	reliable/ unreliable	2.89	.034		
S5	nice / not nice	2.34	.042		
FACTOR 3: BLAME (N=960)		Disagree a lot	Disagree a little	Agree a little	Agree a lot
B1	People who have HIV have caused their own misery	.38	.29	.23	.11
B2	People with HIV must have done something wrong to get it	.34	.22	.20	.25
B3	Getting HIV is the price people pay for choosing to do the wrong things	.41	.21	.26	.12
B4	People who have HIV deserve what happens to them	.67	.25	.07	.03
B5	Getting HIV is punishment for being a sinner	.71	.17	.07	.05
FACTOR 4: COGNITIVE DISTANCE (N=970)		Disagree a lot	Disagree a little	Agree a little	Agree a lot
C1	I'm perfectly safe from getting HIV	.36	.24	.21	.19
C2	Getting HIV is not something I really need to worry about	.49	.21	.15	.15
C3	HIV is not my problem	.48	.22	.13	.18
C4	I'm not the kind of person that gets HIV	.29	.24	.20	.27

Table 4.1 Descriptive statistics of stigma variables.

Enacted Stigma Variables					
SOCIAL DISTANCE (N=957)		Disagree a lot	Disagree a little	Agree a little	Agree a lot
I would not want…					
D1	to hang out with a person who has HIV	.43	.31	.13	.13
D2	to use the same shower than a person with HIV used	.36	.29	.18	.17
D3	*I feel uncomfortable around inmates with HIV	.36	.27	.22	.16
D4	to be friends with a person who has HIV	.49	.34	.11	.07
D5	work with a person who has HIV	.35	.34	.19	.12
D6	to drink from a water fountain if a person with HIV had used it	.37	.30	.16	.18
D7	a person with HIV to be in a cell with me	.21	.21	.26	.32
D8	to play sports, like basketball or volleyball, with a person who has HIV	.34	.27	.19	.21
D9	a person with HIV working in the prison kitchen	.16	.14	.20	.51
SUPPORT FOR MANDATORY DISCLOSURE POLICY (N=951)		Strongly Disagree	Disagree	Agree	Strongly Agree
P1	Outside of prison, people should be able to find out who in the community has HIV	.15	.25	.22	.39
P2	In prison, correctional officers should be able to find out which inmates have HIV	.16	.16	.21	.48
P3	In prison, inmates should be able to find out which other inmates have HIV	.20	.24	.16	.40

Table 4.2 Descriptive statistics enacted stigma variables. *D3 does not contain the question stem as other items.

ITEM	EXPLORATORY FACTOR ANALYSIS						CONFIRMATORY FACTOR ANALYSIS				
	Factor Loadings			Alpha			Indices				
	A	B	A&B	A	B	A&B	SFL	R^2	CFI	TLI	RMSEA
STIGMA VARIABLES											
FACTOR 1: STEREOTYPE-NEGATIVE ATTRIBUTES											
S1	.80	.83	.81	.78	.83	.80	.81	.66	.999	1.000	.004
S2	.77	.82	.79				.65	.42			
S3	.83	.80	.83				.61	.37			
S4	.71	.79	.73				.73	.53			
S5	.48	.59	.52				.47	.22			
FACTOR 2: BLAME											
B1	.79	.84	.81	.79	.74	.78	.88	.78	1.000	1.000	.011
B2	.74	.75	.74				.75	.56			
B3	.75	.70	.75				.64	.41			
B4	.76	.60	.72				.75	.56			
B5	.69	.57	.68				.64	.41			
FACTOR 3: COGNITIVE DISTANCE											
C1	.81	.79	.81	.74	.75	.75	.85	.73	1.000	1.000	.011
C2	.74	.77	.76				.56	.32			
C3	.73	.77	.74				.67	.45			
C4	.73	.68	.72				.72	.53			
FACTOR 4: LABEL											
L1	.72	.77	.75	.67	.68	.67	.68	.47	1.000	1.012	.001
L2	.60	.71	.64				.53	.28			
L3	.55	.67	.60				.53	.28			
L4	.82	.60	.76				.57	.33			
L5	.49	.50	.49				.42	.18			

	EXPLORATORY FACTOR ANALYSIS						CONFIRMATORY FACTOR ANALYSIS				
	Factor Loadings			Alpha			Indices				
	A	B	A&B	A	B	A&B	SFL	R^2	CFI	TLI	RMSEA
ITEM											
ENACTED STIGMA VARIABLES											
FACTOR 5: SOCIAL DISTANCE											
D1	.89	.85	.88	.94	.92	.93	.93	.86	.998	.996	.05
D2	.87	.83	.86				.87	.76			
D3	.85	.86	.85				.89	.79			
D4	.84	.71	.81				.84	.70			
D5	.84	.82	.83				.85	.72			
D6	.82	.82	.82				.81	.65			
D7	.80	.76	.79				.83	.68			
D8	.76	.72	.75				.81	.66			
D9	.63	.62	.62				.75	.56			
FACTOR 6: SUPPORT FOR MANDATORY DISCLOSURE POLICY											
P1	.83	.84	.83	.72	.76	.74	.93	.87	1.000	1.000	0.000
P2	.81	.83	.82				.70	.49			
P3	.76	.80	.77				.74	.55			

Table 4.3: Exploratory and Confirmatory Factor Analysis Results. SFL=Standardized factor loading.

FIGURE 4.2. Final Structural Model. Solid lines represent significance at the p<.01 level. Dotted line represents non-significant relationship (p>.05)

CHAPTER FIVE: CORRELATES OF HIV-ASSOCIATED EVER TESTING AND RECENT TESTING FOR INCARCERATED MEN IN NORTH CAROLINA

5.1 Introduction

The large number of HIV-infected individuals who are unaware of their infection poses a significant barrier to reducing HIV spread. Between 20% and 30% of the HIV-infected population in the United States remain undiagnosed (Marks, Crepaz et al. 2005; Obermeyer and Osborn 2007; Ostermann, Kumar et al. 2007; Bartlett, Branson et al. 2008; Rountree, Chen et al. 2009; Campsmith, Rhodes et al. 2010). Additionally, the Center for Disease Control and Prevention (CDC) estimates this group is responsible for transmitting more than half of all new HIV infections (Marks, Crepaz et al. 2006; Branson 2007). In response to these figures, agencies involved in HIV policy and planning for the United States recommend routine HIV testing for nearly all Americans and yearly HIV testing for those deemed at high risk for infection (CDC 2006).

Epidemiological studies in the United States show disparities in HIV infection rates, with certain groups carrying an unequal proportion of the disease burden (Hammett, Harmon et al. 2002; Hammett 2006; CDC 2008). Men make up almost 75% of domestic HIV and AIDS cases and have consistently shown the highest rates of infection since the beginning of the epidemic (CDC 2008; CDC 2008). Moreover, infection rates for incarcerated men have been estimated to be about 2.2%, almost six times the infection rate of the total general US

adult population (Gaiter and Doll 1996; Spaulding, Stephenson et al. 2002; McQuillan and Kruszon-Moran 2008; Spaulding, Seals et al. 2009).

An estimated 15-25% of all HIV positive individuals, including about 20% of HIV positive men, in the US are incarcerated annually. Most inmates return to their home communities within a few years of entering prison, and approximately 13-19% of all persons infected with HIV in the US are estimated to return to the community from correctional facilities each year (Hammett, Harmon et al. 2002; Spaulding, Stephenson et al. 2002; Hammett 2006; Beckwith, Atunah-Jay et al. 2007; Spaulding, Seals et al. 2009). For infected incarcerated men specifically, the most current estimate of annual release is about 17% (Spaulding, Seals et al. 2009). Previous research with incarcerated men also suggests that drug use and risky sexual behavior returns to pre-incarceration rates for many of those incarcerated once released (Seal, Eldrige et al. 2007). Combined, these facts point to the importance of targeting incarcerated men for routine HIV testing, and indicate the need for research elucidating HIV-associated testing behaviors for men involved in the correctional system.

Relatively little is known about HIV testing behaviors for men who have had involvement with the US criminal justice (Spaulding, Seals et al. 2009). Of the available research, most studies have focused on inmate testing within the correctional system with little examination of factors associated with testing behaviors, including routine testing, for incarcerated men that include the community context (Behrendt, Kendig et al. 1994; Spaulding, Stephenson et al. 2002; Burchell, Calzavara et al. 2003; Kacanek, Eldridge et al.

2007; Rountree, Chen et al. 2009; Rosen, Schoenbach et al. 2009a; Rosen, Schoenbach et al. 2009b; Andrinopoulos, Kerrigan et al. 2010).

Previous studies have found multiple factors are associated with HIV testing in the general population. People who were between 25 and 50 years old, single, of lower socioeconomic status, African-American, and those reporting higher HIV-associated risk behaviors were more likely to get tested than others (Ostermann, Kumar et al. 2007; Rountree, Chen et al. 2009). Among high-risk groups of IV drug users and men who have sex with men; people with higher risk behaviors, higher perceived risk of infection, and more HIV knowledge were more likely to have ever tested for HIV (Kellerman, Lehman et al. 2002). For studies of inmate HIV-testing; being single, reporting risk behavior, closely knowing someone with HIV/AIDS, having high coping self-efficacy, and support for mandatory disclosure have all been positively associated with HIV test acceptance within the prison system (Burchell, Calzavara et al. 2003; Rosen, Schoenbach et al. 2009a; Andrinopoulos, Kerrigan et al. 2010). For other variables such as education level and stigmatizing attitudes, inconsistent or lack of results from prior research suggest data are insufficient to determine their significance in predicting HIV testing behaviors, particularly for high risk populations (Kalichman and Simbayi 2003; Obermeyer and Osborn 2007; Rountree, Chen et al. 2009; Andrinopoulos, Kerrigan et al. 2010).

We were unable to find any large-scale quantitative studies that evaluated men involved in the US criminal justice system regarding their history of HIV testing before their current incarceration or that assessed the proportion who were up to date with annual HIV screening at the time of prison entry. Given new guidelines recommending annual testing for

high risk individuals, research is needed to determine who is testing for HIV as recommended and what factors are influencing HIV testing among inmates both within and outside of prison. The aim of this paper is to document self-reported HIV testing behaviors that occurred before incarceration. Among male prisoners at the time of entry into a state prison system, we sought to identify factors associated with whether an inmate had ever tested for HIV before this incarceration and with recentness of testing.

5.2 Methods

This was a sub-study of Project SCREEN a large cross-sectional study of randomly selected inmates entering the NC prison system between April 2010 and April 2011 (Wohl, 2012). This parent study was designed to explore inmate HIV prevalence, HIV testing rates, and barriers and facilitators to testing within the NC prison system. SCREEN study participants were enrolled from seven North Carolina prison processing centers (PPC) across the state. The PPC is the required gateway into the prison system for newly incarcerated inmates and provides all health services to inmates at entry, including HIV testing.

Sample

For this sub-study, we utilized data from the 5 PPCs across North Carolina that housed and conducted intake of all male inmates in the state. To be eligible participants had to be: at least 18 years of age; able to complete study activities in English; finished with prison processing activities related to HIV/STI screening; not currently held for a violent offense (i.e., rape or murder); held in the general prison entry population at time of approach.

Weekly lists of inmates eligible for screening at each PPC were drawn and then used to randomly select potential participants from the Offender Population Unified System (OPUS) database. Inmate enrollment was stratified by PPC based on the extent to which each facility represented the proportion of the total inmate entries to each facility the year prior. Inmates eligible for screening were brought to a central location within the prison to meet with a SCREEN study Research Assistant (RA). The RA screened and obtained informed consent from each inmate privately and, if eligible and interested, the inmate was enrolled and completed study activities at that time. All study procedures were reviewed and approved by the University of North Carolina Institutional Review Board.

Survey Administration

We used an Audio Computer Assisted Self Interview (ACASI) on a study laptop with touch screen technology to collect data. Participants completed the ACASI in a private room in the administrative area of the PPC, using headphones, with only a research assistant present. Each participant was assigned a random study ID number which was used for any study documentation, including the survey, to increase confidentiality. Participation in the SCREEN study was voluntary; no incentives were given for study participation or survey completion.

The SCREEN survey primarily asked questions about HIV risk factors, HIV testing attitudes, experiences with testing in the prison system, HIV-associated stigmatizing attitudes and beliefs, and demographic information. For this sub-study, we also asked about previous HIV testing experiences outside of prison.

Measures

Dependent variables

HIV testing behaviors: Participants were asked "Were you ever tested for HIV BEFORE coming to this processing center? (yes/no)" and, for those that answered yes, "Before coming to this processing center, when was your last HIV test? (month/year)". I used this information to develop two measures of HIV testing behaviors: 1) ever tested for HIV and 2) recentness of last HIV test prior to incarceration. Ever tested was analyzed as a dichotomous variable (yes/no). For test recentness, each inmate was assigned the 15th of the month as the day of last test, and a SAS date was created to represent the date of reported last test. This date was subtracted from the date the survey was completed to create a variable representing the number of days since last HIV test. From this, I developed a nominal variable with 3 categories: 1) never tested, 2) non-recently tested [defined as last tested more than 12 months before completing the SCREEN survey], and 3) recently tested, [defined as having tested within 12 months of completing the SCREEN survey].

Independent variables

Demographic factors: We assessed age, race, education level, and marital status, using response categories specified in the 2009 Behavioral Risk Factor Surveillance Survey (Centers for Disease Control and Prevention 2009). We asked participants to report the number of times they had been put in prison excluding the current incarceration. We also asked whether participants had a family member or friend who they knew to be HIV positive.

Knowledge: To measure knowledge, we combined the HIV_KQ-18, an 18-item questionnaire measuring HIV transmission knowledge previously validated among low-literacy groups,

with three additional questions measuring current treatment knowledge (Carey 2002). The three additional items included: 1) "People who test positive for HIV in prison can get treatment for HIV"; 2) "Right now, there is no cure for HIV"; and 3) "There are drugs that can lengthen the lives of people with HIV."

High risk behavior: To detect high risk behavior we used one item from the Behavioral Risk Factor Surveillance Survey (Centers for Disease Control and Prevention 2009).This question asked participants to indicate whether he had engaged in at least one of four specified HIV-associated risk behaviors within the past year (yes/no), without identifying which specific behavior(s) he had engaged in. The risk behaviors were: 1) used intravenous drugs, 2) got treated for a sexually transmitted or venereal disease, 3) gave or received money or drugs in exchange for sex, and 4) had anal sex without a condom.

Stigma: To measure stigmatizing attitudes we utilized four theoretically derived sub-components of the stigma process: stereotyping, labeling, blaming, and cognitive distancing. These measures were validated and shown to be reliable within this population (Ochtera, Golin et al. 2012)

Data preparation

Because stratified sampling procedures were used, we created a weight variable based on facility characteristics to improve the precision of our estimates. We also used multiple imputation for all predictor variables to enhance regression capabilities and ensure accurately nested models for analysis. In all, five imputed datasets were created using PROC MI procedures. All data preparation was completed using SAS 9.2.

Statistical Analysis

We first generated descriptive statistics to define the sample population, including their testing behaviors. All descriptive data were analyzed using PROC Surveylogistic, taking into account stratum and sampling weights. Next, we conducted bivariate logistic regression to determine the unique relationships between predictive factors and outcomes of interest. Our first bivariate analyses were run to determine the significance of the relationship between proposed individual correlates when comparing "ever testing for HIV" to "never testing for HIV." Our second bivariate analyses focused on recentness of last HIV test. For these analyses, we tested the association of individual correlates of HIV testing when comparing: 1) recent to never testing; 2) non-recent to never testing; and 3) recent to non-recent testing.

Next, we used multivariate binary logistic regression with three nested models to determine the combination of predictors with the greatest explanatory power of "ever testing for HIV." Model 1 compared demographic variables to the null model. Model 2 introduced knowledge and behaviors thought to be associated with HIV testing. For model 3, we added the four measures of stigmatizing attitudes and beliefs (labeling, stereotyping, blame, and cognitive distancing) to assess their association with HIV testing. We used the same three nested model procedure to assess predictors of test recentness. For this outcome, we used multinomial logistic regression to compare "recent" and "non-recent" testers to "never testers." In addition, we compared recent versus non-recent testing among those who reported both "ever having an HIV test" and "the date of their last HIV test."

For regression analyses, PROC Surveylogistic was again used to account for stratum and sampling. PROC MIAnalyze was also used to determine results based on multiple imputation data. Difference in Wald chi-square scores, taking degrees of freedom into account, was used to determine significant improvement in model fit (p<.05) as nested model analyses progressed. For both outcomes of interest, AIC was used to determine the best overall model fit. Our findings are presented as odds ratios for each parameter of interest. Nested model analyses also report ranges in AIC, Wald chi-square, and differences in Wald chi-square reported for the 5 imputed datasets. The model deemed most predictive is discussed for both outcomes of interest.

5.3 Results

Sample characteristics

A total 819 of the 856 incarcerated men interviewed reported information regarding their prior HIV testing behavior and, thus, made up the final sub-study sample. Of these, 777 reported the date of their last test and created the sub-sample for assessing correlates of test recentness. Ages ranged from 19 to 64 with a median age of 34. Half of the participants were African American and 41% were white (N= 414 and 339, respectively). Fifty-eight percent (N= 471) were single and never married. Around 62% (N= 513) had at least a high school education. Nearly 40% (N= 317) knew someone who was HIV positive, and 26% (N=211) reported engaging in at least one HIV risk behavior within the prior year. In addition, 57% (N= 461) reported serving at least one prior prison term.

Previous Testing Behavior

Eighty percent (N=652) of participants reported "ever testing" for HIV. Of the 610 men who also reported the date of their last HIV test, 36% (N=222) reported testing for HIV within the last year.

Bivariate Logistic Regression (Table1)

For all bivariate analyses, Whites demonstrated significantly lower odds to ever test or recently test when compared to Blacks. Having greater than a high school education, knowing someone HIV positive, and having greater HIV transmission and treatment knowledge were found to be associated with ever testing and more recent testing for HIV compared to never testing, though these variables were not significant when comparing recent to non-recent testing.

Prison recidivists were more likely to have ever tested as well as non-recently tested compared to never testing. Although risk behavior was not found to be significantly associated with general decisions to ever test, inmates who reported engagement in recent HIV risk behaviors were more likely to have tested recently compared to never tested. Similar findings were noted for cognitive distancing and education, with cognitive distancing scores and having a high school education showing no relationship to ever testing. However, of those reporting a last test date, inmates with lower cognitive distancing scores and inmates with a high school education were significantly more likely to be non-recent testers when compared to never testing.

When specifically comparing inmates who were recently tested for HIV to those who reported non-recent testing, only age, race, and marital status were significantly associated. Inmates reporting older age, being white or a minority other than black, and being currently married or previously married were significantly less likely to have recently tested.

Binomial Multivariate Logistic Regression: Ever vs. Never Testing for HIV (Table 2)

Model 1 demonstrated improved fit over the null model, and Model 2 demonstrated statistically significant improvement in fit compared to Model 1 (p=.03). Although Model 3 did not show a significant improvement in fit over model 2 (p=.32-.61), it was determined to have the best overall fit based on AIC (see table 2).

Model 3 results were similar to bivariate findings; being black, having greater than a high school education, serving a prior prison sentence, and greater HIV transmission and treatment knowledge are all associated with higher odds of having ever tested for HIV. Unlike bivariate results, knowing someone HIV-positive was not associated with having ever tested for HIV in this model.

Multinomial Multivariate Logistic Regression: HIV Test Recentness (Table 3)

Model 1 improved model fit over the null based on AIC. Models 2 and 3 did not improve overall model fit (p=.98-.99). However, model 3 offered the best fit to the data based on AIC scores.

When comparing recent testing to never testing for HIV, Blacks and those reporting younger age were significantly more likely to have recently tested. Black race, having greater

than a high school education, and greater HIV knowledge were the only factors found to be significantly related to non-recent testing when compared to never testing for HIV. When comparing recent to non-recent HIV testing, respondents reporting black race and those reporting being single/never married were more likely to be recent testers.

5.4 Discussion

Among a randomly selected sample of 819 men entering a state prison system, a large majority (80%) reported having been previously tested for HIV at some point in their lives. While these results reinforce previous study findings suggesting individuals known to be at higher risk of HIV infection are more likely to be tested, only 27% of the sample (or 36% of men reporting having an HIV test) had tested within the last year, the frequency of testing recommended by the CDC. These findings suggest the need for more active HIV testing efforts with this high risk population.

Similar to the studies with high risk groups previously cited, we found being Black, having higher education, and greater HIV knowledge were associated with ever testing for HIV in this population. Additionally, recidivism was a prison-specific factor associated with ever testing for HIV. When the ever testing category was broken down into recent and non-recent testing, Blacks were still more likely to be tested in both categories, but inmates with higher education and greater HIV knowledge were only more likely to have been non-recently tested compared to never tested. In other words, Black men were more likely to have tested at all, and for those that reported a testing date, they were more likely to be up to date with testing. However, while inmates with higher education and greater HIV knowledge

were more likely to have tested, those who reported a testing date were not more likely to have tested recently.

The most consistent finding across all analyses was that incarcerated white men were far less likely to test for HIV and less likely to have recently tested for HIV when compared to incarcerated black men (OR 0.25-0.61). These results suggest a need to target interventions toward white males to increase their participation in HIV testing; both ever and, when needed, routinely. In this study, 29% of white respondents reported high risk behavior within the year prior to survey completion yet only 18% reported an HIV test within that timeframe. Additional studies to better understand this group's limited HIV testing behaviors would be beneficial to ensure intervention targeting is effective.

In addition, achieving a level of education beyond high school had the greatest relationship with testing, consistently showing twice the odds of ever and non-recent testing compared to those with less than a high school education. This fact points to the need for ensuring appropriate literacy levels and relevant messages when developing and dispersing interventions to increase testing behaviors within this population.

Greater knowledge of HIV transmission and treatment showed statistically significant positive associations with testing behaviors. Although temporality can't be established in this data, these findings suggest increasing HIV knowledge may encourage HIV testing. I also found an increased number of prison-related incarcerations were positively associated with ever testing for HIV. These two findings combined imply the prison system provides an important opportunity to offer HIV education and testing services, as it may be an important place of initial testing for offenders.

HIV risk behaviors were found in previous research to be highly associated with ever testing as well as recent testing for high risk groups and prison-specific testing (Kellerman, Lehman et al. 2002; Burchell, Calzavara et al. 2003; Ostermann, Kumar et al. 2007; Rosen, Schoenbach et al. 2009a). We found no association between risk behavior and ever or recent testing for recently incarcerated men in any multivariate model. However, the interpretation of this finding may be complicated by the risk measure employed in my research. This study used a one item measure that combined several risk behaviors, differing in type of risk and timeframe for risk when compared to other studies. Although our measure captured known high risk behaviors, other more common risks, such as concurrent sexual partnerships and unprotected vaginal sex were not a part of our measure. Further exploration of this finding utilizing other measures of risk behavior captured in this survey will be an important next step.

Additionally, inmate age was only associated with recent compared to never testing for HIV, and the effect size was small. For every year increase in age, there was a 3% decrease in the odds of recent testing compared to never testing. As social awareness and more interventions aimed at encouraging regular testing increase with these new guidelines, we hope this finding represents a small generational trend towards more consistent and widespread offering as well as greater acceptance of routine HIV testing for this population.

When looking only at differences between recent and non-recent testing among those who reported ever testing for HIV, we found very few factors to distinguish these groups beyond those associated with ever testing. As noted above, Black testers were significantly more likely to have tested recently when compared to White and non-Black minority testers.

Additionally, single/never married men who reported testing were significantly more likely to report recent testing when compared to currently married or formerly married men. This last finding may reflect a reduced likelihood of sexual risk behavior for those currently married and, thus, less need for recent testing. However, it would be important to assess and clearly define the actual association between marriage and sexual risk taking in this population. If the proposed relationship is not true, this particular group would benefit from outreach and intervention to encourage regular HIV testing. These limited findings regarding test recentness also point to the need for additional information. It is possible that demographic and behavioral factors may not be the most important factors influencing test recency patterns. Environmental indicators, such as access and availability of testing, were not accounted for in this study and may be more indicative of test recency (Kacanek, Eldridge et al. 2007; Obermeyer and Osborn 2007). More research is necessary to better understand these results.

We were surprised to find no association between stigmatizing attitudes and testing behaviors beyond a small effect between cognitive distancing and non-recent testing in bivariate models. These findings, however, do match the results of one of the only inmate studies to look at the association between HIV-testing and HIV-associated stigma (Andrinopoulos, Kerrigan et al. 2010). This study, conducted with Jamaican inmates, found higher HIV testing-specific stigma was associated with decreased testing during incarceration but more generalized HIV stigmatizing attitudes, like blame, had no association with prison-based HIV testing behaviors.

Theoretically, stigmatizing attitudes and beliefs are suggested to be utilized to ensure resources and power go to those who promote currently recognized social norms (Parker and Aggleton 2003; Link and Phelan 2006). Perhaps inmate status, which represents a deviation from social normative behavior, leads to less utilization of general stigmatizing attitudes in making behavioral decisions due to less opportunity to benefit from defining group differences based on social norms. Thus, general HIV-associated stigma may not play the same role in enhancing behaviors that reflect mainstream societal norms, like HIV testing, with this population. Additionally, most published studies reporting associations between stigma and testing behaviors have been conducted in international rather than domestic settings (Kalichman and Simbayi 2003; Obermeyer and Osborn 2007; MacQuarrie, Eckhaus et al. 2009). Given the focus on independence in the US, in contrast to more communal societies, there may be less perceived desire and/or need to consider stigma and its impact when making testing decisions.

As with all research, our study has several limitations that must be considered in interpreting our results. First, because this is a cross-sectional study we are unable to assess the temporality of the relationships for most of the correlates included in our analyses. It is possible that HIV testing influenced factors, such as HIV knowledge. However, demographic variables, such as race and age are inherently predictors rather than outcomes of behaviors and in these cases temporality can be established. Additionally, as mentioned above, the variables used in this study focused specifically on personal attributes, attitudes, and behaviors. Therefore, we were unable to determine the impact of structural and environmental components in determining who in this population tests for HIV and when they decide to test. As suggested in other research studies, variables such as availability,

accessibility, and peer norms may play a significant role in testing decisions. Further research incorporating these variables is warranted to expand knowledge and enhance interventions related to HIV testing behaviors for this high risk population. Despite these limitations, our findings add important information to our knowledge of testing behaviors for male inmates and reveal, as noted above, important ideas and directions for encouraging ever as well as recent testing for persons at higher risk of HIV infection. Additionally, although results from this study are encouraging, more comprehensive construct validity testing of the proposed stigma measures is warranted.

This study also has several strengths. Our use of random selection for enrollment and stratification by prison facility suggest these data can be considered a more accurate representation of the North Carolina prison population beyond our sample. Data collection via touch-screen ACASI helped to ensure accurate data were collected despite the sensitive nature of the questions asked and increased our capacity to enroll persons with lower literacy levels. Combined, these strengths enhance our ability to generalize results and have important implications for determining intervention recommendations for the NC prison system and community organizations associated with released inmates. Furthermore, this is one of the first large-scale studies to look quantitatively at predictors of HIV-test recentness, providing new and insightful information to help encourage HIV-testing that meets national guidelines. The fact that we were able to provide this information with respect to an inmate population is also important, adding novel information to the HIV testing literature for a population known to be at greater risk of HIV infection.

Parameter	Odds Ratio & Confidence Interval							
	BINARY (N=819)		MULTINOMIAL (N=777)					
	Ever tested for HIV compared to never testing (0/1)		Last tested within past year compared to never testing (2/0)		Last tested greater than 1 year ago compared to never testing (1/0)		Last tested within year compared to last tested greater than 1 year ago (2/1)	
	OR	CI	OR	CI	OR	CI	OR	CI
Age	1.00	(.98, 1.01)	.98	(.96, 1.01)	1.01	(.98, 1.01)	**.98****	(.96, .99)
Race [1]								
White	**.47****	(.40, .55)	**.28 ****	(.23, .34)	**.64****	(.54, .76)	**.43****	(.37, .51)
Other	1.07	(.77, 1.48)	.71	(.48, 1.03)	**.45****	(1.03, 2.04)	**.69****	(.37, .65)
Education [2]								
High school	1.42	(.97, 2.09)	1.33	(.84, 2.10)	**1.57***	(1.03, 2.38)	.85	(.57, 1.25)
Beyond high school	**2.04****	(1.26, 3.27)	**1.76***	(1.01, 3.07)	**2.51****	(1.52, 4.15)	.70	(.45, 1.09)
Marital status [3]								
Married	1.05	(.65, 1.71)	.67	(.37, 1.22)	1.38	(.84, 2.30)	**.48****	(.29, .79)
Other	1.02	(.68, .1.52)	.78		1.18	(.76, 1.82)	**.66***	(.44, .99)
Prison recidivism	**1.15***	(1.01, 1.31)	1.14	(1.00, 1.31)	**1.15***	(1.01, 1.31)	1.14	
Risk Behavior	1.11	(.75, 1.66)	**1.24***	(1.01, 1.52)	1.07	(.89, 1.30)	1.16	(.98, 1.37)
Know PLWHA	**1.70****	(1.17-2.46)	**1.77****	(1.15, 2.72)	**1.57***	(1.05, 2.33)	1.13	(.80, 1.58)
HIV knowledge	**1.07****	(1.03-1.12)	**1.06****	(1.01, 1.11)	**1.10****	(1.05, 1.15)	.96	(.92, 1.01)
Stigma								
Label	1.01	(.98, 1.05)	1.03	(.99, 1.07)	1.00	(.96, 1.04)	1.03	(.99, 1.07)
Stereotype	.99	(.96, 1.03)	1.01	(.97, 1.05)	.99	(.95, 1.02)	1.03	(.99, 1.06)
Blame	.99	(.95, 1.05)	1.01	(.96, 1.07)	.98	(.93, 1.03)	1.04	(.99, 1.09)
Cognitive Distance	.96	(.91, 1.01)	.98	(.92, 1.04)	**.94***	(.89, .99)	1.04	(.99, 1.09)

Table 5.1: Results of bivariate analyses exploring associations between parameters and testing outcomes of interest with a comparison group of inmates who have never tested for HIV.
[1] reference category is black, [2] reference category is no high school degree or equivalent, [3] reference category is single, never married. *p<.05; **p<.01

Parameter	Model 1		Model 2		Model 3	
(N=819)	OR	CI	OR	CI	OR	CI
Intercept	5.96	(3.06, 11.62)		(.77, 5.03)	1.21	(.31, 4.89)
Age	.98	(.96, 1.01)	.98	(.96, 1.01)	.98	(.96, 1.01)
Race [1]						
White	**.44****	(.30, .64)	**.41****	(.28, .61)	**.40****	(.27, .61)
Other	1.01	(.48, 2.12)	.97	(.45, 2.04)	.94	(.44, 1.98)
Education[2]						
High school	1.38	(.93, 2.06)	1.27	(.85, 1.90)	1.25	(.83, 1.87)
Beyond high school	**2.42****	(1.45, 4.04)	**1.95***	(1.14, 3.24)	**1.98***	(1.15, 3.41)
Marital status[3]						
Married	1.13	(.66, 1.94)	1.15	(.66, 1.99)	1.23	(.71, 2.14)
Other	1.22	(.74, 2.01)	1.20	(.72, 1.98)	1.19	(.71, 2.00)
Prison recidivism	**1.18***	(1.02, 1.35)	**1.15***	(1.01, 1.32)	**1.15***	(1.00, 1.32)
Risk Behavior			1.02	(.66, 1.57)	.99	(.65, 1.51)
Know PLWHA			1.23	(.82, 1.84)	1.25	(.83, 1.87)
HIV knowledge			**1.07****	(1.02, 1.12)	**1.07****	(1.02, 1.12)
Stigma						
Label					1.03	(.99, 1.08)
Stereotype					1.01	(.96, 1.04)
Blame					1.00	(.95, 1.06)
Cognitive Distance					.96	(.91, 1.02)
AIC Range	(21527.76, 21572.83)		(21231.99,21277.53)		(21113.32, 21161.33)	
Wald x²Range	(35.63, 36.63)		(44.77, 45.47)		(47.49, 50.14)	
Wald diff			(8.72, 9.14)		(2.72, 4.81)	
p-value			(.03, .03)		(.32, .61)	

Table 5.2: Results of nested model analyses exploring correlates of ever HIV testing in the population
[1] reference category is black ,[2] reference category is no high school degree or equivalent, [3] reference category is single, never married; Null AIC=22729.197; *p<.05, **p<.01

Parameter N=777	Model 1				Model 2				Model 3					
	Recent compared to Never Test		Non-recent compared to Never Test		Recent compared to Never Test		Non-recent compared to Never Test		Recent compared to Never Test		Non-recent compared to Never Test		Recent compared to Non-recent Test	
	OR	CI	OR	CI	OR	CI	OR	CI	OR	CI	OR	CI	OR	CI
Intercept	4.05	(1.80, 9.11)	2.28	(1.11, 4.72)			.66	(.23, 1.84)	.48	(.10, 2.41)	.55	(.11, 2.40)	.92	(.25, 3.43)
Age	**.97***	(.94, .99)	.99	(.96, 1.01)	.97*	(.94, .99)	.99	(.97, 1.01)	**.97***	(.94, .99)	.99	(.97, 101)	.98	(.96, 1.00)
Race [1]														
White	**.27****	(.17, .42)	**.61***	(.41, .91)	.25**	(.15, .41)	**.56****	(.37, .86)	**.25****	(.15, .40)	**.55****	(.36, .85)	**.44****	(.29, .67)
Other	.67	(.28, 1.60)	1.40	(.65, 3.03)	.64	(.27, 1.53)	1.32	(.61, 2.87)	.62	(.26, 1.51)	1.27	(.58, 2.78)	**.49***	(.26, .94)
Education [2]														
High school	1.37	(.84, 2.22)	1.50	(.97, 2.30)	1.27	(.78, 2.08)	1.36	(.88, 2.11)	1.28	(.78, 2.10)	1.33	(.86, 2.08)	.96	(.63, 1.45)
Beyond high school	**2.37****	(1.29, 4.35)	**2.72****	(1.59, 4.65)	**1.92***	(1.02, 3.62)	**2.14****	(1.22, 3.75)	2.01	(1.06, 3.84)	**2.15****	(1.21, 3.81)	.94	(.57, 1.53)
Marital status [3]														
Married	.78	(.40, 1.52)	1.35	(.77, 2.37)	.80	(.41, 1.57)	1.38	(.78, 2.45)	.86	(.43, 1.70)	1.52	(.85, 2.72)	**.57***	(.33, .97)
Other	1.19	(.66, 2.15)	1.22	(.72, 2.08)	1.17	(.64, 2.13)	1.19	(.69, 2.04)	1.15	(.62, 2.11)	1.20	(.69, 1.08)	.96	(.59, 1.56)
Prison recidivism	**1.19***	(1.02, 1.38)	**1.16***	(1.01, 1.34)	1.16	(1.00, 1.35)	1.13	(.99, 1.31)	1.16	(1.00, 1.34)	1.13	(.98, 1.30)	1.02	(.94, 1.11)
Risk Behavior					1.09	(.65, 1.81)	.99	(.65, 1.81)	1.08	(.65, 1.81)	.95	(.60, 1.50)	1.53	(.75, 1.71)
Know PLWHA					1.22	(.75, 1.98)	1.18	(.76, 1.79)	1.29	(.79, 2.09)	1.17	(.76, 1.80)	1.10	(.75, 1.61)
HIV knowledge					1.07*	(1.01, 1.13)	**1.08****	(1.03, 1.13)	1.07	(1.01, 1.13)	**1.08****	(1.03, 1.14)	.99	(.94, 1.04)

				1.05	(1.00, 1.11)	1.03	(.98, 1.07)	1.03	(.98, 107)
Stigma									
Label				1.05	(1.00, 1.11)	1.03	(.98, 1.07)	1.03	(.98, 107)
Stereotype				1.01	(.96, 1.06)	1.00	(.96, 1.05)	1.01	(.97, 1.04)
Blame				.99	(.92, 1.07)	1.01	(.94, 1.07)	.99	(.93, 1.05)
Cognitive Distance				.98	(.92, 1.05)	.95	(.89, 1.02)	1.03	(.99, 1.09)
AIC	(42352.00, 42394.34)		(42023.78, 42067.52)			(41794.30, 41832.31)			
Wald x2	(68.14, 68.86)		(78.77, 79.52)						
Wald diff			(10.45, 10.66)			(87.27, 87.69)			
p-value			(.98, .98)						
						(7.82, 8.84)			
						(.99,.99)			

Table 5.3: Results of nested model analyses exploring correlates of recentness of HIV testing within the population
Null Model AIC=44518.257; *p<.05, **p<.01

CHAPTER 6: SYNTHESIS OF RESEARCH AND FINDINGS

6.1 Synthesis of Dissertation Activities

The purpose of this dissertation was twofold: 1) to increase knowledge related to the conceptualization and measurement of HIV-associated stigma, and 2) to explore the potential correlates of HIV testing for recently incarcerated inmates. Of particular interest was determining the relationship, if any, between HIV-associated stigma and HIV testing behaviors.

Although there is a large body of literature available on health-related stigma theory, relatively little research has been done to empirically test the proposed theory. One reason for this limitation in HIV research is the lack of clearly defined and validated domestic HIV-associated stigma measures, particularly for persons of HIV-negative or unknown status. Without proper measurement tools, the ability to understand the predictors and outcomes of the stigmatizing process, including its relationship with HIV testing is diminished. This information is necessary to ensure accuracy in development and evaluation of public health interventions.

In this dissertation I created and empirically tested a theoretically based conceptual model of the HIV-associated stigma process with a group of HIV-negative or unknown status inmates recently incarcerated in North Carolina. As part of this research, I developed, administered, and assessed the reliability and validity of stigma metrics utilized to test the

conceptual model. Through these processes I was able to confirm the accuracy of the model and the metrics, and sought to utilize these metrics to better understand the association between stigmatizing attitudes and beliefs and enacted stigma as well as HIV testing behaviors for the recently incarcerated men.

Current national guidelines recommend routine and annual HIV testing for persons deemed to be at high risk for HIV infection. With rates of infection at least 6 times the rate of the general population in the United States, male prisoners represent an important demographic for public health outreach related to HIV testing. Determining ways to support HIV testing behaviors in the prison population has important public health implications for reducing the spread of the disease and increasing quality of life for those infected.

Prior research suggests a significant negative association between HIV-associated stigma and HIV testing behaviors. However, little is known about the correlates of HIV testing, including HIV-associated stigma, within the prison population. In order to better understand HIV testing practices and the relationship between stigmatizing attitudes and HIV testing in this population, I assessed the associations between multiple demographic, attitudinal, and behavioral variables and prior HIV-associated testing behaviors. This research included analysis of both ever testing for HIV and recently testing for HIV within the current guidelines of 1 year.

Thus, this dissertation was undertaken to enhance theoretical and empirical understanding of HIV-associated stigma and its impact on HIV testing behaviors for persons at high risk of infection. Below I discuss the key findings of this dissertation project,

acknowledge strengths and limitations of the research, suggest implications of findings, and note future research and practice opportunities.

6.2 Summary of Key Findings

Summary of AIM 1

Aim 1 was conceptualized as 3 interrelated components:

AIM 1a) Based on theoretically described concepts of stigma, develop a comprehensive conceptual model of the HIV-associated stigmatizing process

AIM 1b) Develop measures of the subcomponents of HIV-associated stigma to empirically test the proposed conceptual model

AIM 1c) Gather evidence regarding the independence, reliability, and validity of the developed HIV-associated stigma subcomponent measures.

Using both Classical Test Theory and Structural Equation Modeling, my research found the six created stigma and enacted stigma sub-scales representing published stigma theory (labeling, stereotyping, blame, cognitive distancing, social distancing and support for mandatory disclosure policy) to be reliable and valid measures of stigma (p<.05) for all items and scales. However, two unanticipated results were discovered in this research. First, one of the two stereotyping subscales, the one created to capture "threat," was not retained during factor analysis. Second, although all reliability and validity tests were significant (p<.05), the labeling items showed lower than expected reliability scores (alpha<.80, r^2<.50). Despite these limitations, this analysis lends credence to the theoretical subcomponents of the stigma process which, up until now, have not been empirically explored. This research also contributes current and validated stigma metrics to be utilized in further research.

Summary of AIM 2

Aim 2 was undertaken to assess the structure of the developed conceptual model by evaluating the relationships between stigmatizing attitudes and beliefs and support for HIV-associated enacted stigma behaviors for recently incarcerated men in North Carolina. Results from Structural Equation Modeling analyses found the conceptualized structural model representing these relationships to be an excellent fit to the data. Significant positive associations were also demonstrated between all stigmatizing attitude and belief constructs (labeling, stereotyping, blame, and cognitive distancing) with support for social distancing behaviors. Similar results were found when evaluating the relationships between these variables and support for mandatory disclosure, except for one construct. Cognitive distancing was not significantly related to mandatory disclosure policy support. Despite this, overall findings suggest a significant relationship between stigmatizing attitudes and behavioral proxies for enacted stigma behavior.

As the conceptual model used to illustrate these relationships was based on theory, the finding of excellent structural model fit lends empirical support for currently accepted theoretical conceptualizations of stigma. Although the cross sectional nature of this study does not allow for an understanding of the temporality of the relationships tested, it is often assumed that attitudes and beliefs dictate behaviors. If this assumption is accepted, the associations found in testing this aim help solidify the role of stigmatizing attitudes and beliefs as significant precursors to stigmatizing behaviors which isolate and reduce resources for those living with HIV.

In addition, the non-significant relationship between cognitive distancing and support for mandatory disclosure policy support the argument for identifying and measuring

appropriate stigma sub-components instead of conceptually inflating stigma into one general variable. Utilizing stigma subcomponents in research can provide more accurate and useful empirical data for determining and evaluating targets of stigma-based behavioral interventions.

Summary of AIM 3

The third aim of this dissertation sought to explore the correlates, including stigmatizing attitudes and beliefs, associated with: a) likelihood of ever testing for HIV; and b) likelihood of recent testing for recently incarcerated men in North Carolina.

Similar to prior research, we found being Black, having higher education, greater HIV knowledge, and prison-recidivism were associated with ever testing for HIV in this population. When including recentness of testing as an outcome of interest, Black men were more likely to have tested at all, and for those who reported a testing date, they were more likely to be up to date with testing. However, while inmates with higher education and greater HIV knowledge were more likely to have tested, those who reported a testing date were not more likely to have tested recently.

Stigmatizing attitudes and beliefs (labeling, stereotyping, blaming, and cognitive distancing) were generally found to have no significant association with HIV testing behaviors in the population studied, except for a small negative effect between cognitive distance and non-recent HIV-testing. These results suggest stigma may not be an appropriate target for increasing HIV-associated testing behaviors in this population.

6.3 Strengths and Limitations

Study Strengths

In this study we were able to collect and analyze data from a large sample of current prison inmates, a group which is rarely available for research. This dissertation project, therefore, presented a unique opportunity to discover and utilize information to support public health interventions with this hard to reach population. In addition, we were able to utilize innovative technology, the ACASI, to encourage accurate collection of sensitive data as well as support participation for inmates with low literacy.

This dissertation project also utilized comprehensive techniques for data collection and analysis to ensure accuracy in metrics and a thorough understanding of results. This was a study priority, and occurred at all stages of the dissertation project:

First, this dissertation is firmly grounded in both theory and empiricism. Extensive effort was placed on and conceptualizing stigma based on a thorough review of the theoretical and empirical literature before the creation and empirical testing of measures of stigma and enacted stigma constructs. Second, in the development of stigma and enacted stigma measures I was able to use multiple methodologies including qualitative interviews, cognitive testing, and pilot testing to ensure the measurement items were relevant to and understandable by the population. Third, in evaluating the accuracy of the measures and concepts proposed I utilized both Classical Test Theory and Structural Equation Models to provide as much information as possible for assessment. Fourth, when exploring correlates of HIV testing behaviors I chose to assess prior testing as well as recentness in testing. This

choice was made in order to provide more relevant insight for potential interventions aimed at compliance with current guidelines of annual testing for persons with higher risk.

Study Limitations

Despite the comprehensiveness and methodological rigor applied to this dissertation, several limitations must be taken into account when reviewing results and drawing conclusions from the findings. These limitations are discussed below:

First, the cross sectional nature of data collection significantly limits my ability to understand the temporality of discovered relationships for all study aims. Given this limitation, I could only determine that the components of my theory-driven conceptual model are related but I was unable to provide solid evidence to support or refute the theorized sequencing of events. Similarly, our report of variables associated with testing cannot shed light on the ordering of the relationships. For this, longitudinal research would be needed.

Second, because of the intrapersonal aspect of the measures utilized in this dissertation, I was unable to study the impact of structural and environmental variables in my analyses. In my conceptualization of stigma, I was unable to identify, create, and test metrics specific to these higher level determinants despite current theories' recognition of social and environmental aspects of the stigma process. However, these theories recognize the importance of intrapersonal constructs in the stigma process and my models as well as my metrics provide new and conscious insight into gaps related to the intrapersonal components of stigma theory. In addition, my conceptual model can and should be built upon to include

measurement of actual stigmatizing behaviors as well as structural and environmental components in future stigma work.

Third, an important and unanticipated environmental factor in this study was the movement from opt-in to opt-out HIV testing for inmates upon prison entry in North Carolina. This change in policy occurred in November of 2008, just prior to survey implementation for the SCREEN study. Due to this policy shift, testing rates within the prison system skyrocketed to over 90% testing for HIV at prison entry. Prior to opt-out policy, overall testing rates were around 60%.

This change suggests most of our study participants who had never tested for HIV prior to this incarceration probably tested for HIV within weeks of study enrollment and may have also known their HIV status prior to completing the SCREEN survey. This knowledge may have skewed their responses to survey questions, particularly stigma and enacted stigma scales which asked about current HIV-related attitudes and beliefs. Despite this drawback, we expect that all men completing the SCREEN survey were HIV-tested during prison processing prior to enrollment into the study unless they opted out of having the HIV test. This fact ensures consistency in the impact of recent HIV testing on answers and ensures study results accurately reflect the current situation of recently incarcerated inmates in North Carolina. This distinction is important, and the limitation advantageous, if the results of this study are to be utilized in planning any type of future intervention or education program specific to stigma in the prison processing centers.

6.4 Implications for Future Research

While the results of this study provide important insights for public health work to understand HIV-associated stigma and increase HIV testing behaviors, this study also created several opportunities for future research. These opportunities are briefly discussed below.

Because this study was cross-sectional, we were not able to empirically demonstrate the assumed temporality of the theorized relationships between stigmatizing attitudes and beliefs and support for enacted stigma behaviors. We were also unable to directly measure actual stigmatizing behaviors, and thus utilized perceived support as a behavioral proxy, as many prior studies have done. The field would benefit greatly from enhanced research projects that track the process of stigma over time, and include measures to capture true stigmatizing behaviors via self-report as well as observational study.

Additionally, we proposed and tested a conceptual model of stigma focused on the intrapersonal perspective of the stigma process. Although this information is a valuable component of stigma research, contextual and social variables are also important to explore. Determining ways to increase our understanding of these higher order levels will be highly beneficial in the work to reduce the ill effects of stigma. The conceptual model presented in this dissertation is meant to be the foundation for future work that builds the capability to empirically assess stigmatizing concepts at a higher level of social ecology.

Intrapersonal variables were also the focus of exploring HIV testing correlates with incarcerated men. Findings from this study are valuable for determining what personal-level variables, such as knowledge, can be targeted in interventions to increase testing behaviors. However, contextual level variables could be contributing significantly to testing decisions

for this group of men, either directly or as relationship moderators. Furthering this study to include variables such as access, cost, and availability will provide important insights for developing and initiating appropriate testing interventions.

As discussed in chapter 5, evaluating the potential role of non-normative beliefs and behaviors on stigma is an important issue for further research. Unexpectedly, we found no relationship between HIV-associated stigmatizing attitudes and HIV testing behaviors for inmates. One potential reason for this may come from stigma theory. If stigma is utilized primarily to secure resources and standing through societally-invoked rules, it is possible that those who have broken the rules of society may be less inclined to utilize or invoke stigma when making behavioral decisions. Better understanding this relationship could help further conceptualize stigma theory and its impact on health decisions.

Of note, it is also important to further validate with other populations the stigma and enacted stigma scales created for this project. In Chapter 4, the unanticipated loss of the "threat to others" stereotype subscale during factor analysis led to the possible conclusion that male role norms regarding threat and risk may have been a factor in the poor performance of these items. Evaluating the ability of the scales to perform in different groups, including other high risk groups as well as the general population, will provide valuable insight into their utility and generalizability. A grant application was recently submitted to utilize these scales for HIV-associated stigma research with inmates in another state. If approved, research would begin in 2013.

Our research did find that White male inmates are significantly less likely to have ever tested or recently tested for HIV compared to Blacks, a finding shown consistently in

other empirical studies. In additional analysis, 29% of white respondents reported high risk behavior within the year prior to survey completion yet only 18% reported an HIV test within that timeframe. This suggests the need for more research, potentially including mixed-methodology, to better understand why this particular subpopulation is failing to be tested despite their risky behavior. This information is essential for building effective, targeted interventions to increase testing behaviors.

6.5 Implications for Public Health

The research undertaken for this dissertation has multiple public health implications. These implications include unique impacts for theory, research, and practice.

This study provides evidence to support the theoretically derived components of the HIV-associated stigma process. We found that the subcomponents of the stigma process are unique, though interrelated constructs with differential associations to the outcomes we chose to measure. This finding suggests the importance of specifying components of the word "stigma" in health behavior research to better understand what part of the stigma process is impacting outcomes and increase our ability to accurately compare findings across studies. In addition, the significant relationships found between stigmatizing attitudes and support for enacted stigma behaviors provide further credibility and theoretical backing for the proposed negative impact of stigma on health-related outcomes.

From a research perspective, the conceptualization and empirical testing of stigma and enacted stigma scales offer new tools to both measure stigma and evaluate stigma interventions. These scales are particularly helpful as they fill a gap in the ability to measure

HIV-associated stigma for persons of negative or unknown status in the United States. Because these scales were developed to assess multiple aspects of the stigmatizing process, they can provide more in-depth knowledge about stigma and it's associations with health outcomes of interest. In addition, highlighting the subcomponents of stigma instead of conceptually inflating these components into the umbrella term "stigma" increases the ability to accurately measure intervention success and compare research and evaluation results.

From a practice perspective, findings from the exploration of correlates related to ever and recent testing of HIV provide multiple insights for public health interventions to encourage HIV testing behaviors in this high risk group. Based on analytic results, future interventions should target white males, increase HIV-associated transmission knowledge, and account for low literacy levels in messaging. Results also found recidivists were more likely to have been tested in the past, suggesting prison may be an important venue for encouraging and ensuring routine HIV testing behaviors. Additionally, consistent non-significant associations between stigmatizing attitudes and testing behaviors imply stigma may not be an appropriate target to increase testing behaviors for this population. However, the significant relationships found between measures of stigmatizing attitudes and general support for enacted stigma behaviors suggests HIV-associated stigma is worth targeting in interventions aimed at decreasing discriminatory behaviors toward or enhancing quality of life for those living with HIV.

6.6 Conclusion

This research study is one of the first to conceptualize, empirically test, and validate theoretically proposed HIV-associated stigma theory. Our development and validation of

new measures to represent the sub-components of HIV-associated stigma offer new opportunities to explore HIV-associated stigma and its effects on health for those infected with HIV as well as those of unknown or HIV-negative status.

We found little to no significant association between the subcomponents of HIV stigmatizing attitudes and HIV testing for incarcerated men in North Carolina, suggesting HIV-associated stigmatizing attitudes are not an important target for increasing HIV testing in this group. However, significant associations were found between subcomponents of HIV-associated stigma and support for enacted stigma behaviors. As enacted stigma has the potential to invoke loss of rights, resources, and power for those infected with HIV, stigma remains an important construct for intervention within the inmate population.

APPENDIX:
Description of Survey and Scale Development

Survey Development

We conducted an extensive process to select and, in some cases, develop measures for the SCREEN survey instrument as outlined below:

1. **Extensive literature searches and interviews** *(May 2009-August 2009)* were conducted related to the domains of interest, including stigma and HIV testing for general as well as high-risk populations. Qualitative interviews with 78 inmates and 15 nursing staff across all 7 PPCs were completed to identify salient issues regarding HIV and HIV testing for those incarcerated.

2. **Compilation** *(August 2009-October 2009)* of information from these interviews and the comprehensive literature reviews, potential domains and candidate measures of these domains were compiled. This compilation included previously validated scales and surveys for variables of interest. When no acceptable validated measure could be found, a scale or index was developed using current scale development techniques. Through iterative team meetings the survey structure was finalized.

3. **Cognitive Interviews** *(November 2009-December 2009)* were then conducted with 30 inmates at 7 processing centers to qualitatively assess the usability, reliability, and validity of the survey items.

4. **Pilot-testing** *(November 2009-January 2010)* of the survey, included the stigma subscales, was then completed with 100 inmates in 7 PPCs. From observational information reported by RAs during pilot administration and pilot data analysis, final survey changes were completed and final survey administration began in April 2010.

HIV-Associated Stigmatizing Attitudes and Beliefs Scale Development

Stigmatizing attitudes/beliefs scale development was initiated by an extensive review of empirical and theoretical literature involving health-related stigma. Because no comprehensive, theoretically-based, empirically tested model of stigmatizing attitudes/beliefs was found, four stigma variables were developed representing distinct stigmatizing attitudes/beliefs and two variables representing support for enacted stigma behaviors.

Preliminary item development occurred in four ways. 1) A comprehensive literature review of stigma scales and tests of their validity was conducted, including systematic literature reviews regarding stigma measurement; 2) currently utilized scales were evaluated to determine possible structure and content related to the proposed conceptual model of stigma variables; 3) additional measures of health-related constructs similar to the proposed stigma variables were reviewed as potential resources for the scale; and 4) transcripts from formative qualitative interviews conducted (explained above) were reviewed to identify stigmatizing topics, attitudes, and beliefs related to HIV.

From this process a comprehensive list of potential stigmatizing and discriminatory attitudes items was created. Via peer review from academicians and researchers in the HIV field, items were revised to create 6 scales correlating to the proposed conceptual model:

label, stereotype, blame, cognitive distance, social distance, and support for mandatory disclosure. The stereotype scale was developed to measure 2 factors: stereotype-threat to others and stereotype-socially undesirable attributes.

Of note, one academic criticism of studies to date that have measured stigma is that the scales have been unable to attribute variables that represent enacted stigma (e.g., keeping physical distance from someone with HIV) directly to stigmatizing attitudes and beliefs. In our study, cognitive interviews qualitatively revealed that two stereotype beliefs (*the fear of contracting the disease,* and *the negative attributions made about persons who have the disease*) were the main reasons inmates cited for supporting enacted stigma behaviors.

Cognitive interviews conducted for the full SCREEN survey (described above) included select items from the measures for the proposed conceptual model. Data from these interviews were reviewed to qualitatively assess the reliability and validity of the included stigmatizing attitudes/beliefs and discriminatory attitudes/beliefs items. This information, along with pilot test data presented above, was used to iteratively revise the measures.

All scales were pilot tested (described above) in the SCREEN survey. Preliminary factor analysis, including scree plot and parallel analysis, was used to explore scale uni-dimensionality. Correlations were run to identify scale reliability. Both procedures, conducted using SAS9.2, suggested the proposed scales and factors were uni-dimensional and reliable. Below, each subconstruct measure of HIV-associated stigma and enacted stigma are described in detail:

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Labeling and Stereotyping

Label is defined as the identification of socially-relevant traits persons with a certain condition, like HIV, are considered to share. Stereotype is defined as a 'picture' that represents a prejudiced attitude of what a person living with HIV is like. Although similar, these constructs were considered distinct enough to measure separately. Label focuses on the overarching, widely held socially accepted categories or behaviors associated with the illness, such as *drug user* and *homosexual*. Stereotype places emphasis on attributes that have been in turn associated with those categories, such as *dirty, unreliable,* and *sinful*.

Additionally, the stereotype scale was developed to measure 2 factors: stereotype-threat to others and stereotype-socially undesirable attributes. This division followed findings from our initial research which suggested stereotypes were usually connected to either 1) the perceived threat of contracting HIV or 2) perceptions of the personal characteristics, often traits suggestive of social exclusion or isolation, of a person who gets infected with HIV.

Items for the labeling and stereotyping scales were primarily developed using qualitative interview transcripts from the SCREEN study. Semantic differential scales were created for these measures. This type of scale has been widely used in research of attitudes over the years and allows for an explicit measurement of an individual's perceptions (Fishbein & Ajzen, 1975). In total, we presented 27 semantic differential statements, with response options ranging from 0 to 6. The end scale points (0 and 6) were marked with the uni- or bi-polar words representing a known label or stereotype underneath a vertical line. The points in between (1-5) were indicated by a vertical line but not semantically labeled. Participants were asked to choose the line on the scale that best represented their feeling

about people with HIV. Items were reverse-scored when necessary so that higher scores represented higher endorsement of labeling and negative stereotypes. Of the 27 items, 7 represented the label variable, 7 represented stereotype-threat to safety, and 14 represented stereotype-negative attributes.

Blame

Blame was defined as assigning responsibility for getting HIV and its consequences to the person infected. Blame was measured using 5 questions that focused on beliefs regarding HIV positive inmates/persons being personally responsible for their HIV infection. A four point response option scale was used (agree a lot, agree a little, disagree a little, disagree a lot) for each question. Item responses were combined to create a sum score (0-20), with higher scores representing higher blame. Items for this scale were primarily adapted from Visser et al (2008).

Cognitive Distancing

Cognitive distance is a measure of cognitive separation of the self from the characteristics of a person and/or behaviors that would make one vulnerable to HIV infection. This concept was measured using 5 questions on a four point response option scale (agree a lot, agree a little, disagree a little, disagree a lot) for each question. Cognitive distance items were primarily adapted from the Stereotypes about AIDS scale (Snell, Finney, & Godwin, 1991).

Social Distancing

Social Distance is defined as separation between self and an "other" in activities, geographic locations, and/or events with the separation attributable to the stigmatized condition of the "other". Social distance is different from cognitive distance as it is a measure of a person's willingness to be near someone with HIV. In contrast, cognitive distance is related to a person's feelings regarding whether or not they perceive themselves as susceptible to catching the disease. To measure social distance, participants were asked the extent to which they agreed or disagreed (agree a lot, agree a little, disagree a little, disagree a lot) with 9 items related to sharing space or activities with an inmate/ person who has HIV. Because items were worded in the negative (i.e. "I would not want to work with an inmate who has HIV"), all items were reverse scored so that higher scores were related to greater support for distancing. Items for this scale were gleaned directly from qualitative interviews as well as items from Visser (2008).

Support for Mandatory Disclosure

The extent to which each respondent supported mandatory disclosure of HIV status was measured using a total of 6 items, with 2 items each measuring three types of mandatory disclosure: 1) outside of prison/to general community; 2) in prison/to correctional officers; and 3) in prison/to other inmates. For each type of disclosure, an initial question asked if the respondent agreed or disagreed with mandatory disclosure in that scenario. A second question asked the extent to which they agreed (a little, a lot) or disagreed (a little, a lot) with their first answer for each of the three types of disclosure. A coding pattern was created from each set of two questions corresponding to each type of mandatory disclosure to create a

scale score of 0-3, with disagree a lot=0 and agree a lot=3. Each type of mandatory

disclosure was scored and summed separately, with higher sum scores representing greater

support for mandatory disclosure.

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