THE ASSOCIATION BETWEEN NATIVITY AND HIV/AIDS TESTING RATES

A Thesis In

Health Policy and Administration

by

Gloria Frank

© 2015 Gloria Frank

Submitted in Partial Fulfillment
of the Requirements
for the Degree of

Master of Science

May 2015
The thesis of Gloria Frank was reviewed and approved* by the following:

Rhonda BeLue
Thesis Advisor
Associate Professor of Health Policy and Administration

Patricia Y. Miranda
Assistant Professor of Health Policy and Administration and Demography

Marianne M. Hillemeier
Department Head, Department of Health Policy and Administration; Professor of Health Policy and Administration

*Signatures are on file in the Graduate School
Abstract

HIV/AIDS is one of the major causes of death worldwide; more than 30 million people have died from AIDS. HIV/AIDS testing is important for detection and reduced transmission. In the United States, blacks have the highest rate of HIV infections and deaths compared to any other race/ethnicity. However, foreign-born blacks that immigrated to the United States from high prevalence HIV/AIDS countries are often grouped with black Americans as one population, disregarding the unique characteristics of both populations. Despite the high prevalence of HIV/AIDS among black immigrant and black American communities, studies have not examined HIV/AIDS testing rates among black Americans and black immigrants in the United States. To fill this gap in current research, this study aims to determine whether in HIV/AIDS testing rates differ by nativity among blacks living in the U.S.

This study used a post-test cross-sectional design to answer the following question: Do HIV/AIDS testing rates differ among U.S.-born and foreign-born blacks? Using the National Health and Nutrition Examination Study, this study examined the difference in HIV/AIDS testing rates among U.S.-born blacks and foreign-born blacks, as well as the effect of moderating variables (sexual behavior and drug behavior) on the relationship between nativity and HIV/AIDS testing. The results of the study demonstrated that foreign-born blacks had higher HIV/AIDS testing rates than U.S.-born blacks (Foreign-born: 52.2% vs. U.S.-born: 45.8%).
# TABLE OF CONTENTS

LIST OF FIGURES ....................................................................................................................... v

LIST OF TABLES ............................................................................................................................ vi

ACKNOWLEDGEMENTS ............................................................................................................... vii

INTRODUCTION ............................................................................................................................ 1

BACKGROUND ............................................................................................................................. 3

LITERATURE REVIEW .................................................................................................................. 5

THEORETICAL FRAMEWORK ....................................................................................................... 11

CONCEPTUAL MODEL .................................................................................................................. 19

METHODOLOGY ............................................................................................................................ 22

RESULTS .......................................................................................................................................... 27

DISCUSSION .................................................................................................................................... 34

APPENDIX ......................................................................................................................................... 37

Sample refinement ....................................................................................................................... 37
Recoding of variables .................................................................................................................. 38
Logistic regression ....................................................................................................................... 42

REFERENCES .................................................................................................................................... 43
List of Figures

Figure 1: Theoretical framework (pg. 11)

Figure 2: Conceptual model (pg. 18)

Figure 3: Logistic regression model (pg. 26)
List of Tables

Table 1: Sample characteristics of U.S.-born and Foreign-born blacks 18 years old and older (National Health and Nutrition Examination Survey, 2001-2012) (pg. 27)

Table 2: Results of logistic regression model of HIV/AIDS testing and nativity (pg. 31)
Acknowledgements

First and foremost, I would like to express my gratitude to my thesis advisor Dr. BeLue, who has guided and supported me throughout my thesis process. I could not have got this far without her patience, knowledge, and encouragement. I appreciate everything Dr. BeLue has done for me throughout my time at Penn State. Secondly, I would like to thank Dr. Miranda for taking time out of her busy schedule to read my thesis and provide me with comments and suggestions. Thirdly, I would like to thank my colleagues Beatrice Abiero and Angela Campbell, for their engaging conversations and willingness to answer any questions I had regarding STATA. Last but not least, I would like to thank my wonderful mother for her support throughout my graduate career.
**Introduction**

Worldwide, 75 million people have been infected with the HIV virus, and about 36 million people have died of HIV since the epidemic began (World Health Organization [WHO], 2014). According to WHO, 35.3 million people were living with HIV/AIDS and 1.6 million people died of AIDS worldwide in 2012 (WHO, 2014).

In the United States, black individuals are heavily impacted by HIV/AIDS. According to the Centers for Disease Control and Prevention (CDC), African Americans have the highest HIV/AIDS infection and deaths rates among all racial/ethnic groups (CDC, 2014). However, black immigrants make up a large percentage of the black population in the United States and often come from high prevalence HIV/AIDS countries in sub-Saharan Africa and the Caribbean (Ojikutu et al., 2013). U.S.-born and foreign-born blacks should seek testing to prevent transmission, to determine HIV infection, to prevent HIV from reaching the stage of AIDS, and to receive early treatment for HIV/AIDS.

Although U.S.-born and foreign-born blacks are at high risk for HIV/AIDS, both groups comprise of different cultures, which include differences in beliefs, morals, and values. Public health efforts in HIV/AIDS prevention targeted at the black population may not be effective, without recognizing that the black population includes more than native-born Americans. These efforts must consider that the U.S. black population is diverse and both U.S.-born and foreign-born blacks are at high risk for HIV/AIDS.

This study aims to (1) examine the difference in HIV/AIDS testing rates among U.S.-born and foreign-born blacks and (2) examine if sexual behavior and drug behavior moderate the relationship between HIV/AIDS testing and nativity. Comparing HIV/AIDS testing rates
between U.S.-born and foreign-born blacks will assist in determining the most effective way to decrease the infection and death rates of HIV/AIDS among African Americans and black immigrants in the United States, and knowing if testing rates are different or similar between U.S.-born and foreign-born blacks will help to determine the most effective interventions specific for the individual populations. Furthermore, by examining HIV/AIDS testing rates among U.S.-born and foreign-born blacks, this study will encourage more testing, in both populations by providing information to educate health care workers, policy makers, and U.S.-born and foreign-born blacks.
**Background**

In the United States, about 50,000 people are infected with HIV each year and about 1.1 million people are living with HIV. However, 16% of the 1.1 million people infected with HIV do not know that they are infected (CDC, 2014). Risk factors for HIV, such as unprotected sex and sharing of needles, are equal among all racial/ethnic groups. However, minority groups (African Americans, Hispanics, Asian Americans, and American Indians) are more likely to contract HIV than their white counterparts. Although minority groups are more likely to contract HIV, HIV mostly affects African Americans. According to the CDC, African Americans accounted for an estimated 44% of all new HIV infections.

The black population in the United States is diverse. A growing black immigrant population has emerged in the United States. Immigration from sub-Saharan Africa and the Caribbean has contributed to at least one-fifth of growth in the U.S. black population over the past decade (Ojikutu et al., 2013). Importantly for U.S. public efforts related to HIV/AIDS, sub-Saharan Africa and the Caribbean have high HIV/AIDS infection and deaths rates (Avert, 2014). In sub-Saharan Africa, an estimated 22.9 million people are living with HIV (Avert, 2014). Research has shown that immigrants from higher-prevalence regions in Sub-Saharan Africa and the Caribbean tend to be diagnosed with more advanced HIV infection than native-born blacks (Ojikutu et al. 2014).

Testing can prevent the further spread of HIV by bringing awareness of infection to individuals, and early detection facilitates early treatment. Overall, 20% of undiagnosed individuals are responsible for up to 70% of new HIV infections each year in the United States (CDC, 2014). HIV/AIDS testing is very important in both U.S.-born and foreign-born black populations due to their high risk. According to Ojikutu et al. (2013), HIV testing and
prevention services for immigrant communities are often aggregated with information describing the experience of all “blacks” or “African Americans” without regard to ethnicity or country of origin. However, U.S.-born and foreign-born blacks are two unique populations with different behaviors. For example, while risk factors such as increased sexual behavior and drug use are reasons for HIV/AIDS testing; these risky behaviors play out, differently among African Americans and black immigrants, in ways that could lead to differences in HIV testing rates.

The purpose of this study is to answer the question: Do HIV/AIDS testing rates differ between U.S.-born blacks and foreign-born blacks? Previous research has not compared HIV/AIDS testing rates between U.S.-born and foreign-born blacks. Understanding differences in testing rates between U.S.-born and foreign-born blacks will inform (1) future policies to improve HIV/AIDS among both populations, and (2) health care treatment for the growing foreign-born black population.

The results of this study can be used to help in the development of effective treatment strategies for the increasing foreign-born black populations. Understanding testing rates in foreign-born black populations will help in the creation of HIV/AIDS treatments specifically targeted to foreign-born blacks. Also, health care providers can gain a better understanding of testing rates in these populations, especially in the black immigrant population; this will improve health education promotion for at-risk individuals. In addition to effective treatment and better understanding rates of both populations by physicians, policy makers can use the results of this study to create better policies to help health care better reflect health needs of these populations. This will lower the infection and death rates of HIV/AIDS in U.S. black population.
**Literature Review**

**Mistrust, Stigma, and HIV/AIDS**

Belief in HIV/AIDS conspiracy theories such as “HIV was created by the government” and “a cure for HIV exist but the government would not release it” are very popular among the African American community (Bogart et al., 2010; Bogart & Thorburn, 2005; Ross et al. 2006; Mays et al. 2012). Ross et al., (2003) examined beliefs about the origin of HIV as a genocidal conspiracy among four ethnic groups; African American, Latino, non-Hispanic White, and Asian in Houston, Texas. The findings of this study determined that the highest levels of conspiracy theories were in African American populations as well as Latino and women populations. Similar results were found in a study by Mays et al. (2012), which examined endorsement of HIV/AIDS conspiracy theories between African Americans and Latinos. Results from the Mays et al. (2012) study determined that African Americans agreed that a cure for HIV/AIDS existed but that the government would not import it.

Research has shown that HIV/AIDS conspiracy theories are associated with decreases in HIV treatment and HIV prevention measures in both African American and African communities (Bogart et al. 2010; Bogart & Thorburn, 2005; Ross et al. 2006; Mays et. al. 2012; Ford et.al 2006). When Bogart et al. (2010), examined HIV conspiracy beliefs as a potential barrier to HIV treatment adherence (taking antiretroviral medication), in African American men with HIV taking antiretroviral treatment. Results of the study showed that high levels of mistrust about HIV treatment and the government’s role in the HIV epidemic generate low adherence rates for Antiretroviral treatments.

HIV/AIDS prevention measures such as condom use and HIV/AIDS testing are affected by conspiracy theories. African Americans and black Africans have lower condom use if they
believe in conspiracy theories (Bogart & Thorburn, 2005; Gerbe and Natrass, 2012). Through the examination of endorsement of HIV conspiracy theories and condom use and attitudes among African Americans; Bogart & Thorburn (2005) found that respondents to a telephone survey endorsed HIV/AIDS conspiracy beliefs. However, stronger conspiracy beliefs were among black men and were associated with negative condom attitudes and inconsistent condom use. Gerbe and Natrass, (2012) found similar results in South Africa among black South Africans, the belief in HIV/AIDS conspiracy theories lowered the use of condoms among black men, but also among black women in South Africa.

Conspiracy theories have been associated with HIV/AIDS testing (Bogart et al. 2008; and Ford et al. 2006). In a study of black South Africans, Bogart et al. (2008) found that the association between genocidal beliefs and lack of HIV/AIDS testing was positive. In addition to the positive relationship between HIV/AIDS genocidal beliefs, genocidal HIV conspiracy theories in South Africa were found to be a barrier to HIV/AIDS testing. In the United States belief in conspiracy theories also effect HIV/AIDS testing (Ford et al. 2006). Ford et al. (2006), examined belief in AIDS related conspiracy theories and mistrust in the government among 226 older adults and how these beliefs influence HIV/AIDS testing. Ford et al. (2006) found that belief in conspiracy theories was positively associated with recent HIV/AIDS testing.

**HIV/AIDS Transmission:**

HIV/AIDS can be transmitted through sexual contact, injection drug use, pregnancy and child birth, occupational exposure, and blood transfusion/organ transplant (AIDS.gov). Sexual contact and drug use are the most common ways HIV/AIDS is spread (AIDS.gov).

*Sexual behavior*

HIV/AIDS patterns sexual transmission patterns vary among races. African Americans
are more likely to have been infected by HIV, through heterosexual contact than whites (Kaiser Family Foundation, 2013). For example, among women black women are more likely to have been infected through heterosexual transmission while white women are more likely to have been infected by injection drug use (Kaiser Family Foundation, 2013).

Both U.S.- born and foreign-born blacks are more likely to transmit HIV/AIDS through sexual contact, however sexual behavior among U.S.-born blacks and foreign-born blacks differ. When compared to U.S.-born blacks, foreign-born blacks engage in risky sexual behavior such as, not forgoing sexual activity when a condom is unavailable and having more than one sexual partner (Hoffman et al. 2008). When Hoffman et al. (2008), examined data from a baseline assessment of a clinic-based intervention; to increase partner STI notification for black West Indian immigrants and U.S.-born blacks. The results of the study showed that West Indian men and women were less likely than U.S.-born black men and women to report 1-time partners. In addition, U.S.-born black men were more likely than West Indian men to report that they had decided to forgo sexual intercourse, because a condom was not available. Multiple partners and reduced condom use are risky sexual behaviors the greatly influence HIV/AIDS transmission.

Although foreign-born blacks engage in risky sexual behavior, U.S.-born blacks are more likely to participate in sexual acts that increase the likelihood of contracting HIV/AIDS, for example male to male sexual relationships and anal sex (Hoffman et al., 2008; Tsega et al., 2012; Lauerncin et al., 2009; Johnson et al., 2009). Laurencin et al. (2009), examined the 2001–2005 Morbidity and Mortality Weekly Report (MMWR) CDC data. The results of this study showed that in the African American community male to male-sexual contact is the primary risk factor for HIV/AIDS among African Americans.
Johnson et al. (2009), found similar results from analyzing data from 2001-2007 on adults and adolescents diagnosed with HIV infection reported to the CDC. Johnson et al. (2009) found that the primary mode of HIV infection for native-born blacks (U.S.-born) is male-to-male contact while the primary mode of transmission for foreign-born blacks is heterosexual contact.

Male ideologies have been shown to be associated with sexual behaviors that increased HIV/AIDS risk among African Americans (Bowleg et al., 2011). Bowleg et al. (2011) interviewed black heterosexual men in Philadelphia on ideologies of masculinity. Study participants identified two main ideologies of masculinity: (1) having multiple sexual partners (2) black men cannot be gay or bisexual. Consequently, multiple partners increases the risk of HIV/AIDS transmission and the ideology of an African American man not being gay or bisexual, can increase the amount of men who maybe hiding their sexuality or living a double life, which can increase the transmission of HIV/AIDS.

Accordingly, research has shown that U.S.-born and foreign-born blacks both participate in sexual behaviors that increase the chances of HIV/AIDS. However, the type of sexual behaviors differs between U.S.-born and foreign-born blacks.

*Drug behavior*

Drug use is the second leading cause of HIV/AIDS among African Americans (Laurencin et. al 2009, Johnson et al. 2002). Compared to whites injection drug use is more frequently the source of AIDS among Blacks (CDC,2003). In fact, injection drug use accounted for 9% of cumulative AIDS cases in whites men in 2003 and 32% of such cases in African American men (Blankenship et al. 2006).

African Americans have higher rates of transmission that are associated with injection
drug use than foreign born blacks. Johnson et al. (2002) found that injection drug use-associated transmission is almost three times lower among foreign-born blacks than among U.S.-born blacks (7% vs. 19%). In the examination of interviews and medical records from a New York City HIV partner services program, Tesega et al. (2012) found that black Africans and Caribbeans are less likely to report an injection drug history than African Americans.

**Barriers to HIV/AIDS testing among U.S.-born and foreign-born blacks**

Some barriers to HIV/AIDS testing exist in both U.S.-born and foreign-born black populations. For instance, HIV/AIDS community stigma, inadequate access to health care, concerns about confidentiality, lack of knowledge, lack of insurance, and financial insecurity are barriers to testing in both U.S.-born and foreign-born black populations (Rosenthal et al., 2003; Ojikutu et al., 2013; Doshi et al., 2012; Foley, 2012; and Nunn et al., 2012).

Foreign-born blacks have additional barriers that differ from U.S.-born blacks. Foreign-born blacks report difficulty finding translators for medical appointments and often having to rely on children, friends, or relatives to translate for them; fear of positive test results, leading to deportation or other immigration complications, and medical personal being ignorant of and unconcerned about the opinions of non-U.S.-born blacks (Foley, 2012; Ojikutu et al., 2013). When Foley (2012) examined interviews of HIV-inflected African immigrants in Philadelphia, results showed that cultural barriers affect HIV testing. For example, black African men in the Foley study (2012) did not seek testing because of denial that HIV is prevalent in their home country. They also held cultural beliefs, such as the associations among HIV, sex, promiscuity, death, and HIV being both a moral and physical problem that affects the whole family. Black African men believe that HIV does not only effect the individual but it also effects the family and brings shame to the family. This leads to little discussion about HIV/AIDS or effort to get
tested for HIV/AIDS. Rosenthal et al. (2003) found similar findings in their examination of HIV/AIDS health services for Africans in Houston, Texas. The results of the study found that 79.5% of the sample believed that they had low-perceived risk for contacting HIV.

The lack of studies comparing on HIV/AIDS testing in the U.S.-born and foreign-born black populations and the narrow interpretation of the foreign-born black population are gaps in this research area.
The ecological model is a conceptual framework created by Urie Bronfenbrenner, which was designed to draw attention to individual and environmental determinants of behavior (McLaren and Hawe, 2005). According to Harper et al. (2013), Bronfenbrenner’s ecological theory assets that human development occurs at different levels of social interaction with multiple environmental systems. The development process is bidirectional and occur between individuals and their environments with the interconnectedness of each system and their consequent interaction with the individuals (Harper et al., 2013). The Ecological model is used in this study because HIV preventive measures such as HIV/AIDS testing can be influenced by environmental factors, an individuals environment can determine actions an individual will or will not take. The ecological model will demonstrate the intrapersonal, interpersonal, community and demographic, and structural factors that effect HIV/AIDS testing. In the model each ring (individual, relationship, community, and societal factors) represents a level of influence on HIV/AIDS testing.

**Intrapersonal Factors**

The interpersonal ring the first outermost ring in the ecological model. Interpersonal is defined as characteristics or behaviors of an individual that can have an effect on HIV/AIDS testing. This ring consists of sexual transmitted infections, condom usage, and substance abuse, which can all affect the likelihood of HIV/AIDS testing.

*Sexual transmitted diseases (STD):*

Sexual transmitted Infections (STI) or Sexual transmitted diseases (STD) such as herpes, chlamydia, and gonorrhea can effect HIV/AIDS testing. According to the CDC, individuals who are infected with STDs are at least two to five times more likely than uninfected individuals to acquire HIV infection if they are exposed to the virus through sexual contact (CDC, 2014). The
increase risk of getting HIV due to contraction of an STD can increase the likelihood of an individual testing for HIV. Foreign-born individuals who have been diagnosed with an STD are associated with increased likelihood to prior HIV testing (Schulden et al. 2014). In addition an individual who has had an experience with a treatable STDs such as Chlamydia and Gonorrhea, may be more cautious and take preventive measures such as HIV/AIDS testing.

**Condom Usage:**

Sexual behavior such as lack of condom usage can increase HIV/AIDS risk, which can determine an individual’s decision to get tested for HIV/AIDS.

**Injection drug use:**

Injection drug use and needle sharing are risk factors for HIV/AIDS. Participation in these actions can increase the risk for HIV/AIDS and influence HIV/AIDS testing. For example, in sub-Saharan Africa injection drug users have low HIV testing uptake (Asher et al., 2013).

**English Proficiency:**

English Proficiency is a barrier to HIV/AIDS testing for foreign-born blacks. For foreign-born blacks who are not proficient in English, English will be a barrier to HIV/AIDS testing and influence the uptake of HIV/AIDS testing. Difficulty understanding English could increase the possibility of miscommunication or unawareness of HIV/AIDS testing sites. Studies have shown that foreign born blacks have difficulties finding translators for doctor appointments (Foley, 2005; Okafor et al., 2003). The lack of translators for doctor appointments can determine if a foreign-born black attends doctor appointments or not, which can influence HIV/AIDS testing.

**Sexual Orientation:**
Barriers to HIV/AIDS testing such as HIV/AIDS community stigma, inadequate access to health care, and concerns about confidentiality are barriers among all sexual orientations. However, gay men specifically black gay men, for example are more likely to face testing barriers such as racism, homophobia and HIV related stigma from churches and family members within the black community as well as friends in the black gay community (Arnold et al. 2014). In addition, men who have sex with men are more likely to be afraid than those in lower risk groups such as heterosexuals to get tested for HIV/AIDS (Schwarcz et al. 2011).

**Intrapersonal/network**

Interpersonal is the 2nd outermost shell, Interpersonal is defined formal and informal relationships that can effect HIV/AIDS testing. This shell consists of marital status and number of sexual partners.

*Marital status:*

Marital status (being single, divorced, or widowed) is a significant predictor of HIV testing among all racial and ethnic groups (Rountree et al., 2009). Marital status can influence HIV/AIDS testing. For example, unmarried African Americans are more likely to have been tested for HIV (Rountree et al., 2009).

*Number of sexual partners:*

According to the CDC, the more partners you have, the more likely you are to have a sex partner with a sexually transmitted disease, which can increase the risk of HIV transmission (CDC, 2014). Multiple sexual partners is a risk factor for HIV/AIDS. Since the risk is higher for individuals who have multiple sex partners, it is assumed that these individuals would get tested often.

**Community and demographics**
The third outermost ring is community and demographics. Community and demographic factors are the beliefs of a group of people (community) and identifiers of an individual that can effect HIV/AIDS testing. This shell consists of race/ethnicity, socioeconomic status, culture, stigma and nativity status.

**Sexual Orientation:**

Barriers to HIV/AIDS testing such as HIV/AIDS community stigma, inadequate access to health care, and concerns about confidentiality are barriers among all sexual orientations. However, gay men specifically black gay men, for example are more likely to face testing barriers such as racism, homophobia and HIV related stigma from churches and family members within the black community as well as friends in the black gay community (Arnold et al. 2014). In addition, men who have sex with men are more likely to be afraid than those in lower risk groups such as heterosexuals to get tested for HIV/AIDS (Schwarcz et al. 2011)

**Race/Ethnicity and Nativity status:**

In this study, we focus specifically on Blacks living in the United States. African Americans have the highest HIV infection rates in the United States, however they are least likely to have been tested for HIV among racial groups (Onyeabor et. al 2013, Araya et. al 2010). In a research study of a sample of blacks in Massachusetts, non–U.S.-born blacks were less likely to be recently tested for HIV infection and the length of time since initial immigration was a predictor of not having had a recent HIV test (Ojikutu et al. 2014). U.S. born blacks and foreign-born blacks are two unique U.S. populations that are often seen as one. Nativity is an important characteristic that differentiates these two populations, especially in determining health outcomes and disease risk.

**Socio-economic status:**
Socio-economic status, which includes education, income and insurance, can effect HIV/AIDS testing. Research has shown that lower-status (low education and low income) individuals express equal or greater intentions to obtain HIV testing, but are less likely to act on their intentions (McGarry et al. 2014). Health insurance has been shown to be a barrier to HIV/AIDS testing. For example, many African immigrants assume that one cannot get treatment without insurance, which most do not have, so there is little motivation to be tested (Foley, 2005)

Societal
The fourth outermost ring is societal. This shell consists of stigma.

Stigma:

The thoughts or the opinions of others can determine the likelihood of testing. HIV/AIDS Stigma is associated with delays in HIV testing by individuals who are at high risk for HIV infection (Chesney and Smith, 1999). Sigma surrounding an HIV positive status has been shown to be a reason for not seeking testing (Chesney and Smith, 1999). In addition, research has shown that perceived stigma against people living with HIV within African communities, is described as manifesting through communal fear, avoidance of persons with HIV (Blanas et al. 2013).

The theoretical framework of this study demonstrates how social interactions and environmental systems can influence HIV/AIDS testing among U.S.-born and foreign-born blacks. Based on this theoretical framework and previous research, the conceptual model of this study will examine the association of nativity on HIV/AIDS testing as well as the effect of the intrapersonal factors specifically drug behavior (Injection drug use) and sexual behavior (condom usage) or moderating variables on the direct effect of nativity on HIV/AIDS testing.
Studies have shown that differences in sexual and drug behaviors among U.S.-born and foreign-born blacks exist; these differences can affect testing rates among the groups. As demonstrated in the theoretical framework the interpersonal and community and demographic factors that effect HIV/AIDS testing among U.S.-born and foreign-born blacks will be examined as control variables. These factors include, English proficiency, and SES (income and education), sexual orientation, marital status, number of sexual partners, and STDs (Chlamydia and Gonorrhea).
Nativity
U.S.-born blacks
Foreign-born blacks

Drug behavior
(Injection drug use)
and/or
Sexual behavior (Condom usage)

HIV/AIDS Testing rates

SES
English proficiency
Age
Sex
Sexual orientation
Marital status
Number of sexual partners
STDs
(Control)
**Conceptual Model**

U.S.-born blacks and foreign-born blacks are two unique U.S. populations that are often seen as one. Nativity is an important characteristic that differentiates these two populations, especially in determining health outcomes and disease risk. The conceptual model of this study (figure 2) suggests that nativity among blacks in the United States has a direct effect on HIV/AIDS testing rates. However, previous literature has shown that there is a difference in HIV/AIDS risk behavior (sexual and drug behavior) among U.S.-born and foreign-born blacks. Therefore, the relationship between nativity and HIV/AIDS testing rates could be affected by the sexual and drug behaviors of the individual black populations. The direct effect of nativity on HIV/AIDS testing and the possible effect of sexual and drug behavior or moderating variables on the relationship between nativity and HIV/AIDS testing rates will be examined in this study.

Sexual behavior, such as having sex without a condom, can increase the risk of HIV/AIDS. Individuals who participate in risky sexual behavior should undergo increased HIV/AIDS testing rates compared to those who do not participate in risky sexual behavior. Differences in sexual behavior among U.S.-born and foreign-born blacks can result in different HIV/AIDS risk, which can affect HIV/AIDS testing rates among the populations. U.S.-born blacks are more likely than foreign-born blacks to use condoms, as well as forgo sexual intercourse because a condom was not available, and U.S.-born black men are more likely to engage in homosexual activity (Hoffman et al. 2008). Drug-use behaviors also differ between U.S.-born and foreign-born blacks. Since HIV can be transmitted through blood, drug behavior such as sharing of needles can increase chances of using unsterilized needles, which can

Migrant issues such as English as a second language, for foreign-born blacks has been shown to influence the uptake of HIV/AIDS testing as well as increase the likelihood of health messages becoming lost or distorted in translation (Burns et al., 2007). Foreign-born blacks report difficulties finding translators for medical appointments; English proficiency is related to higher odds of predicting low self-reported health among immigrants (Foley, 2005; Okafor et al., 2003). Foreign-born blacks that are more proficient in English are more likely to seek health services, such as HIV/AIDS testing. English proficiency will be controlled in this study.

Socioeconomic Status (SES), which includes education and income, will be controlled in this study. Studies have shown that inadequate access to health care, lack of knowledge, lack of insurance, and financial insecurity are barriers to testing in both U.S.-born and foreign-born blacks populations (Rosenthal et al., 2003; Ojikutu et al., 2013; Doshi et al., 2013; Foley, 2005; Nunn et al., 2012;).

Sexual orientation has shown to be a barrier to HIV/AIDS testing, specifically for black men who have sex with men. Experiences of racism and homophobia during visits to health care facilities and stigma and discrimination in the general community have been shown to be barriers to HIV/AIDS testing for men who have sex with men. (Levey et al., 2010; Bowleg et al., 2012).

Having multiple sex partners can increase the risk of HIV/AIDS. Individuals, who have multiple sex partners should engage in frequent HIV/AIDS testing. Foreign-born blacks are more likely than U.S.-born blacks to have more than one sexual partner (Hoffman et al. 2008).
It is expected that individuals who have or have had a sexual transmitted disease will be more likely to get tested for HIV due to the previous exposure of a STD or STI. Exposure to STDs specifically Chlamydia and Gonorrhea increases the probability of HIV infection, STDs also increases the awareness of HIV/AIDS and the importance of testing. Previous exposure to STDs has shown to increase the likelihood of previous HIV/AIDS testing (Schulden et al. 2014).

Premarital HIV/AIDS testing has been shown to be a prevention strategy for the transmission of HIV/AIDS testing among couples. Studies have shown that premarital HIV/AIDS testing is encouraged in African countries such as Uganda and Ghana (Turyagyenda et al. 1998; Luginaah et al. 2005). According to (Turyagyenda et al. 1998) parents and clergy are supportive of premarital HIV/AIDS testing and insist that couples get tested for HIV/AIDS. In addition studies have shown that unmarried African Americans are less likely to be tested for HIV/AIDS (Rountree et al., 2009).

Therefore, in this study of the association between nativity and HIV/AIDS testing rates in the U.S. black population, English proficiency, and SES (income and education), sexual orientation, marital status, number of sexual partners, and STDs (Chlamydia and Gonorrhea) are confounding variables and will need to be controlled, because certain characteristics are more prevalent in one group than the other. Age will also be controlled in this study.

Based on this conceptual model and previous research, this study will examine the following hypotheses:

1. U.S.-born blacks will have higher HIV/AIDS testing rates than foreign-born blacks
2. Sexual behavior and drug behavior will moderate the relationship between nativity and HIV/AIDS testing.
Methodology

Data

This study uses the National Health and Nutrition Examination Survey (NHANES) to examine the effect of nativity on HIV/AIDS testing rates. NHANES is an annual, nationally representative, repeated cross-section health examination survey. The survey combines household interviews and physical examinations conducted by the National Center for Health Statistics, a department of the Centers for Disease Control and Prevention (CDC). NHANES is designed to assess the health and nutritional status of adults and children in the United States; each NHANES participant represents approximately 50,000 other U.S. residents. The NHANES interview questions gather demographic, socioeconomic, dietary, and health-related information, and the examination component includes medical, dental, physiological measurements, and laboratory tests. The survey contains data on chronic diseases and risk factors for chronic diseases, such as personal lifestyles, heredity, and environment. For the purposes of this study multiple surveys were used. This study uses data from the 2001-2012 NHANES datasets, however the focus is on individuals who self-report their race and black and who are 18 and older.

Sample

The NHANES sampling design is a multistage design that over-samples those 60 and older, as well as African Americans and Hispanics. The oversampling of 60 and older, African Americans, and Hispanics ensures reliable and precise health status indicators for these populations that tend to be under-represented. The NHANES sampling procedure consist of four stages. Detailed explanations of the 4 stages of the sampling procedure can be found on the NHANES website (http://www.cdc.gov/nchs/tutorials/nhanes/surveydesign/SampleDesign/intro.htm).
The sample used in this study will be defined as non-hispanic blacks, which will be divided into non-foreign born and foreign-born blacks. This study focuses on black Americans, therefore individuals who do not identify, as black in the survey will not be included in the sample. The sample will include both male and female and the age range of the sample will be 18 and older. The sample will include black individuals who are 18 and older because individuals in this age range are considered adults.

The sample for this study was drawn from the 2001-2012 NHANES datasets. The datasets were merged in Stata and the sample size of this data was 62,951. Since this study focuses on the blacks, a sub-sample of blacks was taken from the total sample. This sub-sample included 14,904 blacks. 13,987 individuals out of 14,904 blacks in the sub-sample are U.S.-born blacks and 1,531 individuals out of 14,904 blacks in the sub-sample are foreign born blacks. However, this study specifically looks at U.S.-born blacks and foreign-born blacks who are 18 years and older. Therefore the final sample of this study is 7,763. 7,038 blacks out of 7,763 are U.S.-born blacks and 725 blacks out of 7,763 blacks are foreign-born blacks.

**Measures**

**Dependent variable**

The outcome variable of interest for this study is HIV/AIDS testing rates; this outcome variable will be measured using the question:

- “Except for tests you may have had as part of blood donations, have you ever had your blood tested for the AIDS virus infection?”
- The answers given for this question were: Yes, No, Refused, and Don’t know
This question will allow the distinction between individuals within the two populations who have been tested for HIV/AIDS and those you have never been tested for HIV/AIDS.

Independent variable

The main effect of interest in this study is the association of nativity among blacks in the United States on HIV/AIDS testing. The independent variable of this study is nativity. A variable for nativity will be created to indicate whether an individual was born in the United States or was born outside of the United States. This variable will be created using the NHANES survey question

- “In what country were you born?”

This new variable will allow the non-Hispanic black population to be divided into two groups (U.S.-born and foreign-born). In addition to the dependent and main independent variable of interest, other independent variables such as sexual behavior and drug behavior will be examined.

Other variables of interest

Sexual behavior will be measured by a variable created to indicate whether an individual has ever had sex without a condom. This variable will be created using the NHANES survey questions:

- In “In the past 12 months, about how often have you had (vaginal or anal) sex without using a condom?”
- “In the past 30 days, how many times have you had sex without using a condom?”

This variable will determine the condom usage among U.S.-born and foreign-born blacks.
Drug behavior will be measured by a variable created to indicate if an individual has ever injected drugs not prescribed by a doctor. This variable will be created using the NHANES survey questions:

- “Have you ever used a needle to take street drugs?”
- “Have you ever use a needle to inject illegal drugs?”

This variable will determine injection drug use among U.S.-born and foreign-born blacks.

Analysis

This study utilizes secondary data or existing data, therefore data management and data analysis were performed using STATA version 12 (StataCorp LP., College Station, Texas).

Descriptive statistics include means and percentages of the independent variable, dependent variable, confounding variables, and control variables as described in table 1. The averages and percentages of these variables will be compared between the U.S.-born and foreign-born blacks.

Bivariate analysis will be used to test the hypotheses of this study. Mean differences will be examined between U.S.-born and foreign-born blacks using a t-test and a chi-square test. These tests will determine the significance of the hypotheses and whether HIV/AIDS testing rates differ or are the same among U.S.-born and foreign-born blacks. Each hypothesis will be tested by levels to compare the mean differences of the outcome (HIV/AIDS testing rates).

- Null hypothesis: $H_0: Y_{G1}=Y_{G2}$
- Alternative hypothesis: $H_a: Y_{G1} \neq Y_{G2}$
- Hypothesis 1: $b_1=0$
Hypothesis 2: $b_2=0$

Figure 3: Regression

<table>
<thead>
<tr>
<th>Regression model with Moderators</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\text{HIV/AIDS testing}_i = b_0 + b_1 \text{nativity}_i + b_2 \text{sexual behavior}_i + b_3 \text{drug behavior}_i + b_4 \text{control variables}_i + b_5 \text{nativity}_i * \text{sexual behavior}_i + b_6 \text{nativity}_i * \text{drug behavior}_i + e_i$</td>
</tr>
<tr>
<td><strong>control variables (age, sex, income, education, Marital status, sexual orientation, STDs, number of sexual partners, and English proficiency)</strong></td>
</tr>
</tbody>
</table>

Reduced form equation:

$\text{HIV/AIDS testing}_i = b_0 + b_1 \text{nativity}_i + b_2 \text{control variables}_i + e_i$

Hypothesis 1: $b_1=0$

Hypothesis 2: $b_2=0$

Logistic regression models will be used in this study to test whether a nativity difference exists among blacks in United States in regard to HIV/AIDS testing rates, holding constant age, income, education, and sex. The regression model (displayed in Figure 3) will allow for the quantification of the relationship between the independent (nativity) and dependent variable (HIV/AIDS testing rate). The regression model will also test the hypothesis concerning the nature of the relationship between the independent and dependent variables. By using the regression model, the total effect of nativity on HIV/AIDS testing will be examined. The model will include the moderating variables of drug behavior, sexual behavior, as well as control variables age, sex, income, education, and English Proficiency. The results of the logistic regression model will be displayed in Table 2.
## Results

Table 1: Sample characteristics of U.S.-born and Foreign-born blacks 18 years old and older (National Health and Nutrition Examination Survey, 2001-2012)

<table>
<thead>
<tr>
<th>Variable</th>
<th>U.S.-Born Black (n=7,038)</th>
<th>Foreign-Born Black (n= 725)</th>
<th>P-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Demographic Characteristics</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Sex</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male **</td>
<td>3,377 (48.0%)</td>
<td>378 (52.1%)</td>
<td>0.0330</td>
</tr>
<tr>
<td>Female **</td>
<td>3,661 (52.0%)</td>
<td>347 (47.9%)</td>
<td>0.0330</td>
</tr>
<tr>
<td><strong>Age</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18- 25 ***</td>
<td>1,570 (22.3%)</td>
<td>119 (16.4%)</td>
<td>0.0002</td>
</tr>
<tr>
<td>26-32</td>
<td>729 (10.4%)</td>
<td>83 (11.5%)</td>
<td>0.3611</td>
</tr>
<tr>
<td>33-39 ***</td>
<td>652 (9.3%)</td>
<td>100 (13.8%)</td>
<td>0.0001</td>
</tr>
<tr>
<td>40-49 ***</td>
<td>1,091 (15.5%)</td>
<td>153 (21.1%)</td>
<td>0.001</td>
</tr>
<tr>
<td>50+ ***</td>
<td>2,996 (42.6 %)</td>
<td>270 (37.2 %)</td>
<td>0.0057</td>
</tr>
<tr>
<td><strong>Education Status</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Less than 9th grade **</td>
<td>408 (5.8%)</td>
<td>59 (8.2%)</td>
<td>0.0113</td>
</tr>
<tr>
<td>Some High School ***</td>
<td>1,800 (25.6%)</td>
<td>123 (17%)</td>
<td>0.0000</td>
</tr>
<tr>
<td>High School grad/ Some college ***</td>
<td>3,968 (56.5%)</td>
<td>359 (49.7%)</td>
<td>0.0004</td>
</tr>
<tr>
<td>College/Grad School ***</td>
<td>852 (12.12%)</td>
<td>182 (25.2%)</td>
<td>0.0000</td>
</tr>
<tr>
<td>Missing: U.S. Born- 10</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Foreign Born- 2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Marital status</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Married ***</td>
<td>2,206(32.46%)</td>
<td>338(47.34%)</td>
<td>0.0000</td>
</tr>
<tr>
<td>Widowed **</td>
<td>653 (9.61%)</td>
<td>38 (5.32%)</td>
<td>0.0002</td>
</tr>
<tr>
<td>Divorced/separated</td>
<td>1,128(16.60%)</td>
<td>106(14.85%)</td>
<td>0.2301</td>
</tr>
<tr>
<td>Never married/ living with partner ***</td>
<td>2,810(41.34%)</td>
<td>232(32.49%)</td>
<td>0.0000</td>
</tr>
<tr>
<td>Income (Family poverty income ratio)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-------------------------------------</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Less than 1.0 **</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.0-1.9</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.0-2.9 **</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.0-3.9</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.0-4.9</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Missing</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>U.S. Born- 2,120</th>
</tr>
</thead>
<tbody>
<tr>
<td>Foreign Born- 204</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>English proficiency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Do you speak English at home?</td>
</tr>
<tr>
<td>Yes</td>
</tr>
<tr>
<td>No</td>
</tr>
<tr>
<td>Missing</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>U.S. Born-5,650</th>
</tr>
</thead>
<tbody>
<tr>
<td>Foreign Born- 550</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Sexual orientation for females</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heterosexual</td>
</tr>
<tr>
<td>Homosexual</td>
</tr>
<tr>
<td>Other (Bisexual and something else)</td>
</tr>
<tr>
<td>Missing</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>U.S. Born- 5,135</th>
</tr>
</thead>
<tbody>
<tr>
<td>Foreign Born- 561</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Sexual orientation for males</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heterosexual</td>
</tr>
<tr>
<td>Homosexual</td>
</tr>
<tr>
<td>Other (Bi-Sexual Something Else)</td>
</tr>
<tr>
<td>Missing</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>U.S. Born- 5,283</th>
</tr>
</thead>
<tbody>
<tr>
<td>Foreign Born- 515</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Sexual behavior</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>U.S. Born- 2,120</th>
</tr>
</thead>
</table>

28
<table>
<thead>
<tr>
<th>Have you ever had sex without a condom?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes***</td>
</tr>
<tr>
<td>No***</td>
</tr>
<tr>
<td>Missing</td>
</tr>
<tr>
<td>U.S. Born- 4,832</td>
</tr>
<tr>
<td>Foreign Born- 498</td>
</tr>
<tr>
<td>1,605 (72.8%)</td>
</tr>
<tr>
<td>601 (27.2%)</td>
</tr>
<tr>
<td>145(63.9%)</td>
</tr>
<tr>
<td>82 (36.1%)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Number of male sexual partners</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
</tr>
<tr>
<td>1-10</td>
</tr>
<tr>
<td>10+</td>
</tr>
<tr>
<td>Missing</td>
</tr>
<tr>
<td>U.S. Born- 5,768</td>
</tr>
<tr>
<td>Foreign Born- 601</td>
</tr>
<tr>
<td>323 (17.29%)</td>
</tr>
<tr>
<td>1,534 (82.12%)</td>
</tr>
<tr>
<td>11 (0.54)</td>
</tr>
<tr>
<td>38 (23.03%)</td>
</tr>
<tr>
<td>127 (76.97%)</td>
</tr>
<tr>
<td>0 (0%)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Number of female sexual partners</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
</tr>
<tr>
<td>1-10</td>
</tr>
<tr>
<td>10+</td>
</tr>
<tr>
<td>Missing</td>
</tr>
<tr>
<td>U.S. Born- 5,384</td>
</tr>
<tr>
<td>Foreign Born- 531</td>
</tr>
<tr>
<td>203 (12.27%)</td>
</tr>
<tr>
<td>1,390 (84.0%)</td>
</tr>
<tr>
<td>61 (3.69%)</td>
</tr>
<tr>
<td>24 (12.4%)</td>
</tr>
<tr>
<td>166(85.6%)</td>
</tr>
<tr>
<td>4 (2.06%)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Have you ever been told you have Chlamydia?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
</tr>
<tr>
<td>No</td>
</tr>
<tr>
<td>Missing</td>
</tr>
<tr>
<td>U.S. Born- 3,538</td>
</tr>
<tr>
<td>Foreign Born- 374</td>
</tr>
<tr>
<td>94 (2.7%)</td>
</tr>
<tr>
<td>3,406 (97.3%)</td>
</tr>
<tr>
<td>4 (1.1%)</td>
</tr>
<tr>
<td>347(98.9%)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Have you ever been told you have Gonorrhea?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
</tr>
<tr>
<td>No</td>
</tr>
<tr>
<td>Missing</td>
</tr>
<tr>
<td>U.S. Born- 3,539</td>
</tr>
<tr>
<td>Foreign Born- 374</td>
</tr>
<tr>
<td>55 (1.6%)</td>
</tr>
<tr>
<td>3,444 (98.4%)</td>
</tr>
<tr>
<td>2 (0.6%)</td>
</tr>
<tr>
<td>349(99.4%)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Drug Behavior</th>
</tr>
</thead>
<tbody>
<tr>
<td>Have you ever injected drugs?</td>
</tr>
<tr>
<td>Yes</td>
</tr>
<tr>
<td>No</td>
</tr>
<tr>
<td>Missing</td>
</tr>
<tr>
<td>90 (2.6%)</td>
</tr>
<tr>
<td>3,351 (97.4%)</td>
</tr>
<tr>
<td>4 (1.2%)</td>
</tr>
<tr>
<td>345(98.9%)</td>
</tr>
<tr>
<td>0.0926</td>
</tr>
<tr>
<td>0.0926</td>
</tr>
</tbody>
</table>
Table one displays the sample characteristics among U.S.-born blacks and foreign-born blacks. Significant differences were found in some variables, which show that differences exist among U.S.-born and foreign-born blacks in regards to HIV/AIDS risk and HIV/AIDS testing profiles. As seen in Table one compared to U.S. born blacks, foreign-born black respondents were more likely to be male (52.1% vs. 48.0% p-value < 0.05), to be married (47.34% vs. 32.46% p-value < 0.01), to have gone to college or grad school (25.2% vs. 12.1%, p-value <0.01), and have a poverty ratio index between 2.0-2.9 (23.42% vs. 20.64%, p-value < 0.05 ). However, U.S.-born blacks respondents were more likely to be to be female (52.0% vs. 47.9%, p-value <0.01), over 50 (42.6% vs. 37.2, p-value <0.01), never married/ living with partner (41.34% vs. 32.49, p-value <0.01), and have a family poverty income ratio less than 1.0 (3.5% vs. 2.69%, p-value < 0.05). Differences in sexual behavior exist as well also among U.S.-born and foreign-born blacks. In regards, to sexual behavior among U.S.-born and foreign-born blacks; U.S.-born blacks are more likely to have sex with a condom than foreign-born blacks (72.8% vs. 63.9% p-value <0.01). These results are similar to previous studies that have analyzed condom usage among U.S.-born and foreign-born blacks (Hoffman, 2008). STI’s are low among both U.S. -
born and foreign-born blacks. In regards to HIV/AIDS testing, foreign-born blacks were more likely (52.2% vs. 45.8%) to be tested for HIV/AIDS than U.S. born blacks; however the results were not significant.

**Logistic Regression Results**

Table 2: Logistic Regression Model of HIV/AIDS Testing and Nativity (N=1,531)

<table>
<thead>
<tr>
<th>Variables</th>
<th>Odds Ratio (95% confidence interval)</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Nativity</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Foreign born blacks</td>
<td>.770 (.430 1.37)</td>
<td>0.381</td>
</tr>
<tr>
<td>U.S. born blacks (reference)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Sexual Behavior</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sex without a condom</td>
<td>1.02 (.786 1.33)</td>
<td>0.865</td>
</tr>
<tr>
<td>Sex with a condom (reference)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Drug Behavior</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>inject drugs</td>
<td>7.18 (1.60 32.2)</td>
<td>0.010*</td>
</tr>
<tr>
<td>Do not inject drugs (reference)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Chlamydia</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Have been told by the doctor that you have chlamydia</td>
<td>4.74 (1.02 1.59)</td>
<td>0.005 *</td>
</tr>
<tr>
<td>Have been told by the doctor that you do not have chlamydia (reference)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Gonorrhea</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Have Gonorrhea</td>
<td>.840 (.292 2.41)</td>
<td>0.747</td>
</tr>
<tr>
<td>Do not have Gonorrhea (reference)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Gender</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>1.27 (1.02 1.59)</td>
<td>0.029</td>
</tr>
<tr>
<td>Male (reference)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Income</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Less than 1.0 (reference)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.0-1.9</td>
<td>1.15 (.607 2.18)</td>
<td>0.665</td>
</tr>
<tr>
<td>2.0-2.9</td>
<td>1.16 (.601 2.24)</td>
<td>0.655</td>
</tr>
<tr>
<td>3.0-3.9</td>
<td>1.23 (.630 2.41)</td>
<td>0.539</td>
</tr>
<tr>
<td>4.0-4.9</td>
<td>1.12 (.560 2.27)</td>
<td>0.734</td>
</tr>
<tr>
<td>Variable</td>
<td>1.20 ( .611   2.37)</td>
<td>0.591</td>
</tr>
<tr>
<td>----------</td>
<td>---------------------</td>
<td>-------</td>
</tr>
<tr>
<td><strong>Marriage status</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Married (reference)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Widowed</td>
<td>2.41 (.737   7.89)</td>
<td>0.145</td>
</tr>
<tr>
<td>Divorced/separated</td>
<td>1.30 (.928   1.84)</td>
<td>0.124</td>
</tr>
<tr>
<td>Never married/ living with partner</td>
<td>1.20 (.915   1.58)</td>
<td>0.183</td>
</tr>
<tr>
<td><strong>Education</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Less than 9th grade (reference)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Some High School</td>
<td>.111 (.013   .939)</td>
<td>0.044*</td>
</tr>
<tr>
<td>High School grad/ Some college</td>
<td>.142 (.017   1.18)</td>
<td>0.071</td>
</tr>
<tr>
<td>College/Grad School</td>
<td>.167 (.019   1.40)</td>
<td>0.099</td>
</tr>
<tr>
<td><strong>Age</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18-25 (reference)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>26-32</td>
<td>1.60 ( 1.09   2.37)</td>
<td>0.016 *</td>
</tr>
<tr>
<td>33-39</td>
<td>2.05 ( 1.34   3.13)</td>
<td>0.001**</td>
</tr>
<tr>
<td>40-49</td>
<td>1.12 ( .771   1.63)</td>
<td>0.542</td>
</tr>
<tr>
<td>50+</td>
<td>.565 (.373   .855)</td>
<td>0.007</td>
</tr>
<tr>
<td><strong>Interaction 1</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nativity and Sexual behavior</td>
<td>1.25 (.608   2.55)</td>
<td>0.546</td>
</tr>
</tbody>
</table>

*p-value < 0.05
** p-value <0.01

Table two displays the results from the logistic regression model. The results demonstrates that the odds of female respondents being tested for HIV/AIDS increases by .3% (OR:1.3 [95% CI: 1.02 - 1.59]) compared to male respondents, the odds of respondents who have had some high school education being tested for HIV/AIDS decreases by 89%. (OR: .11 [95% CI:013 - .939]) compared to respondents who have had less than a 9th grade education.

The results of the logistic regression also showed that the odds of respondents who use
drugs being tested for HIV/AIDS increases by 6.2% (OR: 7.2 [95% CI: 1.60 - 32.2]) compared to those who do not have chlamydia. The odds of respondents who have chlamydia being tested for HIV/AIDS increases by 3.7% (OR: 4.7 [95% CI: 1.02 - 1.59]) compared to those who do not have chlamydia.

The odds of respondents between the ages of 26 to 32 being tested for HIV/AIDS increases by 0.6% (OR: 1.6 [95% CI: 1.09 - 2.37]) and the odds of respondents between the ages of 33-39 being tested for HIV/AIDS increases by 1.1% (OR: 2.1 [95% CI: 1.34 - 3.13]) compared to respondents being tested for HIV than respondents who are between the ages of 18-25. All of the variables mentioned above were also statistically significant. The results of the regression also showed that sexual behavior does not moderate the relationship between nativity and HIV/AIDS testing, the interaction was not significant. The interaction term for nativity and drug behavior was unable to be detected because there were not enough foreign-born blacks who did drugs to, therefore the cell size was too small, which caused the interaction term to be omitted.

The bivariate analysis demonstrated that the first hypothesis which stated that, U.S.-born blacks will have higher HIV/AIDS testing rates than foreign-born blacks was not statistically significant (p-value: 0.218), I failed to reject the null hypothesis. The second hypothesis stated that sexual behavior and drug behavior will moderate the relationship between nativity and HIV/AIDS testing. The bivariate analysis demonstrated that sexual behavior as a moderator between the relationship between nativity and HIV/AIDS testing is not statistically significant (p-value: 0.955), therefore I failed to reject the null. I was unable to determine if drug behavior will moderate the relationship between nativity and HIV/AIDS, because there were not enough foreign-born blacks that did drugs to test the hypothesis.
Discussion

This study examined the difference in HIV/AIDS testing rates among U.S.-born and foreign-born blacks and examined if sexual behavior and drug behavior moderate the relationship between HIV/AIDS testing and nativity. This study also worked to fill the current gap in research pertaining to HIV/AIDS testing in the U.S. black population by examining the relationship between nativity and HIV/AIDS testing rates.

The results of this study demonstrated that HIV/AIDS risk and testing profiles, such as age, income, education, marital status, and condom usage differ among U.S.-born and foreign-born blacks. In addition, the results of the study showed that HIV/AIDS testing differ among U.S.-born and foreign-born blacks. The first hypothesis of this study, which states that U.S.-born blacks will have higher HIV/AIDS testing rates than foreign-born blacks was not supported by the results, although close in numbers (Foreign-born: 52.2% vs. U.S.-born: 45.8%) foreign-born blacks had higher HIV/AIDS testing rates than U.S.-born blacks, however, this was not statistically significant. Although, not statistically significant, similar results were found by Ojikutu et al., 2013.

The regression analysis demonstrated that male respondents who are U.S.-born and foreign-born, U.S.-born and foreign-born black respondents who do not inject drugs, who do not have chlamydia, who are not between the ages of 26-32 and 33-39, and who have had some high school education are less likely to be tested for HIV/AIDS. In addition, U.S.-born and foreign-born blacks that have had some high school education are less likely to get tested of HIV/AIDS. The second hypothesis of this study, which stated that sexual behavior and drug behavior, will moderate the relationship between nativity and HIV/AIDS testing. The data did not support this hypothesis.
Limitations

Current literature has stated that stigma has an effect on HIV/AIDS testing. NHANES does not provide any measurements for stigma. This is a limitation of the study because the data inhibits the measuring of how stigma may vary in these communities and how they affect HIV/AIDS testing rates between these two groups.

Due to missing information the variables: number of male sexual partners, number of female sexual partners, male sexual orientation, female sexual orientation, and language were unable to be added to the regression analysis. This prohibited the ability to examine if the number of male and female sexual partners, sexual orientation, and language have an effect on HIV/AIDS testing for U.S.-born and foreign-born blacks.

Policy implications and future research

Strategies to increase HIV/AIDS testing among U.S. black populations should consider the different populations that make up the U.S. black population. Therefore, it is important that physicians, policy makers, and health educators understand that all blacks in the United States are not the same. U.S.-born and foreign-born blacks have different health profiles, specifically concerning HIV/AIDS risk and testing. As the results of this study have shown: U.S.-born and foreign-born black males, U.S.-born and foreign-born blacks who do not inject drugs, U.S.-born and foreign-born black who do not have chlamydia, U.S.-born and foreign-born black who are not between the ages of 26-32 and 33-39, and U.S.-born and foreign-born black who are have had some high school education are less likely to be tested for HIV/AIDS. Therefore, future HIV/AIDS policies should consider these characteristics for testing. Also, physicians and community health workers should recommend HIV/AIDS testing more frequently to U.S.-born
and foreign-born blacks, with these characteristics. Although stigma was not examined in this study, it is important to recognize the impact of stigma on the decision of HIV/AIDS testing.

This study found that male U.S.-born and foreign-born blacks are less likely to be tested for HIV/AIDS. Future research should examine the motives of HIV/AIDS testing among male U.S.-born and foreign-born blacks.
Appendix

STATA Code

Sample refinement

** set sampling weights for sample**
svyset [w= wtmec2yr], psu( sdmvpsu) strata(sdmvstra)

/* generate agetwo = .
replace agetwo= . if (ridageyr>=0) & (ridageyr<=17) & !missing(ridageyr)
replace agetwo= 2 if (ridageyr>=18) & (ridageyr<=25) & !missing(ridageyr)
replace agetwo= 3 if (ridageyr>=26) & (ridageyr<=32) & !missing(ridageyr)
replace agetwo= 4 if (ridageyr>=33) & (ridageyr<=39) & !missing(ridageyr)
replace agetwo= 5 if (ridageyr>=40) & (ridageyr<=49) & !missing(ridageyr)
replace agetwo= 6 if (ridageyr>=50) & (ridageyr<=85) & !missing(ridageyr)
labeled var agetwo "aget"
labeled define agetlabel 1 "0-17" 2 "18-25" 3 "26-32" 4 "33-39" 5 "40-49" 6 "50+
label values agetwo agetlabel
tabulate agetwo */

gen age = ridageyr

***************
*REFINE SAMPLE*
***************
drop if agetwo==.
Recoding of variables
*/ generate a new variable for sexual behavior (sex without a condom)*/

generate sexcon= .
replace sexcon = 0 if (sxq251==1) & !missing(sxq251)
replace sexcon = 0 if (sxq250==0) & !missing(sxq250)
replace sexcon = 1 if (sxq251>=2) & (sxq251<=5) & !missing(sxq251)
replace sexcon = 1 if (sxq250>=1) & (sxq250<=40) & !missing(sxq250)
replace sexcon = . if (sxq250>=77777) & (sxq250<=99999) & !missing(sxq250)
replace sexcon = . if (sxq251>=77) & (sxq251<=99) & !missing(sxq251)
lab var sexcon "sexwithoutcondom"
label define sexwithoutcondomlabel 0 " 0 No" 1 " 1 Yes"
label values sexcon sexwithoutcondomlabel
tabulate sexcon

*/ New variable for hiv/aids testing */
generate hivt= .
replace hivt = 0 if (hsq590==2) & !missing(hsq590)
replace hivt = 1 if (hsq590==1) & !missing(hsq590)
replace hivt = . if (hsq590==9) & !missing(hsq590)
label var hivt "hivtest"
label define hivtestlabel 0 "0 no" 1 "1 yes"
label values hivt hivtestlabel
tabulate hivt

*/ nativity among blacks/*
generate nativst=.
replace nativst = 0 if (dmdborn==1) & (ridreth1==4)
replace nativst= 0 if (dmdborn2==1) & (ridreth1==4)
replace nativst= 0 if (dmdborn4==1) & (ridreth1==4)
replace nativst= 1 if (dmdborn>=2) & (dmdborn<=3) & (ridreth1==4)
replace nativst= 1 if (dmdborn2>=2) & (dmdborn2<=5) & (ridreth1==4)
replace nativst= 1 if (dmdborn4==2) & (ridreth1==4)
replace nativst = . if (dmdborn==7) & (dmdborn2==7) & (dmdborn4==7)
label var nativst "immigrantstatus"
label define immigrantstatuslabel 0 " 0 U.S. born black" 1 " 1 foreign born black"
label values nativst immigrantstatuslabel
tabulate nativst

*/new variable for drug behavior/*
generate drug = .
replace drug = 0 if (duq120==2) & !missing(duq120)
replace drug = 0 if (duq370==2) & !missing(duq370)
replace drug = 1 if (duq120==1) & !missing(duq120)
replace drug = 1 if (duq370==1) & !missing(duq370)
replace drug = . if (duq120>=7) & (duq120<=9) & !missing(duq120)
replace drug = . if (duq370>=7) & (duq370<=9) & !missing(duq370)
label var drug "injectdrugs"
label define injectlabel 0 "no" 1 "yes"
label values drug injectlabel
tabulate drug
*/gender blacks/*
generate genb=. 
replace genb= 1 if (riagendr==1) & (ridreth1==4) 
replace genb= 2 if (riagendr==2) & (ridreth1==4) 
label var genb "genderblacks"
lable define genderblackslabel 1 "1 male" 2 "2 female"
lable values genb genderblackslabel
tabulate genb

*/# of sexual partners male for females pt. 2/*
generate sexpmm=. 
replace sexpmm= 1 if (sxd450==0)& !missing(sxd450) 
replace sexpmm= 1 if (sxq120==0) & !missing(sxq120) 
replace sexpmm= 1 if (sxq450==0) & !missing(sxq450) 
replace sexpmm= 2 if (sxd450>=1) & (sxd450<=10)& !missing(sxd450) 
replace sexpmm= 2 if (sxq120>=1) & (sxq120<=10)& !missing(sxq120) 
replace sexpmm= 2 if (sxq450>=1) & (sxq450<=10)& !missing(sxq450) 
replace sexpmm= 3 if (sxd450>=11) & (sxd450<=100)& !missing(sxd450) 
replace sexpmm= 3 if (sxq120>=11) & (sxq120<=130)& !missing(sxq120) 
replace sexpmm= 3 if (sxq450>=12) & (sxq450<=700)& !missing(sxq450)

/*replace sexpmm= . if (sxd450==77777) & !missing(sxd450) 
replace sexpmm= . if (sxq120==99999)& !missing(sxq120) 
replace sexpmm= . if (sxd510>=77777) & (sxq450<=99999)& !missing(sxq450)*/

label var sexpmm "sexual partners mmale"
lable define sexualpartnersmmalelabel 1 "1 0" 2 "2 1-10 " 3 " 3 10+"
lable values sexpmm sexualpartnersmmalelabel
tabulate sexpmm

/# of sexual partners female for males pt.2/*
generate sexpfmm=. 
replace sexpfmm= 1 if (sxq510==0) & !missing(sxq510) 
replace sexpfmm= 1 if (sxq190==0) & !missing(sxq190) 
replace sexpfmm= 1 if (sxq510==0) & !missing(sxq510) 
replace sexpfmm= 2 if (sxq510>=1) & (sxq510<=10)& !missing(sxq510) 
replace sexpfmm= 2 if (sxq190>=1) & (sxq190<=10)& !missing(sxq190) 
replace sexpfmm= 2 if (sxq510>=1) & (sxq510<=10)& !missing(sxq510) 
replace sexpfmm= 3 if (sxq510>=11) & (sxq510<=1000)& !missing(sxq510) 
replace sexpfmm= 3 if (sxq190>=11) & (sxq190<=130)& !missing(sxq190) 
replace sexpfmm= 3 if (sxq510>=11) & (sxq510<=1000)& !missing(sxq510)
/*replace sexpfmm=. if (sxq510>=77777) & (sxq510<=99999) & !missing(sxq510)
replace sexpfmm=. if (sxq190>=77777) & (sxq190<=99999) & !missing(sxq190)
replace sexpfmm=. if (sxd510>=77777) & (sxd510<=99999) & !missing(sxd510)*/
label var sexpfmm "sexual partners female"
label define sexualpartnerssfemalelabel 1 " 1 0" "2 1-10" 3 "3 10+
label values sexpfmm sexualpartnerssfemalelabel
tabulate sexpfmm

Education 2
generate eduu=.
replace eduu= 1 if (dmdeduc2==1) & !missing(dmdeduc2)
replace eduu= 1 if (dmdeduc3==66) & !missing(dmdeduc3)
replace eduu= 2 if (dmdeduc2==2) & !missing(dmdeduc2)
replace eduu= 2 if (dmdeduc3>=9) & (dmdeduc3<=12) & !missing(dmdeduc3)
replace eduu= 3 if (dmdeduc2>=3) & (dmdeduc2<=4) & !missing(dmdeduc2)
replace eduu= 3 if (dmdeduc3>=13) & (dmdeduc3<=15) & !missing(dmdeduc3)
replace eduu= 4 if (dmdeduc2==5) & !missing(dmdeduc2)
replace eduu=. if (dmdeduc2>7) & (dmdeduc2<=9) & !missing(dmdeduc2)
replace eduu=. if (dmdeduc3>77) & (dmdeduc3<=99) & !missing(dmdeduc3)
label var eduu "education"
label define educationnnlabel 1 "1 less than 9th grade" 2 "2 some High School" 3 "3 High school grad/some college" 4 "4 College grad/ grad school"
label values eduu educationnnlabel
tabulate eduu

*/told by doctor you have Gonorrhea/*
generate gonerr=. 
replace gonerr= 0 if (sxq270==2) & !missing(sxq270)
replace gonerr= 1 if (sxq270==1) & !missing(sxq270)
replace gonerr=. if (sxq270>=7) & (sxq270<=9) & !missing(sxq270)
label var gonerr "Gonorrhea"
label define gonerrehealabel 0 "0 no" 1 "1 yes"
label values gonerr gonerrehealabel
tabulate gonerr . "drop"
*/told by doctor you have Chlamydia/*

generate chlmy=. 
replace chlmy= 0 if (sxq272==2) & !missing(sxq272)
replace chlmy= 1 if (sxq272==1) & !missing(sxq272)
replace chlmy=. if (sxq272>=7) & (sxq272<=9) & !missing(sxq272)
label var chlmy "Chlamydia"
label define chlmydialabel 0 "0 no" 1 "1 yes"
label values chlmy chlmydialabel
tabulate chlmy

*/ Marital Status/*
generate marristat=.
replace marristat= 1 if (dmdmartl==1) & !missing(dmdmartl)
replace marristat = 2 if(dmdmartl==2) & !missing(dmdmartl)
replace marristat= 3  if (dmdmartl>=3) & (dmdmartl<=4)& !missing(dmdmartl)
replace marristat=  4  if (dmdmartl>=5) & (dmdmartl<=6)& !missing(dmdmartl)
replace marristat= . if (dmdmartl>=77) & (dmdmartl<=99)& !missing(dmdmartl)
label var marristat "marriage"
label define marriagelabel 1" 1 married" 2"2 widowed" 3" 3 Divorced/seperated" 4" 4 never married/living with partner"
label values marristat marriagelabel
tabulate marristat

*/sexual orientation of Males/*
generate somale= .
replace somale= 1 if (sxq292==1) & !missing(sxq292)
replace somale= 2 if (sxq292==2) & !missing(sxq292)
replace somale= 3 if (sxq292>=3) & (sxq292<=4)&!missing(sxq292)
replace somale= . if (sxq292>=5) & (sxq292<=9) & !missing(sxq292)
label var somale "sexual orientation of males"
label define sexualorientationofmaleslabel 1 "1 hetrosexual" 2 "2 homosexual" 3 "3 other"
label values somale sexualorientationofmaleslabel
tabulate somale

*/sexual orientation of females/*
generate sofemale= .
replace sofemale= 1 if (sxq294==1) & !missing(sxq294)
replace sofemale= 2 if (sxq294==2) & !missing(sxq294)
replace sofemale= 3 if (sxq294>=3) & (sxq294<=4) &!missing(sxq294)
replace sofemale= . if (sxq294>=5) & (sxq294<=9) & !missing(sxq294)
label var sofemale "sexual orientation of females"
label define sexualorientationoffemaleslabel 1 "1 hetrosexual" 2 "2 homosexual" 3 "3 Other"
label values sofemale sexualorientationoffemaleslabel
tabulate sofemale

OTHER= bisexual AND somethig else"

/*/income*/
generate income=. 
replace income=1 if (indfmpir>=0) & (indfmpir<=.09) & !missing(indfmpir)
replace income=2 if (indfmpir>=1.0) & (indfmpir<= 2.0) & !missing(indfmpir)
replace income=3 if (indfmpir>=2.0) & (indfmpir<=3.0) & !missing(indfmpir)

41
replace income=4 if (indfmpir>=3.0) & (indfmpir<=4.0) & !missing(indfmpir)
replace income=5 if (indfmpir>=4.0) & (indfmpir<=5) &!missing(indfmpir)
replace income=6 if (indfmpir>=5.0) & (indfmpir<=6) &!missing(indfmpir)
label var income "income1"
label define income Familypovertyincomeratiolabel 1"1 < 1.0" 2"2 1.0-1.9"3"3 2.0-2.9"4" 4 3.0-3.9"5"5 4.0- 4.9"6 "5.0"
label values income Familypovertyincomeratiolabel
tabulate income

/*language*/

gen lang = .
replace lang = 1 if (acd011a==1) | (acd010a==1) & !missing(acd011a) & !missing(acd010a)
replace lang = 0 if (acd011b==8) | (acd010b==8) | (acd011c==9) | (acd010c==9) & !missing(acd011a) & !missing(acd010a)
tab lang

**Logistic regression**
***INTERACTION TERMS***

gen natinter1 = nativst * sexcon

gen natinter2 = nativst * drug

tab natinter1
tab natinter2

logistic hivt i.nativst i.sexcon i.drug i.female i.chlmy i.gonerr i.income i.marristat i.agetwo i.eduu

logistic hivt i.nativst

logistic hivt i.natinter1
logistic hivt i.natinter2
References


Organization website: http://www.who.int/hiv/en/